



Discovery Report

Carson River Watershed, Watershed HUC 16050201, 16050202, 16050203

Alpine County, California

Douglas County, Nevada

Carson City, Nevada

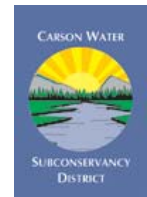
Churchill County, Nevada

Lyon County, Nevada

Storey County, Nevada

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R|O|Anderson



Carson River Watershed Discovery Report

December 14, 2012

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I. General Information

Within the Federal Emergency Management Agency’s (FEMA) Risk Mapping, Assessment, and Planning (Risk MAP) Program, the Discovery process is intended to initiate watershed-wide discussions about increasing resilience to flooding. FEMA partners with local and regional officials during Discovery to gather and validate available flood data, as well as to discuss flood history, catalog areas at risk for flood loss, examine development plans, review the adequacy of existing hazard data, assess mapping needs, and discuss community activities that relate to flood risk and solutions for reducing flood risk. The goal of Discovery is to determine which areas within a watershed require mapping, risk assessment, or mitigation planning assistance.

Because flood hazards change over time, the Discovery process provides an opportunity to review comprehensively the components and activities that contribute to flood risk. Local participation in Discovery will increase flood risk understanding and help identify proactive steps to protect communities from flood-related loss of life and property damage. Through Risk MAP, FEMA can provide information to improve risk communication and enhance local mitigation plans, resulting in decreased flood risk.

As part of the Discovery process, FEMA holds a Discovery Meeting to review the flood risk data that were collected, discuss the community’s flooding history, development plan, flood risk concerns, stormwater and Special Flood Hazard Area (SFHA) management activities, and other daily operations that affect flood risk.

This report, along with the Discovery Maps, is intended to summarize the information gathered as part of the Discovery process for the Carson River Watershed (HUC 16050201, 16050202, and 16050203).

The Carson River watershed comprises approximately 3,965 square miles and includes portions of six counties and two states. These geographic units of the Carson River watershed are Alpine County, California, and Douglas, Lyon, Storey, Carson City, and Churchill Counties in Nevada. A small unpopulated portion of Pershing County is also located within the watershed, however this area has no direct tributaries to the Carson River and is not typically included for planning purposes.

Approximately 606 square miles of the watershed are located in Alpine County, California. This portion of the upper watershed is delineated into four sub-watersheds as follows:

1. Wolf Creek
2. East Fork Carson River
3. Markleeville Creek
4. West Fork Carson River

Major valleys within these sub-watersheds include Charity Valley, Pleasant Valley, Hope Valley, Diamond Valley, Wolf Creek Meadow, and Faith Valley.

Approximately 3,359 square miles of the watershed is located in Nevada. There are five hydrographic areas in the Nevada portion of the watershed:

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)

Geographic regions and subwatersheds are listed below and included on the Discovery Maps.

The U.S. Geological Survey defines the Carson River as three separate hydrologic units code (HUC) as follows:

- 16050201 Upper Carson
- 16050202 Middle Carson
- 16050203 Lower Carson

II. Watershed Stakeholder Coordination

Outreach to community officials and stakeholders was conducted as part of the Discovery process. In addition to the six counties within the Carson River Watershed, seven additional stakeholders were identified. These stakeholders are organizations in the form 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 the Appendix A to this document.

Communities and the identified stakeholders were contacted initially in March of 2012 to apprise appropriate individuals of the upcoming Discovery meetings. A Carson River Risk Mapping, Assessment, and Planning (MAP) Charter Discovery Group Meeting was held at the Carson Water Subconservancy's District Conference Room in Carson City on March 21, 2012 to provide background on the Discovery process. The group discussed watershed flood issues, identified gaps in data, and reviewed the current five-year mapping master plan during the meeting.

On May 8, 2012, the communities and stakeholders were sent a memorandum that identified the data to be collected. As responses were received, follow up telephone calls were made to clarify information or request missing data. Discussed during these conversations were mitigation plans, areas of flooding concern, and the availability of GIS data. On July 5, 2012, a subsequent request for information and data was forwarded to those communities that did not respond to the first request. During the month of July, follow up telephone calls were made to community officials. The draft Discovery Report and Discovery Maps were distributed to stakeholders on August 17, 2012 for review and comment in preparation of the Discovery meeting. Following the Discovery Meeting, stakeholders were given a period of time to provide comments for use in the compilation of the final Discovery Report and Maps.

III. Data Analysis

Several communities and stakeholders provided data during the Discovery process. These data were collected in several different formats, including CD’s containing existing reports, paper and digital copies, emails, shapefile data, and hyperlinked locations to local and statewide data.

The data were recorded and reviewed to determine usefulness. A list of the data collected prior to the Discovery meeting, the deliverable or product in which the data are presented, and the source of the data is shown in Table 1.

This Data Analysis section is further divided into two subsections: the first subsection includes a list of data that can be used for Risk MAP products (regulatory and non-regulatory). The second subsection contains a listing of other data and information used by the project team to form a holistic understanding of Carson River Watershed.

Table 1: Data Collection for Carson River Watershed

Data Types	Deliverable/Product	Source
Community Assistance Visits	Community Fact Sheet	Nevada Division of Water Resource, Local Agencies
Community Rating System	Community Fact Sheet	FEMA’s “Community Rating System Communities and Their Classes”
Demographics, Industry	Community Fact Sheet	US Census Bureau, QuickFacts and American FactFinder
Insurance Policies	Community Fact Sheet	FEMA Regional Office
Mitigation Plans Status	Community Fact Sheet	Nevada Department of Emergency Management, California Emergency Management Agency, Local Agencies
Mitigation Projects	Community Fact Sheet	Data.gov: FEMA Hazard Mitigation Program Summary
Repetitive Loss	Community Fact Sheet	Nevada Division of Water Resources, Local Agencies
Claims	Community Fact Sheet	Nevada Division of Water Resources, Local Agencies
Letter of Map Change (LOMCs)	Community Fact Sheet	FEMA, FIS
Declared Disasters	Community Fact Sheet	Nevada Division of Emergency Management
Hazards	Community Fact Sheet	Local Hazard Mitigation Plans, FEMA, Nevada Division of Water Resources, Nevada Division of Emergency

		Management
GIS Boundaries: Community, City, Town	Discovery Map Geodatabase	Douglas County GIS ¹ , Alpine County GIS, Churchill County GIS
Boundaries: County and State	Discovery Map Geodatabase	www.census.gov
Boundaries: Watersheds	Discovery Map Geodatabase	Nevada Division of Environmental Protection
Effective Flood Zones: Modernized SFHAs	Discovery Map Geodatabase	Douglas County GIS, Alpine County GIS, FEMA
Future or recent highway improvement, bridge, culvert, levee locations	Discovery Map Geodatabase	Douglas County GIS, Alpine County GIS, Churchill County GIS, FIS Levee Locations
Hydrography: California & Nevada	Discovery Map Geodatabase	Douglas County GIS, Alpine County GIS
Mitigation Projects: Recent, ongoing, planned, desired FEMA/OFA/local projects	Discovery Map Geodatabase	Developed based on community provided information, Local Hazard Mitigation Plans
Recently developed or planned high growth areas	Discovery Map Geodatabase	Douglas County GIS, Alpine County GIS, Churchill County GIS
Stream Gages	Discovery Map Geodatabase	US Geologic Survey
Study Needs: FEMA	Discovery Map Geodatabase	Developed based on community provided information
Study Needs: Recent, ongoing, planned, desired FEMA/OFA/local studies	Discovery Map Geodatabase	Developed based on community provided information
Topographic Availability	Discovery Map Geodatabase	LiDAR from Carson Water Subconservancy (2004), FEMA (2003), Churchill County (2011); Carson Valley (2012)
Transportation: Roads & Railroads	Discovery Map Geodatabase	Douglas County GIS, Alpine County GIS, Churchill County GIS

¹ Douglas County GIS provides geographic information system services for Carson City, Douglas County and Lyon County.

i. Data for Subsequent Flood Risk Products

1. Topographic Data

LiDAR acquisition for the Douglas County, Nevada, FEMA restudy (finally published in 2008) was performed by EarthData Aviation at the request of Horizons Inc. in a Navajo Chieftain aircraft (tail number N62912) equipped with an LH System ALS40 LiDAR system including an inertial measuring unit (IMU) and a dual frequency GPS receiver. Acquisition was accomplished on October 23rd and 24th, 2003. These data were post-processed to provide topographic mapping and are described in TSDN dated 2005. The existence of this dataset was not generally known by engineers working in Carson Valley. Instead, most flood hydraulic studies relied on data produced during 2004, as described below.

In 2004, a LiDAR topographic survey of the Carson River corridor, including Alpine County, Douglas County, Carson City, and Lyon County, was produced for Carson Water Subconservancy District (and others) by BAE Systems/Woolpert. The purpose of that survey was to develop topographic information for river restoration projects to be developed along the Carson River. Because the LiDAR dataset was not originally intended for floodplain analysis and delineation, the required QA/QC to comply with FEMA guidelines was not part of the original work. Therefore, in 2010, the LiDAR dataset was reviewed and field data collected to validate the topographic dataset according to FEMA guidelines for topographic data to be used for floodplain analyses².

Given the age of the 2004 LiDAR dataset, CWSD personnel, in cooperation with other stakeholders, decided that a new LiDAR topographic dataset is appropriate for Carson Valley floodplain mapping (and other uses). Planning and funding of the proposed LiDAR project was funded by NDEP and CWSD. The LiDAR data were gathered in late September 2012.

Churchill County commissioned a LiDAR topographic survey of the reach of Carson River downstream from Lahontan Dam to Fallon, Nevada. The purpose for these data is use in flood risk assessment and evaluation of the levee and canal systems. Churchill County Engineering and the U.S. Army Corps of Engineers are currently conducting analyses for Churchill County using the LiDAR information.

² Thompson, D. B. and M. Bernard (2009). Validation of the 2004 BAE Systems LiDAR topography dataset for the Carson Valley portion of the dataset. Engineer's report, R.O. Anderson Engineering, P.O. Box 2229, Minden, NV 89423.

Thompson, D. B. and M. Bernard (2010). Validation of the 2004 BAE Systems LiDAR topography dataset for the Dayton Valley portion of the dataset. Engineer's report, R.O. Anderson Engineering, P.O. Box 2229, Minden, NV 89423.

ii. Other Data and Information

1. Mitigation Plans/Status, Mitigation Projects

Mitigation plans in Nevada are prepared by the counties for all the incorporated and unincorporated communities, and special districts within the county. Mitigation plans in California can be prepared individually by the counties, cities, and other special districts, or jointly as a regional plan. Hazard mitigation plans were obtained for five of the six counties. The status of each county's plan is as follows:

- Alpine County's hazard mitigation plan lapsed as of 2010.
- Carson City's plan is current with the next update due in April of 2016.
- Churchill County recently submitted their plan to FEMA for review.
- Douglas County's plan is current with the next update due in March of 2013.
- Lyon County is currently in the process of developing their hazard mitigation plan.
- Storey County's plan is current with the next update due in December of 2014.

Although invited to participate by each of the participating jurisdictions, involvement of members of the general public was relatively limited. A review of mitigation goals for each community revealed that while many of the plans noted the need to pursue flood mitigation projects, such as installing new flood facilities or updating storm drainage systems, only the Carson City and Alpine County plans identified specific mitigation projects and their locations.

2. National Flood Insurance Program Mapping Study Needs

i. Mapping Changes

Comparing the Letter of Map Change (LOMC) list from FEMA to the LOMC table in the effective Flood Insurance Study (FIS) identifies two completed Letters of Map Revision (LOMR) in Douglas County that have not been incorporated into the effective study. The first is along the Cottonwood Slough (12-09-1034P), and the second affects the Park Ditch and Pine Nut Creek (12-09-1513P).

FEMA is currently working on the Walker River Preliminary Map Revision (PMR), a new riverine engineering analysis along the Walker River for 14.5 miles of detailed study on 14 panels in Lyon County. The analysis will include modeling of sedimentation and dredging scenarios and the creation of depth grids.

ii. Coordinated Needs Management Strategy

The Coordinated Needs Management Strategy (CNMS) is an initiative to update the way FEMA organizes, stores, and analyses 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 FIRMs has been validated through detailed assessment. The second is by showing which previously studied or unstudied floodplains inadequately represent flood hazards. In this way, CNMS leads to the improvement of flood hazard data. Currently, the Carson River Watershed has no requests identified in CNMS.

3. Socio-Economic Analysis

The US Census 2010 Quick Facts and the 2006–2010 American Community Survey were used for this research. Community Fact Sheets for each county are provided in the Appendix B. Populations within the watershed boundary exhibit substantial variations in reported demographics. For example, the rural communities such as Alpine County and Storey County contain only 1,102 and 3,896 people, respectively, in contrast to larger rural communities, such as Carson City with a population of about 55,300 people. The median age of individuals living in the watershed ranges from 39.0 to 47.0, with the majority of the counties having more than 15% of the population over 65 years old. The population of Carson River Watershed is made up primarily of Caucasians (over 75% in all the counties), American Indians (ranging from 1.8% to 21.8%), and persons of Hispanic or Latino origin (ranging from 6% to 21.3%). Median household income in the watershed ranges from a low of \$48,433 to a high of \$63,478 annually. Residents across the watershed worked primarily in the following industries:

- Educational services, and health care and social assistance,
- Arts, entertainment, recreation, accommodation and food services, and
- Retail trade and manufacturing.

Table 2: Socio-Economic Analysis

County	Population	Median Age	Median Household Income	Top Industry
Alpine County	1,102	40.9	\$63,478	Educational services, and health care and social assistance
Carson City	55,274	41.1	\$52,067	Educational services, and health care and social assistance
Churchill County	24,637	39.0	\$51,597	Arts, entertainment, and recreation, and accommodation and food services
Douglas County	46,997	47.0	\$60,721	Educational services, and health care and social assistance
Lyon County	51,871	39.9	\$48,433	Retail trade
Storey County	3,896	46.4	\$61,525	Manufacturing

4. Community Rating System

The Community Rating System (CRS) is a voluntary program created under the NFIP to reduce flood damages to insurable property, strengthen and support the insurance aspects of the NFIP, and encourage a comprehensive approach to SFHA management. Currently, only Carson City, Douglas County, and Storey County participate in the CRS program. Both Carson City and Douglas County provide educational materials regarding flood risks to their citizens.

5. Flood Control Structures

i. Levees

There are no levees identified in the USACE National Levee Database (NLD). However, there are several levees identified on FEMA’s FIRM panels as listed below:

Table 3: Levees Identified on FEMA FIRM Panels

Community	Flood Source	FIRM Panel
Carson City	Combs Canyon Creek	32001C0083E
Carson City	Eagle Valley Creek/ Combs Canyon Creek	32001C0084E 32001C0092E
Carson City	H Tributary	32001C0092E 32001C0094E
Carson City	Kings Canyon Creek	32001C0111E 32001C0112E
Lyon County	Unnamed Wash at Silver Springs	32019C0211E 32019C0213E
Lyon County	Unnamed Wash at Silver Springs	32019C0214E 32019C0212E
Lyon County	Carson River	32019C0289E
Lyon County	Carson River	32019C0452E
Lyon County	Undetermined	32019C0452E

ii. Dams

Lahontan Dam and Reservoir was constructed by the Bureau of Reclamation in 1911-1915 as part of the Newlands Project to divert and store water from the Truckee River and Carson River basins to provide irrigation to lands near Fallon. It is located in Churchill County and is owned by the Bureau of Reclamation and operated by the Truckee-Carson Irrigation District. The dam also produces hydroelectric power. The total storage capacity of the Lahontan Reservoir is approximately 313,000 acre-feet to the top of the 20-inch high wooden flashboards on the spillways. The dam has a spillway elevation of 4,162.0 feet and a top of flashboard elevation of 4,163.67 (Lahontan Dam datum). The outlet works have a maximum discharge capacity of approximately 2250 cfs at a reservoir pool elevation of 4,162. The two spillways are uncontrolled and have a combined maximum capacity of approximately 66,000 cfs at a reservoir pool elevation near the crest of the dam (elevation 4174). The dam has a structural height of 162 feet and a crest length of 1,325 feet.

In Carson City there are two dams identified for flood control purposes. The Eagle Valley Golf Course Dam was constructed in 1984 and is located in northeast Carson City on the west course of the Eagle Valley Golf Course. The dam, which is owned and maintained by Carson City, is classified as a Medium size dam with a significant hazard rating by the Division of Water Resources. The dam is an earthen dam with up to 53 acre-feet of storage capacity. The

crest elevation of the dam is at 4,771 feet and the top width of the dam is approximately 15 feet.

The Shenandoah Detention Basin was constructed in 1999 and is located in Carson City on the east side of U.S. Highway 395 just north of Bonanza Drive. The reservoir is owned and operated by Carson City. The dam is an earthen dam with approximately 34 acre-feet of storage capacity.

Additionally, several small reservoirs exist in Alpine County; however, they are of insignificant capacity.

6. SFHA Management/Community Assistance Visits

Data collected from the Nevada Division of Water Resources, indicates that the most recent Community Assistance Visit (CAV) occurred on the following dates:

- *Alpine County* *No CAV performed*
- *Carson City* *July 21, 2011*
- *Churchill County* *September 28, 2011*
- *City of Fallon* *October 04, 2011*
- *Douglas County* *February 23, 2012*
- *Lyon County* *October 20, 2009*
- *City of Fernley* *October 29, 2009*
- *City of Yerington* *September 02, 2009*
- *Storey County* *September 06, 2007*

A CAV is a visit to the community by FEMA personnel or staff of a State agency on behalf of FEMA to provide technical assistance to the community and assure that the community is enforcing adequately its SFHA management regulations. Douglas County was the only jurisdiction among the stakeholders from which we received a copy of the CAV Report. No issues were identified during the CAV process and Douglas County was commended for doing an excellent job of administering its floodplain building requirements.

7. Regulatory Mapping

The most recent FIRM updates for the communities in the Carson River Watershed became effective as follows:

- *Carson City* *Revised Preliminary November 28, 2011*
This revision included new detailed flood hazard information for Vicee Canyon Creek, Ash Canyon Creek, Kings Canyon Creek, and Kings Split in Carson City, Nevada.
- *Churchill County* *September 26, 2008*
HDR Engineering Inc. was contracted by FEMA to complete a countywide DFIRM and FIS for Churchill County. This became effective on September 26, 2008. The

DFIRM process included digitizing floodplain boundaries from the effective paper FIRMs and fitting them to a digital database (DFIRM).

- *Douglas County* *January 20, 2010*

During this revision, floodways were developed or revised for the confined reaches of Bobwhite Wash, Buckeye Creek, Calle Hermosa Wash, Calle de Asco Wash, and Juniper Road Wash. Alluvial fan floodplains were amended or/or extended for Buckbrush Wash, Sunrise Pass Wash, Johnson Lane Wash, Airport Wash, and Buckeye Creek.

- *Lyon County* *January 16, 2009*

This revision incorporated the approximate analyses of “behind levee” flooding to indicate the extent of the “behind levee” floodplain.

- *Storey County* *January 16, 2009*

This revision incorporated the approximate analyses of “behind levee” flooding to indicate the extent of the “behind levee” floodplain.

- *Alpine County* *No FIS; the entire County is currently mapped by FEMA as Zone D.*

8. Watershed Projects

i. Ongoing Projects

Carson City Freeway Project — Carson City is working with FEMA on mapping revisions associated with the new U.S. Highway 395 freeway and associated improvements. To date, more than half of the improvements are complete. When the freeway is complete, there will be changes to the timing and flowrate of floodwaters that reach the Carson River.

Churchill County LiDAR and Canal System Projects — Because of the Fernley canal breach, embankments associated with the extensive canal system in Churchill County are being reviewed by the Churchill County Engineer. Churchill County commissioned collection of a LiDAR topographic dataset of the valleys throughout the Fallon area. The U.S. Army Corps of Engineers (USACE) is currently modeling portions of Churchill County using the LiDAR dataset. Some of the structures are 80–90-years old, therefore the risk presented by the failure of these structures should be evaluated. In anticipation of another relatively wet year, the Lahontan Conservation District (LCD) performed debris removal from the Carson River in their district to improve channel capacity. Significant amounts of sediment near bridge crossings and other locations where flows are obstructed have been sources of flooding issues. Most of the bridges are located near commercial and residential areas, which are the highest risk areas. In 2011, Churchill County received a USACE grant to support sediment removal, which is currently in progress. Although Lahontan Dam is a significant structure, the principal concern is not dam failure, but insufficient channel capacity downstream from the structure if/when capacity of the reservoir is exceeded. Churchill County Engineering Department is examining alternatives for controlled release and diversion areas in the event of extreme flooding. When results from the USACE hydraulic modeling (based on the LiDAR topographic data) is complete, options for addressing river channel and canal capacity will be

evaluated. An example of problems with sediment accumulation is the bridge at Bafford Lane, which is 70% occluded. Furthermore, houses were built in proximity to river channel. Although the USACE hydraulic modeling and LiDAR topographic data are not in strict compliance to FEMA guidelines, the results should be useful for floodplain planning and management tasks. If a canal failure similar to the Fernley breach occurs, the damage and cost could be great because commercial and residential buildings are in risk areas which were not previously developed. The goal is completion of the project before January 31, 2013.

US Bureau of Reclamation (USBR) Safety of Dams Project — The USBR Safety of Dams project was scheduled to begin in April 2012. Models used to manage Lahontan Dam operations include the Riverware daily model. In 2011, the Riverware daily flow model was used to optimize storage in Lahontan Reservoir. The results were useful in avoiding downstream flooding during a normal snowmelt event. USBR developed a real-time hourly model for projecting flow conditions during a forward five-day scenario, which would assist assessment of short-term flooding conditions.

Carson River Mapping and Modeling Project—Carson Water Subconservancy District (CWSD) is currently working on projects to revise floodplain mapping of the entire Carson River. Additional efforts comprise education of the CWSD board and stakeholders on the fundamentals of the modeling program and changes to the floodplain maps. Additionally, CWSD is involved in working with the Carson River Coalition (CRC) River Corridor working group which is serving as steering committee considering which projects to work on for the Floodplain Management Plan which was adopted by all the counties. It has identified the need to update LiDAR and land use maps for the entire watershed and is a coordinated effort.

R.O. Anderson and HDR personnel continue work on the Carson River mapping project. The flood mapping for FEMA Mapping Activity Statement (MAS) #1 and #2 will be completed in December 2012, which includes only Lyon County and Carson City. Funding has been received for MAS #3 which will encompass modeling of the Carson Valley. The next phase, MAS #4 will include mapping of the Carson Valley. The statistical analysis of records from U.S. Geological Survey (USGS) streamgage records of the Carson River watershed upstream from Lahontan Reservoir is in progress. USGS only has short-time interval hydrographs for a couple of major events; therefore, it would be valuable to also look at historic flood events.

State Route 88 Flood Mitigation Project — Douglas County has prepared a grant for the State Route 88 Flood Mitigation Project to be submitted under FEMA's Unified Hazard Mitigation Assistance Program pending federal funding this year.

Douglas County Community and Senior Center — Douglas County is moving forward with plans to build the new community and senior center in Carson Valley. The Pine Nut Pre-Disaster Mitigation Preliminary Map Revision (PMR) is turning into a Letter of Map Revision (LOMR) to include the Community Center.

Douglas County Martin Slough Path — Carson Valley Inn (CVI) has received approval from Douglas County for their Site Improvement Permit (SIP) #00675-02 for the North Parking

Lot and Bike Trail Improvements. The Bike Trail will follow a path along the Martin Slough which is in an AE and AE (floodway) so the project has obtained an approval from FEMA for a Conditional Letter of Map Revision (CLOMR). SIP 00675-02 was issued on October 9, 2012, with U.S. Army Corps of Engineers' approval, and construction commenced the beginning of November.

National Weather Service Forecasting — The National Weather Service is working on forecasting for floods and prevention of hazards to life and property. There are three forecast points along the Carson River (at Woodfords, near Gardnerville, and at Carson City), but they can put a forecast point at any USGS gage that has a lot of historical data. They may consider forecast points at Dayton, Fort Churchill, and somewhere below Lahontan in the future. The National Weather Service is trying to get flood inundation maps online for public access to be able to approximate areas and depth of water during flooding from minor flooding up to flood of record.

Truckee Carson Irrigation District Canal Maintenance — The Truckee Carson Irrigation District (TCID) has a contract with USBR to do operations and maintenance work on the canals, Lahontan Dam, and the Newlands Project in Fernley and Churchill County. TCID has equipment to perform the work, but no funding for the studies. TCID believes that the outcome of the Charter and Discovery Process will benefit TCID because of concerns with the canal and where water will go in flooding. This is the value of inundation maps and the Environmental Action Plans (EAP) they develop. TCID's contribution is to do the work if the county identifies structures which need to be replaced.

USGS Streamgaging Stations — USGS is responsible for the operation and management gauging stations, taking measurements every six weeks of low, average, and high flow. Prior to 1975, unit value of historical data begins to drop off because the information was collected on strip charts. The USGS is working with FEMA and NOAA to create a system-wide approach for data accumulation.

Flood History Database — The Nevada Division of Water Resources is participating in a pilot project with the US Army Corps of Engineers Silver Jackets to update the flood history database and link to weather forecasting data through ACOE. They are creating website links which could serve Carson River data through the USGS website.

Lyon County Floodplain — Lyon County is working with the Carson Water Subconservancy District (CWSD) to redefine the floodplain in the Dayton Valley area. CWSD has also provided funding for an analysis and feasibility flood study of Ramsey Canyon near Silver Springs. Flows from Ramsey Canyon pass through Silver Springs to Lahontan Reservoir. The modeling and studies are complete for Ramsey Canyon and the County is now working to submit a hydrology only LOMR to FEMA for approval.

Lyon County Hazard Mitigation Plan — Lyon County has contracted with a consultant to develop their local Hazard Mitigation Plan.

Markleeville Creek Floodplain Restoration Project — The Alpine Watershed Group has retained a consultant to complete the final restoration planning and design stages for the Markleeville Creek Floodplain Restoration. This includes community outreach, final restoration design, environmental analysis/documentation and project permitting. The goal of the restoration project is to re-establish the natural form and function of Markleeville Creek through the site of the former United States Forest Service (USFS) Guard Station.

American Rivers Floodplain Restoration in Hope Valley — Alpine Watershed Group (AWG) is leading this project on the West Fork of the Carson River between Hwy 88 and Blue Lakes Rd. on U.S. Forest Service (USFS) property. The project is being sponsored by American Rivers, USFS, AWG, and others. A consultant was hired to look at restoring portions of the river to allow it to reach its floodplain but not re-watering the entire meadow. The design phase will be complete soon. Alpine Watershed Group is seeking funding to complete additional projects and may be moving upstream into Faith and Charity Valleys.

ii. Completed Projects

Carson City Stormwater Mitigation Projects - Carson City completed improvements to alluvial fan stormwater mitigation systems. In 1986, a flood control dam was built in the west side subarea of Golf Course Creek B in order to alleviate damage from floods. In 1999, a flood control basin was built in the F Tributary just south of East Bonanza Drive. In 2002, basins within Silver Oak Golf Course were completed. In 2005, Vicee Retention Basin was completed. In 2007, the Eagle Valley Creek and the Timberline/Combs Canyon basins were completed.

Carson City Emergency Action Procedure – Carson City has prepared an emergency action procedure which shows locations where sandbags should be placed and pre-positioned.

Douglas County FEMA Map Challenge — After four years of contesting the data used by the Federal Emergency Management Agency (FEMA) to develop flood maps for the Carson Valley, it has been determined that the 2010 maps will remain as best available information.

Dayton Valley Bank Stabilization Projects – Dayton Valley Conservation and R.O. Anderson have completed over 30 different river restoration and bank stabilization projects in the past 14 years. A majority of the projects which were implemented were the result of property owners along the Carson River experiencing significant annual erosion of valuable agricultural lands and needing to find viable long-term methods to minimize erosion from annual stream flows.

9. Community Involvement

The CWSD is a unique multi-county, bi-state agency dedicated to establishing a balance between the needs of the communities within the Carson River Watershed and the function of the river system. The thirteen member Board of Directors consists of representatives from each of the five counties within the watershed plus two representatives from the agricultural community. In 2009, Storey County joined CWSD as a non-voting member. Granted no regulatory authority of its own, the CWSD's mission is to work within existing governmental frameworks to promote cooperative action for the watershed that crosses both agency and political boundaries. The CWSD strives to involve all counties and communities within the

watershed in the efforts to preserve the rich history and unique resources of the Carson River Watershed.

CWSD is a Cooperating Technical Partner with FEMA. FEMA has provided funding for flood-related activities on a regional basis. CWSD members have also signed a Risk Map Charter for the Carson River Watershed which will provide for a collaborative effort between local, State and Federal agencies to identify, assess, communicate, and plan for flood risk within the Carson River Watershed. The flood risk information provided can be used to enhance hazard mitigation plans, make informed decisions to improve resilience after flooding, protect beneficial functions of floodplains, and raise awareness about local flood risks.

10. Other Data

i. Floodplain Management Ordinances

All six of the counties within the Carson River Watershed have floodplain management ordinances.

ii. Capital Improvement Plans

Carson City and Douglas County both have Capital Improvement Plans (CIP). Carson City's CIP is currently being updated and includes channel restoration, sediment control, and other drainage improvement projects in the next 5 years. Douglas County's CIP for Fiscal Year 2012-2016 does not include any new storm water control projects.

IV. Discovery Meeting

The first Discovery Meeting was held for the Carson River Watershed on September 13, 2012. Representatives from U.S. Bureau of Reclamation, Nevada Division of Water Resources, Nevada Division of Emergency Management, Nevada Division of Environmental Protection, Carson Water Subconservancy District, Alpine County, Carson City, Douglas County, Churchill County, HDR Inc., R.O. Anderson Engineering, Inc., and FEMA Region IX attended the meeting. Sign in sheets and meeting notes from the meeting are provided in Appendix C.

Representatives from Carson Water Subconservancy District and R.O. Anderson Engineering, Inc. met separately with Lyon County, on October 5, 2012, who was unable to attend the Discovery meeting.

The second Discovery Meeting was held on October 31, 2012. Representatives were present from U.S. Geological Survey, U.S. Army Corps of Engineers, National Weather Service, Nevada Division of Water Resources, Nevada Division of Environmental Protection, Carson Water Subconservancy District, Alpine County, Carson City, Douglas County, Churchill County, Storey County, Truckee Carson Irrigation District, Town of Gardnerville, HDR Inc., R.O. Anderson Engineering, Inc., and FEMA Region IX attended the meeting. Sign in sheets and meeting notes from the meeting are provided in Appendix C.

V. Findings and Options

The Discovery process has identified several priority restudy needs as well as mitigation projects in the Carson River Watershed as listed below in Table 4. If funded and completed, these projects should be used to update the FIS and FIRM for the Carson River Watershed communities. In addition, FEMA's tool for tracking study accuracy, CNMS, should be updated to reflect these needs. A description of each project listed by County is provided in Appendix D. As discussed above, each project was ranked as a high, medium, or low priority by the stakeholders.

VI. References

- Alpine County, *Alpine County Natural Hazard Mitigation Plan*.
- Alpine County Website. Available at <http://www.alpinecountyca.gov/>.
- Carson City Website. Available at <http://www.carson.org/>.
- Carson City, November 2010. *Carson City Hazard Mitigation Plan*.
- Carson City Public Works, January 2009. *Emergency Action Plan for Eagle Valley Golf Course Dam*.
- Carson City Public Works, October 2006. *Emergency Action Plan Shenandoah Detention Basin*.
- Carson Water Subconservancy District, 2008. *Carson River Watershed Regional Floodplain Management Plan*.
- Carson Water Subconservancy District, May 2007. *Carson River Stewardship Plan*.
- Carson Water Subconservancy District Website. Available at www.cwsd.org/.
- Churchill County and City of Fallon, 2012. *Churchill County and City of Fallon Multi-Jurisdictional Hazard Mitigation Plan*.
- Douglas County, Nevada, February 2009. *Douglas County Natural Hazard Disaster Mitigation Plan*.
- Douglas County Website. Available at <http://www.douglascountynv.gov/>.
- Federal Emergency Management Agency, November 2011. *Flood Insurance Study, Carson City, Nevada*.
- Federal Emergency Management Agency, January 2008. *Flood Insurance Study, Churchill County, Nevada*.
- Federal Emergency Management Agency, January 2010. *Flood Insurance Study, Douglas County, Nevada*.
- Federal Emergency Management Agency, January 2009. *Flood Insurance Study, Lyon County, Nevada*.
- Federal Emergency Management Agency, January 2009. *Flood Insurance Study, Storey County, Nevada*.
- Federal Emergency Management Agency. Region IX National Flood Insurance Program. Available at <http://www.r9map.org/>. Accessed on August 8, 2012.
- Lyon County Website. Available at www.lyon-county.org/.
- Storey County, Nevada, January 2010. *Storey County Hazard Mitigation Plan*.
- U.S. Census Bureau. 2010. State & County QuickFacts. Available at <http://quickfacts.census.gov/qfd/index.html>. Accessed on June 7, 2012, July 10, 2012, July 11, 2012, and July 17, 2012.
- U.S. Census Bureau. 2000. American FactFinder, Available at <http://factfinder2.census.gov>. Accessed on June 7, 2012, July 10, 2012, July 11, 2012, and July 17, 2012.

VII. **Appendix and Tables**

Appendix A — Stakeholder Contact Information

Appendix B — Community Fact Sheets

Appendix C — Discovery Meeting Sign-In Sheets & Meeting Notes

Appendix D — Recommended Watershed Projects

Appendix E — Stakeholders Comments of Draft Discovery Report and Map

Appendix F — Discovery Maps

Carson River Watershed Discovery Project

	Contact	Title	Email	Phone
Alpine County	Brian Peters		bpeters@alpinecountyca.gov	530-694-2140 x425
Carson City	Robb Fellows	Floodplain, CRS and NDPES Manager	RFellows@carson.org	775-283-7370
Churchill County	Milorad Misha Stojicevic	Capital Projects and Engineering Manager	mstojicevic@churchillcounty.org	775-423-2153
	Ron Juliff	Office of Emergency Management	ccecm@phonewave.net	775-423-4188
	Eleanor Lockwood	Planning Director /Floodplain Manager	planning- director@churchillcounty.org	775-423-7627
	Preston Denny	GIS	planning-gis@churchillcounty.org	775-423-7627
DEM	Elizabeth Ashby	SHMO	eashby@dps.state.nv.us	775-687-0314
DWR	Kim Davis	State Floodplain Manager	kadavis@water.nv.gov	775-684-2884
Douglas County	Erik Nilssen	County Engineer	enilssen@co.douglas.nv.us	775-782-9063
	Barbra Resnik	Civil Engineer II	bresnik@co.douglas.nv.us	775-782-6234
FEMA	Eric Simmons	Region 9 Engineer	eric.simmons@dhs.gov	510-627-7029
HDR	Mitch Blum		mitchell.blum@hdrinc.com	
Lyon County	Rob Loveberg	Planning Director	rloveberg@lyon-county.org	775-463-6592
NOAA	Gary Barbato		gary.barbato@noaa.gov	775-673-8104
Storey County	Austin Osborne		aosborne@storeycounty.org	775-847-0966
TCID	Kate Rutan		kate@tcid.org	775-423-2141
USACE	Judy Soutiere		Judy.M.Soutiere@usace.army.mil	
USBR	Pat Fritchel		pfritchel@usbr.gov	775-884-8368
	Terri Edwards		tedwards@usbr.gov	
USGS	Steven Berris		snberris@usgs.gov	775-887-7693
Consultant with City of Fallon	Steve Endacott		sendacott@sci-nevada.com	775-423-1345 x 225

RIX Discovery 2012: Carson River Watershed**Fact Sheet: Alpine County, California**

CID: 06003	FIS/FIRM: No FIS; the entire County is currently mapped by FEMA as Zone D.
LOMCs: None	Last CAV/CAC Date: None
Demographics: Population: 1,102 Median Age: 40.9 Elderly (65+): 9.9% Native: 95%	Social Characteristics Non-English Speakers: 2.7% High School + Education: 92.1% Bachelors + Education: 29.7%
Industrial Population in labor force: 64.9% Median Income: \$63,478	Top 5 Industries: (1) Educational services, and health care and social assistance; (2) Public administration; (3) Arts, entertainment, and recreation, and accommodation and food services; (4) Professional, scientific, and management, and administrative and waste management services; and, (5) Other services, except public administration.
Insurance Total Policies: 116 Floodprone Policies: 0	Zone X Policies: 0 Zone D Policies: 116
Mitigation Plans: <i>Alpine County Natural Hazard Mitigation Plan</i> Effective: 2004 Expires: Lapsed as of 2010	
Other Plans: <i>Alpine County General Plan</i> Effective: 2009 <i>Carson River Watershed Regional Floodplain Management Plan</i> Effective: 2008	

RIX Discovery 2012: Carson River Watershed

Fact Sheet: Carson City, Nevada

<u>CID:</u> 320001	<u>FIS/FIRM:</u> Effective Date: January 16, 2009 Level of Study: Detailed
<u>LOMCs:</u> 5	<u>Last CAV/CAC Date:</u> July 21, 2011
<u>CRS Status</u> Class: 6 Effective: October 1, 2009	SFHA Discount: 20% Non-SFHA Discount: 10%
<u>Demographics:</u> Population: 55,274 Median Age: 41.1 Elderly (65+): 16.5% Native: 88.4%	<u>Social Characteristics</u> Non-English Speakers: 8.2% High School + Education: 88% Bachelors + Education: 21.6%
<u>Industrial</u> Population in labor force: 64.7% Median Income: \$52,067	<u>Top 5 Industries:</u> (1) Educational services, and health care and social assistance; (2) Public administration; (3) Arts, entertainment, and recreation, and accommodation and food services; (4) Retail trade; and, (5) Manufacturing.
<u>Presidentially-Declared Disasters</u> Flood-related total: \$3,099,910 (includes Carson Water Subconservancy District) Recent flood related: February 28; 1986, January 3, 1997; February 3, 2006 Other hazards: August 27, 2004 – Waterfall Fire	
<u>Insurance</u> Total Policies: 638 Floodprone Policies: 451	Zone X Policies: 184 Zone D Policies: 3
<u>Mitigation Projects and Other Grants</u> Mitigation Projects: Eagle Valley Golf Course Basin, Shenandoah Basin, Silver Oak Golf Course Basins, Timberline/Combs Basins, Eagle Valley Creek Basins and Vicee Canyon Basin.	
<u>Mitigation Plans:</u> <i>Carson City Hazard Mitigation Plan</i> Effective: April 6, 2011 Expires: April 6, 2016	
<u>Other Plans:</u> <i>Carson City Sand Bagging Plan</i> Effective: 2010 <i>Carson River Watershed Regional Floodplain Management Plan</i> Effective: 2008	<i>Community Wildfire Protection Plan</i> Effective: August 2009

RIX Discovery 2012: Carson River Watershed

Fact Sheet: Churchill County, Nevada

CID: 320030, 320002

FIS/FIRM: Effective Date: September 26, 2008
Level of Study: Detailed

LOMCs: 0

Last CAV/CAC Date: September 28, 2011

CRS Status – Does Not Participate

Demographics:

Population: 24,637

Median Age: 39.0

Elderly (65+): 15.3%

Native: 94.2%

Social Characteristics

Non-English Speakers: 5.6%

High School + Education: 87.7%

Bachelors + Education: 18.2%

Industrial

Population in labor force: 62.7%

Median Income: \$51,597

Top 5 Industries: (1) Arts, entertainment, and recreation, and accommodation and food services; (2) Educational services, and health care and social assistance; (3) Retail trade; (4) Public administration; and, (5) Professional, scientific, and management, and administrative and waste management services.

Presidentially-Declared Disasters

Flood-related total: \$30,149

Recent flood related: January 3, 1997

Other hazards: None

Insurance

Total Premiums: \$82,809

Total Coverage: \$40,351,900

Total Policies: 161

Floodprone Policies: 105

Zone X Policies: 56

Zone D Policies: 0

Rep Losses: 1

Zone Claims: 3

Mitigation Projects and Other Grants

Mitigation Project: None

Mitigation Plans:

Churchill County and City of Fallon Multi-Jurisdictional Hazard Mitigation Plan

Effective: Submitted to FEMA 2012

Other Plans: *Churchill County Master Plan*

Effective: 2010

Carson River Watershed Regional Floodplain Management Plan

Effective: 2008

Lahontan Dam Table Top Flood Exercise

Effective Date: 2009

Carson River Geographic Response Plan

Effective: Unknown

Design, Estimating and Construction Review Truckee Canal Risk Assessment

Effective: 2008

**RIX Discovery 2012: Carson River Watershed
Fact Sheet: Douglas County, Nevada**

CID: 320008

FIS/FIRM: Effective Date: September 30, 1992
Level of Study: Detailed

LOMCs: 5

Last CAV/CAC Date: February 23, 2012

CRS Status

Class: 6
Effective: October 1, 2004

SFHA Discount: 20%
Non-SFHA Discount: 10%

Demographics:

Population: 46,997
Median Age: 47.0
Elderly (65+): 20.1%
Native: 94.1%

Social Characteristics

Non-English Speakers: 2.7%
High School + Education: 91.8%
Bachelors + Education: 23.2%

Industrial

Population in labor force: 61.5%
Median Income: \$60,721

Top 5 Industries: (1) Educational services, and health care and social assistance; (2) Arts, entertainment, and recreation, and accommodation and food services; (3) retail trade; (4) Construction, and (5) Manufacturing

Presidentially-Declared Disasters

Flood-related total: \$969,760
Recent flood related: February 28; 1986; January 3, 1997; February 3, 2006
Other hazards: None

Insurance

Total Policies: 1,076
Floodprone Policies: 640

Zone X Policies: 436
Zone D Policies: 0

Mitigation Projects and Other Grants

Mitigation Project: U.S. Highway 395 Culvert Project
FEMA Funding: \$875,916.00
Local Cost-Share: \$41,972 (Douglas County), \$250,000 (NDOT)

Mitigation Plans:

Douglas County Natural Hazard Disaster Mitigation Plan

Effective: March 24, 2008
Expires: March 24, 2013

Other Plans: *Douglas County Master Plan*

Effective: 2012

Douglas County Open Space and Agricultural Lands Preservation Implementation Plan

Effective: 2004

Douglas County Code Title 20 Zoning Ordinance of Douglas County

Effective: 1996

Carson River Watershed Regional Floodplain Management Plan

Effective: 2008

RIX Discovery 2012: Carson River Watershed

Fact Sheet: Lyon, Nevada

CID: 320029, 320038, 320016

FIS/FIRM: Effective Date: January 16, 2009
Level of Study: Detailed

LOMCs: 2

Last CAV/CAC Date: October 20, 2009

Demographics:

Population: 51,871
Median Age: 39.9
Elderly (65+): 15.1%
Native: 24.4%

Social Characteristics

Non-English Speakers: 4.3%
High School + Education: 84.7%
Bachelors + Education: 11.9%

Industrial

Population in labor force: 58.8%
Median Income: \$48,433

Top 5 Industries: (1) Retail trade; (2) Educational services, and health care and social assistance; (3) Manufacturing; (4) Arts, entertainment, and recreation, and accommodation and food services; and (5) Construction.

Presidentially-Declared Disasters

Flood-related total: \$1,044,838
Recent flood related: February 28; 1986, January 3, 1997; February 3, 2006; February 15, 2008
Other hazards: None

Insurance

Total Policies: 363
Floodprone Policies: 195
Zone X Policies: 167
Zone D Policies: 1

Other Plans:

Lyon County Comprehensive Master Plan
Effective: 2010
Carson River Watershed Regional Floodplain Management Plan
Effective: 2008

**RIX Discovery 2012: Carson River Watershed
Fact Sheet: Storey County, Nevada**

CID: 320033

FIS/FIRM: Effective Date: January 16, 2009
Level of Study: Detailed
Last Community Meeting: April 23, 2008

LOMCs: 0

Last CAV/CAC Date: September 6, 2007

CRS Status

Class: 8
Effective: 10/01/1994

SFHA Discount: 10%
Non-SFHA Discount: 5%

Demographics:

Population: 3,896
Median Age: 46.4
Elderly (65+): 16.9%
Native: 95.2%

Social Characteristics

Non-English Speakers: 1.2%
High School + Education: 91.8%
Bachelors + Education: 13.9%

Industrial

Population in labor force: 67.6%
Median Income: \$61,525

Top 5 Industries: (1) Manufacturing; (2) Educational services, and health care and social assistance; public administration; (3) Construction; (4) Arts, entertainment, and recreation, and accommodation and food services; and, (5) Professional, scientific, and management, and administrative and waste management services.

Presidentially-Declared Disasters

Flood-related total: \$1,171,546
Recent flood related: February 28; 1986, January 3, 1997; February 3, 2006
Other hazards: None

Mitigation Projects and Other Grants

Mitigation Project: Six Mile Canyon Drainage Improvements Project
FEMA Funding: \$1,141,160.97
Local Cost-Share: \$380,387.00

Mitigation Plans:

Storey County Hazard Mitigation Plan
Effective: December 4, 2009
Expires: December 4, 2014

Other Plans: *Storey County Master Plan*

Effective: 1994
Carson River Watershed Regional Floodplain Management Plan
Effective: 2008

Carson River Watershed
Discovery Meeting 09/13/2012
Attendance Roster

Appendix C

Name	Organization	Email	Phone
Ron Juliff	Churchill County	ccem@phonewave.net	(775) 423-4188
Robb Fellows	Carson City	RFellows@carson.org	775 283-7370
Eric Simmons	FEMA	eric.simmons@ ^{ma.dvs.} gov	510 627-7029
Jean Stone	NDEP	jstone@ndep.nv.gov	775-687-9456
Ed James	CWSD	edjames@cwsp.org	
Brenda Hunt	CWSD	brenda@cwsp.org	887-9005
Barbara Resnik	D.C.	bresnik@co.douglas.nv.us	(775) 782-6234
Erik Nilssen	D.C.	enilssen@co.douglas.nv.us	775 782-9063
Pat Fritchel	Reclamation	pfritchel@usbr.gov	775-884-8358
Elizabeth Ashby	KIDEM	eashby@dps.state.nv.us	775 687-0314
KIM DAVIS	NDWR	kadavis@water.nv.gov	775-684-2884
DAVID THOMPSON	RDA ENGRG	dthompson@rcanderson.com	775/215-5013 or 702-2322
Mitch Blum	HDR	mittchell.blum@hdrinc.com	775/337-4726
Zach Wood	Alpine County	zwoode@alpinecounty.ca.gov	530-694-2170 x 437
Toni Leffler	CWSD		

Carson Water Subconservancy District
Carson River Risk MAP Charter Meeting
September 13, 2012, 9:00 a.m.

MEETING NOTES

Attendees:

Elizabeth Ashby, NV Dept. of Emergency Management
Mitch Blum, HDR Inc.
Kim Davis, NDWR
Robb Fellows, Carson City Public Works
Pat Fritchel, USBR
Eric Herron, R.O. Anderson
Stephanie Hicks, R.O. Anderson
Brenda Hunt, CWSD
Ed James, CWSD
Ron Juliff, Churchill County
Toni Leffler, CWSD
Erik Nilssen, Douglas County
Barbara Resnik, Douglas County
Eric Simmons, FEMA
Jean Stone, NDEP
David Thompson, R.O. Anderson
Zach Wood, Alpine County

This meeting of the Carson River Risk Mapping, Assessment, and Planning (MAP) Charter Discovery Group was held in the Carson Water Subconservancy District's Conference Room, 777 E. William St., #110, Carson City Nevada. Introductions were made around the room.

Item #2 - Presentation (R.O. Anderson)

- a. Discovery Process Overview** – Eric Simmons of FEMA gave an overview of the process. Discovery is a watershed-wide discussion of the Risk Mapping, Assessment and Planning (MAP) process. The Carson River watershed is a good model because there are already watershed-wide efforts. Stephanie Hicks explained the presentation today. The discovery process is designed to:
- start a dialogue about your flood risk;
 - understand your needs and priorities;
 - communicate available resources;
 - offer partnerships and answer questions; and
 - give a complete, current picture of flood hazards and risks to help better plan for the risk, take action to protect communities, and communicate the risks to citizens.

The goal of the Risk MAP process is to reduce loss of life and property due to flooding by:

- identifying risk;
- using the Risk MAP data to assess present and future risks areas;
- measuring quantifiable risk reduction;
- communicating the risk;
- planning for the risk;
- mitigating the risk; and
- transferring and reducing the risk.

What is Risk Map?

- Flood mapping products and flood hazard maps that are:
 - developed by FEMA in accordance with communities;
 - based on the best available data from the community and the latest technologies;
 - conducted by watershed; and
 - strengthened by partnerships.
- Risk MAP tools can be used to:
 - create or improve Hazard Mitigation Plans;
 - make informed decisions about development, ordinances, and flood mitigation projects; and
 - communicate with citizens about flood risks.

The Risk MAP Process timeline, a 3-5 yr. process, includes a discovery meeting, project kickoff, flood study review, resilience meeting, and final CCO meeting.

The Discovery Process includes:

- data collection of information about the communities in the watershed to develop a draft Discovery Report and Map;
- a discovery meeting to present potential flood risk products and get feedback, discuss and prioritize areas needing flood risk study, and discuss local planning and communication assistance; and
- the outcome to finalize the Discovery Map and Report based on meeting input, develop a scope of work and budget for Risk MAP projects, and determine available local contributions.

The data collected to date from this watershed includes:

- local flood history, risks, and hazards;
- current and future mitigation activities;
- development and floodplain management plans and ordinances;

- flood studies and flood mapping needs;
- infrastructure information for levees and new bridges, dams, culverts, and road improvements;
- boundary, hydrography, and transportation layers; and
- regional watershed plans.

Additional data reviewed to date included:

- FEMA approved Hazard Mitigation Plans;
- previous flood hazard studies conducted;
- Letters of Map Amendments and/or Letters of Map Revisions;
- Average Annualized Loss (AAL) information;
- census data; and
- Federal and State disaster information.

There are concerns about riverine flooding, development within the floodplain, and the capacity of Lahontan Reservoir. Possible needs and solutions include:

- updating recent DFIRMs based on recent LiDAR,
- conducting Flood Risk Assessment using multiple risk factors;
- mitigating repetitive loss properties; and
- other mitigation projects.

b. Meeting Goals and Objectives -

- Continued dialogue about flood risk by reviewing and validating the information received;
- Communicating available resources;
- Presenting a current picture of flood hazards and risks to help better plan for the risk to increase flood resilience, take action to protect communities, and communicate the risk to the citizens;
- Understanding our needs; and
- Developing a list of our flood risk study needs to be included in the Discovery Report.

It was noted that the maps appeared to over state some of the flooding damage area because they are based on census area, not flood risk areas. Additional Info needs to be provided to R.O. Anderson by Oct. 11 to be included in the Discovery Report.

Item #3 - Discovery Stations - Breakout Session. – Stephanie explained the purpose of the breakout stations. She suggested naming the comments (like DC1 for Douglas County comment #1) and put the identifier on the map to show

location. On each map there is a breakdown to identify what they are looking for, completed or needed. The four breakout stations are as follows:

a. Grants/Hazard Mitigation Planning Session - Hazard Mitigation is a sustained action taken to reduce or eliminate long-term risk to people and property from hazards.

- Types of mitigation include:
 - ✓ prevention,
 - ✓ structural projects,
 - ✓ property protection,
 - ✓ natural resource protection, and
 - ✓ education and awareness.
- Map and identify flood mitigation projects completed or planned.

b. NFIP Coordination Station –

- Identify any repetitive and severe repetitive loss properties.
- Identify/discuss areas of urban change or planned growth.
- Are there areas of high population (or population growth) where a Zone A exists on the FIRM?
- Are there areas of future development pressure where a mapped floodplain would be helpful to identify risk?

c. Risk Mapping Station –

- Indicate places where bridges or roads are regularly closed due to flooding.
- Identify dams causing local flood issues, flood gauges for advance warning, safe room for schools, low water crossings, and high water marks.
- Identify places where structures flood and there is no current special flood hazard defined.
- Identify areas that may have additional topographic or ground survey information.
- Where are areas of concern for emergency response, i.e. evacuation routes, critical facilities, and other vulnerabilities?
- Identify other factors that should be used in risk assessment.

COMMENTS: The Risk Map was creating using very course data. It was suggested that multiple risk factors should be depicted and used to more accurately analyze risk. This could be identified as a needed project.. There are areas which are not reflecting damage where they should and others that shows damage where you wonder why. Identify projects within communities. Prioritize.

d. Floodplain Mapping Station –

- Are there inaccuracies in the FIRMS for your community? Where?
- Are there new road crossings that are not reflected on the FIRM?

- Where are problem flooding areas?
- Identify areas where the effective Flood Insurance Rate Maps (FIRM) and Flood Insurance Study (FIS) products do not reflect current conditions.
- Identify locations of new bridges, culverts, channel realignment.
- Do you have flood hazard data used for planning/management not reflected on the FIRM such as local flood studies that have not gone through the Letter of Map Change (LOMC) process but are used for local permitting as the best available data?

COMMENTS: FIRM maps don't accurately reflect the 2010 data, esp. in Douglas County. We are starting a process of better studies of the Carson River floodplain. We might want to ask communities to list their top three or four concerns. Some projects in one area may benefit another area. Identify top, medium, and low priority projects on each county's list for mapping and mitigation. We may need to go through this process again in the future to reassess.

Risk to what? Structures, transportation, water/sewer infrastructure, clean water production. This information may be available in the state hazard mitigation plan which identifies costs. Consider funding sources which may not be in priority order. Additional gauges may be useful in making decisions. Ongoing gauge maintenance important. Consider areas for conservation easements or attenuation facilities.

Item #4 - Next Steps - Mr. James mentioned that the next step is to begin prioritizing projects throughout the watershed. One issue brought up was a concern that the priority list would be based on cost of damage. If this occurs, some counties which have small populations would not have their projects listed very high on a watershed basis but are important to their areas. It was suggested that at the next meeting the group would set up raking criteria and each county would rank their list of projects in their county. The counties' rankings would then be merged together to create a watershed-wide priority list.

Item # 5 - Discuss 2012 NFIP Reform Act (Kim Davis) – Ms. Davis explained the reauthorization of National Flood Insurance Program (NFIP) on July 6, 2012. No one in the region can say how it will be implemented at the format level. The Association of Floodplain Managers created a good summary of the contents of the Biggert-Waters Flood Insurance Reform Act of 2012, which was distributed to the group. The authority of the NFIP is extended five years to Sept. 30, 2017. The bill addresses primarily flood insurance and mapping.

The biggest issue with flood insurance is that the large catastrophes, like Katrina, have depleted FEMA funds and the bill is to make the NFIP actuarially sound. FEMA owes the Federal government \$15 billion for Katrina.

- Historically the NFIP could not raise insurance premiums by more than 10% per year, but rates have been raised to be phased in over a five-year period at 25% per year until the actuarial rates are achieved.
- The bill increases the limit for annual rate increases within any risk classification of structures from 10% to 20%, effective July 1, 2012.
- Defines Severe Repetitive Loss properties for single family residences as four or more claims, each for more than \$5,000 and cumulatively more than \$20,000. For multi-family residences, the Director may provide a definition by regulation.
- Places limits on a bank's forced placement of flood insurance wherein the forced placed insurance would be cancelled and premiums refunded upon proof of a borrower's existing flood insurance coverage.
- Effective on the effective date of the new map, when flood maps change a property that has a higher rate as a result of a new map shall have the new rates phased in over a five-year period at 20% per year.
- Lender penalties for non-compliance with mandatory flood insurance purchase requires is increased from \$350 to \$2,000 per violation, with the annual limit removed.
- Minimum annual deductibles on claims are changed to \$1,500 for coverage up to \$100,000 and \$2,000 for coverage over \$100,000 for pre-FIRM (the date community receives first Risk MAP) properties, and \$1,000 and \$1,250 for below and above \$100,000 coverage for post-FIRM properties.
- Rates must be set to cover historical loss, including catastrophic loss.
- The bill requires FEMA must establish a National Flood Insurance Reserve Fund to handle Katrina-type events.
- Requires a 10-yr repayment plan for the current insurance fund debt and a report and repayment plan whenever FEMA has to borrow funds to pay NFIP claims.
- Clarified that private flood insurance may satisfy flood insurance coverage requirements if it meets certain standards.
- Allows state sponsored non-binding mediation of flood insurance claims disputes, including NFIP representatives participation.
- Amends the Real Estate Settlement Procedures Act (RESPA) to require explanation of the availability of flood insurance under the NFIP or through private insurance for properties both in and out of Standard Flood Hazard Areas (SFHAs).
- Establishes reporting requirements associated with reimbursement of expenses for Write Your Own (WYO) insurance companies.
- Establishes a process involving the National Oceanographic and Atmospheric Administration (NOAA) to allocate tropical storm and hurricane damages between wind and water damage.

Regarding mapping, the Act:

- Establishes a Technical Mapping Advisory Council to advise FEMA on improving accuracy, on standards that should be adopted for flood maps, data, and map maintenance, and on funding needs and strategies.
- Establishes an on-going National Flood Mapping Program requiring that flood maps show 100-yr and 500-yr floodplains for all populated areas and areas of possible population growth, as well as areas with residual risk behind levees or below dams.
- Requires FEMA to notify property owners when their properties are included in or removed from an area covered by mandatory insurance purchase requirements.
- Authorizes \$400 million for flood mapping per year for fiscal years 2013-2017. This is the first time it has been a congressional authorization, but it still needs to be appropriated for FY 2013-17.
- Formalizes a Scientific Resolution Panel to arbitrate when a community has received an unsatisfactory ruling with respect to an appeal of a revised flood insurance rate map.
- Removes limitations of state contributions to updated flood mapping, previously 50%.
- Requires a study on federal interagency coordination of flood mapping, including collection and utilization of data among all governmental users.

The Mitigation Programs:

- consolidates the NFIP-funded mitigation programs (Repetitive Flood Claims, Severe Repetitive Loss Properties, and Flood Mitigation Assistance) into a single program. Addresses levees, flood structure accreditation task force. FEMA is updating Levee Analysis and Mapping Project (LAMP). Levee is a man-made structure designed and maintained for flood control, so does not include roads. Different approaches on how to map current zone designations. LAMP is for non-certified levee structures. Allows for different approaches for levees built to protect some flooding but not 100-year flood. Non-levee embankments are not recognized by FEMA. Model as though they are not there. Not maintained to be a flood control structure.
- Allows the required Flood Mitigation plan to be part of a community's multi-hazard mitigation plan.
- Removes beach nourishment as an allowed mitigation activity.
- Adds elevation, relocation or flood-proofing of facilities as allowed mitigation activities.
- Adds demolition and rebuild as an allowed mitigation activity.
- Notes the capacity for "direct" grants if the Administration, after consulting with the State and community, determines that neither has a capacity to manage the mitigation grant.
- Caps the use of mitigation grant funds for state mitigation plan development at \$50,000 and at \$25,000 for a community.
- Provides for denial of grant funds if not obligated in five years.

- Restructures federal share requirement.

The bill also establishes a Flood Protection Structure Accreditation Task Force in cooperation with the Corps of Engineers (COE) which is charged with better aligning the information collected by the COE's Inspection of Completed Works Program with FEMA's flood protection structure accreditation requirements. FEMA is required to develop a process for determining when a flood event has commenced for the purpose of flood insurance coverage. Education is key to helping people understand flooding possibilities and the need for insurance.

Item #6 - Other items – Brenda Hunt explained that John Cobourn and Steve Lewis with UNCE are applying for a 319 grant for education about the Carson and Truckee Rivers to include billboards, etc.

Elizabeth Ashby noted that the Hwy. 88 application for FEMA funding was not approved for funding last year but will be resubmitted. The committee will prioritize submissions for application. The project must fit NFIP requirements or be Pre-Disaster Mitigation (PDM) qualified. The mercury Superfund site in Lyon County extends to Lahontan Reservoir or Carson Sink and does not qualify. She suggested that perhaps a proposal for acquisition of property would be better received for funding than bank stabilization projects. Mr. James noted that bank stabilization projects are what are needed.

Item #7 - Schedule Next Meeting -. Mr. James will send out a Doodle poll to determine the next meeting date in mid-to-late-October after all data has been submitted and the report reviewed.

The meeting concluded at 10:50 a.m.

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CARSON WATER SUBCONSERVANCY DISTRICT
 Carson River Risk MAP Charter Discovery Meeting
 October 31, 2012, 11:00 A.M.

LIST OF ATTENDEES

Name	Agency	Phone/Fax Number	E-Mail Address
Kate Rutan	TCID	423-2141/423-5354	Kate@Tcid.org
Tom DALLAIRE	Town of Gillette	782-7134 x102	TDALLAIRE@Co.douglas.nv.us
Stephanie Hicks	RO Anderson Eng	215-5042	shickse@roanderson.com
Robb Fellows	CCPW	283-7370	RFellows@carson.org
Brian Peters	Alpine Co.	530 6942140x425	bpeters@alpinecountyca.gov
Eric Nilsson	D.C.	775 782-0963	enilsson@co.douglas.nv.us
Ron Juliff	Churchill County/City of Fallon	775 423-4188	ccem@phonewave.net
Steve Berris	USGS	775-887-7693	sberris@usgs.gov
Toby Welborn	USGS	775-887-7671	twelbor@usgs.gov
KIM DAVIS	NDWR	775-684-2884	kadavis@water.nv.gov
Jean Stone	NDP	687-9456	jstone@ndep.nv.gov
Brenda Hunt	CWSD		brenda@cwsd.org
Judith Santiere	ACOE (by teleconf.)		
Gary Barbato	Weather Serv. - Reno ("")		
Austin Osborne	St. Co. ("")		
Eric Simmons	FEMA ("")		
Ed James	CWSD		
Toni Leffler	CWSD		
Mitch Blum	HDR		

**Carson Water Subconservancy District
Carson River Risk MAP Discovery/Charter Meeting
October 31, 2012, 11:00 a.m.**

MEETING NOTES

Attendees:

Gary Barbatos, Weather Service, Reno (by teleconference)
Steve Berris, U.S. Geological Survey (USGS)
Mitch Blum, HDR Inc.
Kim Davis, NDWR
Tom Dullaime, Town of Gardnerville
Robb Fellows, Carson City Public Works
Stephanie Hicks, R.O. Anderson
Brenda Hunt, Carson Water Subconservancy District (CWSD)
Ed James, CWSD
Ron Juliff, Churchill County
Toni Leffler, CWSD
Erik Nilssen, Douglas County
Austin Osborne, Storey County (by teleconference)
Brian Peters, Alpine County
Kate Rutan, Truckee Carson Irrigation District (TCID)
Eric Simmons, FEMA (by teleconference)
Judy Soutiere, Army Corps of Engineers (ACOE) (by teleconference)
Jean Stone, Nevada Division of Environmental Protection (NDEP)
Toby Welborn, USGS

This meeting of the Carson River Risk Mapping, Assessment, and Planning (MAP) Discovery/Charter Discovery Group was held in the Carson Water Subconservancy District's Conference Room, 777 E. William St., #110, Carson City Nevada. Introductions were made around the room.

Item #1 - Review of Project Prioritization Criteria - Ed James reviewed the proposed prioritization criteria as follows:

- A. Does this project provide immediate impact or benefit to the county or community? (Is there urgency to this project?)
- B. What are the potential direct and/or indirect damages to the community if a flood occurs?
- C. Will this project provide benefits to public safety and/or infrastructures? transportation
- D. Does the project provide a positive benefit to cost ratio?
- E. Are there other grant funding programs or other likely sources available through which this project could be funded?
- F. What is the estimated cost of the project? Lower expense would probably get done sooner.

- G. What amount of match could the community come up with to support the project? Local funding for specific projects as match for FEMA funding.
- H. Does the project/program preserve the integrity, resources, and functions of the floodplain? Conservation easements, avoiding construction/building in floodplain.
- I. Does this project reduce the potential impacts to water quality in the watershed (i.e., public health and safety)? Sediment and WQ in river.
- J. Your personal view on how important the project is to flood protection in the Carson River Watershed.

Mr. James noted that a low or medium priority project might be pursued sooner if funding available and that discussion was going to focus today on rating criteria A-I since J is so subjective. Stephanie Hicks said she would take notes to add in Discovery Report.

Item #2 - Prioritization of Projects

a. Counties Provide Project Overview –

Alpine County - Brian Peters:

- *Old Markleeville Guard Station Restoration Project* in downtown Markleeville is the farthest along – 1st priority - \$1-1.5 million
- *Grover Hot Springs bridge* (3-4 yrs.)
- *American Rivers Floodplain Restoration in Hope Valley* is a project being done by the Alpine Watershed Group (AWG) on the West Fork between Hwy 88 and Blue Lakes Rd. on U.S. Forest Service (USFS) property. The group hired Mitch Swanson to look at restoring portions of the river to allow it to reach its floodplain but not re-watering the entire meadow. The design phase to be done soon. They are seeking funding to do projects and may be moving upstream into Faith and Charity Valleys
- In prioritizing the projects, none of them are urgent for risk to property or lives. They are *environmental improvement projects* which provide benefits to resources and functions to the river and water quality. They are all in the medium priority category to Alpine County. The *bridge projects* which are state projects are problematic because none are of high priority for replacement, so they would be low priority

Douglas County - Eric Nilssen:

- 80% of the *flood mapping* is designated as Zone A. Having more detailed flood mapping would be helpful to Douglas County. This is important after FEMA's remapping put 8,000 houses in the floodplain that weren't in before. Douglas County would like to remap as soon as possible because of flood

insurance requirement for folks who don't need to be paying flood insurance - high priority.

- *Attenuation area studies* –Property owned by BLM is subject to flash flooding on the east side of valley. The fire stations are on west side with most homes on east side of river. They need better all-weather access to first responders. Attenuation studies would benefit areas downstream. Medium priority.
- *Flood mapping for other washes or sloughs* are low priority.

Tom Dallaire:

- The *Pine Nut area* which effects Gardnerville is most important to provide for emergency access. It is high priority for Hazard Mitigation Plan. It has some funding already and is reported as ongoing project. They need to identify funding and implementation.

Carson City – Robb Fellows:

Emergency Action Procedures was updated last year.

Project list comes from the Capital Improvement Program for flood protection and water quality improvement. Nine projects have been added to the original remapping (see handout). Most are effecting industrial areas. He suggests the following priorities:

1. *Golf Course A & B Drainage Basin & System Improvements* - high priority because it effects 70 different structures and is closest to river, drainage problems, could cut off emergency access.
2. *Goni Wash Sediment & Detention Basins* - (going north) - Carson City is trading BLM land to put detention/ sedimentation basins to provide protection and relief for industrial businesses in Goni area. – high priority
3. *Goni Wash Drainage Channel & System Improvements* - going south to protect downtown and relieve flooding in the Carson Mall area. - high priority
4. *South Carson Street Storm Drain System Improvements*- medium priority
5. *South Carson Street/South Current Storm Drain Systems*- medium priority
6. *Empire Drainage System Improvements* - medium priority
7. *Voltaire Canyon Channel and Drainage System Improvements* - low priority
8. *Saliman & Carson High Drainage System Improvements*- low priority
9. *King Street Drainage/Flood Protection Improvements* - low priority

Lyon County – Stephanie Hicks went over list given by Rob Loveberg:

1. First priority is *River Road project*. Jean Stone noted NDEP funding for a DVCD restoration project where the road being undercut – high priority
2. *Bank stabilization projects along the Carson River through Dayton Valley including Ft. Churchill*. There is uncertainty about being able to do this project because it is a Superfund Site. It is important to establish communication about funding with NDEP, FEMA, etc. FEMA won't fund because other federal funds are already designated toward the Superfund Site. This is a policy issue that group could work to get an exemption.
3. *Drainage system studies to have a conveyance system for alluvial fans* – study/restudy, construction – medium priority
4. *Silver Springs* is a low priority because of problems with the cost benefit analysis.

Churchill County – Ron Juliff:

- *Feasibility Study for a Flood Retention Basin Upstream of Fort Churchill* - This addresses high risk areas of flooding. It might be feasible to construct a barrier to backfill flood water into uninhabited areas upstream of Lahontan Reservoir. Because this land is located in Lyon County, Jeff Page needs to be involved in the conversation. – Churchill County's #1 priority - high priority
- *Flood Water Shunt to Sheckler Reservoir addresses flooding below Lahontan* - It is an effort to slow down water before overflowing the river which presents a risk to life and property causing millions of dollars worth of risk. They plan to implement Misha Stojicevic's engineering study using a natural swale to Sheckler. - Churchill County's #2 priority - high priority
- *FIRM Impact Study of a Levee Along Casey and Bottom Roads* - FIRM maps are based on old data. A LiDAR study done and FEMA may be able to accept the data to update maps. Judy Soutiere said that the ACOE assumed the LiDAR would meet FEMA requirements but she will verify that. Churchill County will send a letter to ACOE to make sure the LiDAR met FEMA requirements. - Churchill County's #3 priority - medium priority
- *Firm Flood Scenario Review* - Churchill County's #4 priority - low priority
- *Matrix for Flood Risk Assessment* - There have been changes to the sewer and water systems so Churchill County needs a matrix for flood risk assessment to consider

the infrastructure between the city and the county. There have been situations where water travelling in canals has been higher than homes, wells, and septic tanks. - Churchill County's #4 priority - low priority

When asked if TCID had any concerns with Churchill County's list of projects and priorities, Kate Rutan responded that TCID is okay with the study about the retention pond above Lahontan to determine feasibility. Ms. Rutan mentioned that her boss said that the concept of the retention pond had been looked at before and required a "perfect storm" for there to be a need. Lahontan Reservoir is capable of taking overflows as long as they are able to dump into Sheckler Reservoir before the water gets to downtown and the Walmart area. To reduce flooding on the Carson River itself, *the channel needs to be cleaned out*. It is an ongoing project to take out debris but they want to take out sediment. Add this to the list and give it a high priority. It can be done immediately, pending permitting.

b. Watershed Prioritization -

- Regional projects – *restudy of CR Floodplain* is on-going – high priority
- *Early warning system* - Set up in Douglas County to include a tipping bucket and reverse 911 - Is operational in Carson City with warnings issued by National Weather Service.
- *Floodplain Preservation*
- *Building Codes* – things to do by counties to protect floodplain
- *Public Awareness Campaign* – floodplain, flood insurance
- *ERM Gap Analysis* – markers and data gaps?
- *DFIRM Update Procedure* – keep model updated
- *Photo Monitoring* – photos during flood events to get identify flood risks and get info out, gather historical data/photo
- *Hazard Areas* – where? Need to be more robust? Chemical plants, hazards on river unstable banks
- *Infrastructure design/replacement* – road can act as levee
- *Carson River Inundation Mapping* – look at inundation mapping in different flood events. Mr. Barbatos reported that this is ongoing with NOAA throughout the U.S. There is only one in the western U.S. at the Boise River at Boise, ID. The Weather Service doesn't have GIS expertise so they rely on FEMA and others to get the whole suite of maps. They can be used in real time during flood to determine where the flooding is effecting and where to sandbag/evacuate, etc. Someone besides the Weather Service needs to do the modeling. The Weather Service maintains a website for \$4,500 per site to host the information. This shows the

area and depth to determine sandbagging vs. evacuation. Ms. Davis noted that this gets to flood warning and public outreach with a visual example. The Nevada Silver Jackets Pilot Project has been approved by COE with part allowing to leverage to incorporate mapping into a website that Toby is working on. High population areas would benefit greatly.

Ms. Stojicevic added that there is a need to analyze the aquifer because there are two different types of flooding with energy and standing water which causes problems with septic tanks. The invisible damages of flooding can be bigger than what is seen since visibility is only ½-1 foot.

Each person was given a priority listing of watershed projects to rate from 1(low) to 5 (high) by how well it meets the list of criteria A-J. Those projects were numbered 1-12 for ease of reference as below:

1. *Restudy of Carson River Floodplain*
2. *Early Warning*
3. *Floodplain Preservation*
4. *Building Codes*
5. *Public Awareness Campaign*
6. *ERM Gap Analysis*
7. *DFIRM Update Procedure*
8. *Photo Monitoring*
9. *Hazard Areas*
10. *Infrastructure Design/Replacement*
11. *Carson River Inundation Mapping*
12. *Churchill County Aquifer Study*

The ratings were totaled by each person to determine an overall rating for each project. Each person posted their ratings on the board to determine a watershed-wide rating for each project. The postings are shown below as a summary of the priority list of watershed projects. NOTE: When assigning values to high (3), medium (2), and low (1), the final numbers in **bold** below, reflect a numerical priority of each project.:

1. 14-H, 2-M, 1-L = H = **47**
2. 13-H, 4-M, 0-L = H = **47**
3. 13-H, 4-M, 0-L = H = **47**
4. 3-H, 13-M, 3-L = M = **38**
5. 5-H, 9-M, 1-L = M = **43**
6. 0-H, 4-M, 13-L = L = **21**
7. 2-H, 5-M, 10-L = L = **26**
8. 5-H, 3-M, 9-L = L = **30**
9. 12-H, 4-M, 1-L = H = **45**

10. 10-H, 3-M, 4-L = M = **40**
11. 13-H, 3-M, 1-L = H = **46**
12. 9-H, 5-M, 2-L = H = **39**

Item #3 - Finalizing the Discovery Process

- a. **Discovery Report & Map** – Stephanie incorporated comments received this far and created a table. From October 11, R.O. Anderson had 20 working days to finalize the report and mapping. They will incorporate the project priorities set today. The deadline was originally November 8th prior to inclusion of the second Discovery Meeting.

Mr. James added some comments: The Discovery meeting blank will incorporate comments from today's meeting. We want to meet FEMA criteria.

Mr. Blum said that the new FEMA notebook has including Discovery process information into the report as a requirement.

Item #4 - Other items – None.

The meeting concluded at 1:05 p.m.

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**Carson River Watershed Discovery Project
Recommended Watershed Projects**

Project Name	Jurisdiction	Project Description	Watershed Project Priority
Markleeville Creek Floodplain Restoration Project	Alpine County	Alpine Watershed Group has hired a consultant to complete the final restoration planning and design stages for the Markleeville Creek Floodplain Restoration. The next phase is for acquisition of the property and then to perform the restoration.	High
Woodfords-Highway 88 Bridge	Alpine County	Woodfords-Highway 88 Bridge and STPUD mainline is a known flood hazard area.	Medium
Various Mitigation Projects for Roads Prone to Flooding	Alpine County		Medium
State Highway 89/4	Alpine County	State Highway 89/4 known flood damage in the past.	Low
Alpine County HMP	Alpine County	Update Alpine County's Lapsed Hazard Mitigation Plan.	Medium
Goni Canyon Wash	Carson City	This tributary consists of approximately 6 square miles and is located north of Hwy 50 east, centered around Goni Road. Hydrology and mapping of the flood hazard from this tributary was completed in the mid 1980's with topographic data gathered in the mid 1970's. Over the years there have been many changes in the tributary and numerous CLOMR applications were approved by FEMA. The largest change was between 1980 and 1990 when the airport park and industrial areas were developed. There are about 55 structures at risk within the SFHA. The current FIS 1% annual chance flood flow is 2,776 cfs. Recently with the Freeway project and CLOMR, the 1% annual chance flood flow was revised to 2,193 cfs.	High
Tributary Golf Course Creek A and B	Carson City	This tributary consists of approximately 5 square miles and is located north of Highway 50 East and east of College Parkway. Hydrology and mapping of the flood hazard from this tributary was completed in the mid 1980's with topographic data gathered in the mid 1970's. Over the years there have been many changes in the tributary. Golf Course Creek B, west side subarea, had seen a flood control dam built in 1986. Whereas Golf Course Creek A, east side subarea, had seen diversion channels and piping installed in the late 1980's. There are about 80 structures at risk within the SFHA. The current FIS 1% annual chance flood flow is 1,930 cfs. Recently with the Freeway project and CLOMR, the 1% annual chance flood flow was revised to 1,232 cfs. However, this did not include the flood control dam. therefore, the flows should be reduced more taking into account the dam facility.	High
Clear Creek & Prison Hill	Carson City	This tributary consists of approximately 23 square miles and is located south end of Carson City and north border of Douglas County. Hydrology and mapping of the flood hazard from this tributary was completed in the mid 1980's with topographic data gathered in the mid 1970's. Over the years there have been some topographic changes and Clear Creek was realigned in the late 1980's. There are about 50 structures at risk within the SFHA. The current FIS 1% annual chance flood flow is 2,450 cfs.	High
Voltaire Canyon Channel and Drainage System Improvements	Carson City	Voltaire Canyon Channel and Drainage System Improvements consist of piping, channel and surface changes to convey flood flow to the freeway phase 2B drainage facilities. The system will reduce the BFE. About 50 commercial structures benefit from the improvements. The main flooding source is Voltaire Canyon and the approximate cost is \$2,000,000.	Low
Saliman and Carson High Drainage System Improvements	Carson City	Saliman and Carson High Drainage System Improvements consist of piping, inlets, and surface changes to re-direct flows from Mills Park to the southeast to Robinson Street then east to the freeway facilities. They system will reduce the BFE and reduce the flood impact to the Carson High School. The main flooding source is Ash Canyon Creek and the approximate cost is \$500,000.	Low
South Carson Street Storm Drain System Improvements	Carson City	South Carson Street Storm Drain System Improvements consist of piping, inlets, and surface changes beginning at the linear ditch/S. Roop Street running west to Stewart then to South Carson Street then north to 8th Street. The system will reduce the BFE. About 30 commercial and multifamily structures benefit from the reduction. Access and evacuation during an event is a benefit. The main flooding source is Kings Canyon Creek and the project is estimated to cost \$1,750,000.	High
South Carson Street/South Curry Storm Drain System Improvements	Carson City	The South Carson Street/South Curry Storm Drain System Improvements consist of piping, inlets, and surface changes beginning at Rhodes Street running north along South Carson Street to Stewart Street, then east to the open area south of the State DMV building. The system will convey flood flow and provide water quality benefits. The system will reduce the BFE and about 10 commercial structures will benefit from the reduction. Access and evacuation during an event is a benefit. The main flooding source is H and I Tributary and Voltaire Canyon. The project is estimated to cost \$1,000,000.	High
King Street Drainage/Flood Protection Improvements	Carson City	The King Street Drainage/Flood Protection Improvements consist of curb, gutter, and sidewalk improvements with a flood wall beginning at South Ormsby Boulevard running west about 360 feet on the south side of King Street. The system will direct flood flow east preventing a breakout to the southeast. About 25 residential structures benefit from the improvements. The main flooding source is Kings Canyon Creek and the approximate cost is \$100,000.	Medium

**Carson River Watershed Discovery Project
Recommended Watershed Projects**

Project Name	Jurisdiction	Project Description	Project Priority
Goni Wash Sediment and Detention Basins	Carson City	The Goni Wash Sediment and Detention Basins project consists of two basins located on city property, one north of Danielle Drive and east of Kelvin Road, the other one is north of Maxwell Road. The system will reduce the BFE. About 25 commercial/industrial structures benefit from the improvements. The main flooding source is the Goni Wash and the approximate cost is \$1,000,000.	High
Empire Drainage System Improvements	Carson City	Empire Drainage System Improvements consist of piping, inlets, and surface changes beginning at Fairview/Hwy 50 East running east to Darla Way, to Morgan Mill Road, then to the Carson River. Easement purchase is a part of this project. They system will reduce the BFE. About 33 residential structures benefit from the improvements. The main flooding source is the local urban area from the southwest. The project is estimated to cost \$1,100,000.	Medium
Goni Wash Drainage Channel & System Improvements	Carson City	The Goni Wash Drainage Channel and System Improvements project consists of piping, inlets, and surface changes to reinforce an existing levee-like structure and to improve various other existing systems. Easement purchase is part of the project. Locations are north of the airport. The system will reduce the BFE and about 65 residential/industrial structures will benefit from the improvements. The main flooding source is Goni Wash and Tributary D. The project is estimated to cost \$4,000,000.	Medium
Golf Course A & B Drainage Basin & System Improvements	Carson City	The Golf Course A and B Drainage Basin and System Improvements project will consist of piping, inlets, and surface changes to convey flood flows to detention/water quality basins, then to the river. Land or easement purchase is part of this project. Locations are Arrowhead Drive south to the Carson River. About 70 residential/industrial structures will benefit from the improvements. The main flooding source is Golf Course Creek A and B. The project is estimated to cost \$5,000,000.	High
Feasibility Study for a Flood Retention Basin Upstream of Fort Churchill	Churchill County	The City of Fallon is requesting a study to determine what kind of structure could be put in place to meter Carson River flood flows, as well as understand the impacts of implementing a retention basin upstream of Fort Churchill. Lahontan Reservoir was not designed as a flood control works. However, by careful, proactive management of outflow, the dam has a significant flood mitigation effect on the downstream community. Increasing the storage capacity of the reservoir is considered neither feasible nor effective for flood control. However, being able to meter or control the inflow to Lahontan Reservoir would provide more time, efficiency (and margin of safety) for precautionary water releases to occur. In other words, significant flood mitigation would occur through controlling the reservoir in-flow / out-flow, verses increasing the storage capacity. To that end, a relatively deserted area with naturally occurring retention features has been identified along the Carson River just upstream of Fort Churchill where a railroad bridge crosses the Carson River. Communities that stand to benefit from such a structure would be, Silver Springs, Churchill County and the City of Fallon. <i>Note: The two items that comprise our highest priority are linked and must work in tandem for flood prevention to be effective. Creating a flood retention basin before Lahontan reservoir, will allow the inflow to Lahontan to be managed. Uncontrolled run off entering the reservoir can result in exceeding the dams' capacity. Thus, requiring water spreading before it enters the Carson River channel to avoid flooding flows. Even with controlled inflow to Lahontan, during peak run off, capacity may still be an issue and require water spreading. However, without (1.) above, the only prevention measure that remains is to divert flood flows before they enter the Carson River channel below Lahontan dam. Flood water flow must be shunted to non-populated areas such as Sheckler Dry Reservoir and the uninhabited Navy bombing range south of Sheckler. Dam overflow and uncontrolled release of water from Lahontan to the Carson River channel has historically resulted in Churchill County and City of Fallon flooding. Any future uncontrolled releases will imperil county and city residents.</i>	High
Flood Water Shunt to Sheckler Reservoir	Churchill County	The City of Fallon has identified a need to enhance or institutionalize a method of mitigating flooding below Lahontan Dam that has been used in the past is to shunt water from the V line canal to Sheckler Reservoir. Once Sheckler is full, and water "spreading" has been authorized, water is released from Sheckler Dam and spreads onto open desert, most of which is owned by the US Navy. The Navy has authorized this action during flood emergency situations. Actions required include upgrading the works at Diversion Dam structure upstream of the V line canal, increasing the flow capacity of the diversion to Sheckler, and any enhancements required to keep Sheckler Dam stable when water is released into the desert. The enhanced drain to Sheckler could be accomplished by increasing the capacity of the existing drain, or by constructing a new drain further upstream on the V Line Canal. <i>Note: The two items that comprise our highest priority are linked and must work in tandem for flood prevention to be effective. Creating a flood retention basin before Lahontan reservoir, will allow the inflow to Lahontan to be managed. Uncontrolled run off entering the reservoir can result in exceeding the dams' capacity. Thus, requiring water spreading before it enters the Carson River channel to avoid flooding flows. Even with controlled inflow to Lahontan, during peak run off, capacity may still be an issue and require water spreading. However, without (1.) above, the only prevention measure that remains is to divert flood flows before they enter the Carson River channel below Lahontan dam. Flood water flow must be shunted to non-populated areas such as Sheckler Dry Reservoir and the uninhabited Navy bombing range south of Sheckler. Dam overflow and uncontrolled release of water from Lahontan to the Carson River channel has historically resulted in Churchill County and City of Fallon flooding. Any future uncontrolled releases will imperil county and city residents.</i>	High

**Carson River Watershed Discovery Project
Recommended Watershed Projects**

Project Name	Jurisdiction	Project Description	Project Priority
FIRM Impact Study of a Levee Along Casey or Bottom Roads	Churchill County	The current flood scenario for the Churchill County and City of Fallon Flood Rate Insurance Maps (FRIM) predicts flood waters in the Carson River backing up at the Highway 50 Bridge and then overtopping the V line canal near Casey Road. The result is “nuisance flooding” along the New River Drain, which meanders through the heart of Fallon’s residential area. Because of the areas topography, even a low amount of flood water has the potential to create significant damage to the community, and mitigating this flow would release numerous moderate and low income residents from the requirement to purchase flood insurance (a stated goal of the CWSD). Therefore, the recommendation is to study the feasibility and floodplain impact of building a levee along the southwest bank of the V line canal. <i>Note: If the solutions for flooding risk listed in (1.) and (2.) above cannot be accomplished; creating a physical barrier to divert flood water from low lying areas of the City of Fallon will provide relief for city residents. This would only be a partial solution, since county residents may still be exposed to significant flood damage.</i>	Medium
FIRM Flood Scenario Review	Churchill County	In 2007, FEMA released a Churchill County Preliminary Flood Insurance Study (FIS) report. Overall, the preliminary FIS was an excellent summation of the history of the flood problem for the City of Fallon, the past studies and the assumptions that contributed to its development. However, the supporting information for the FIS was based on a 1977 study conducted by the Corp of Engineers using historical storage of Lahontan Dam. Consequently, this information was significantly out of date and did not take into account current operating procedures for Lahontan Dam nor the flood mitigation initiatives and procedures put in place by the City of Fallon, Churchill County, the Bureau of Reclamation and the Truckee Carson Irrigation District (TCID). Therefore, the recommendation is to reassess the FIRM flood scenario for Churchill County taking into account the significant technological and procedural advancements that have occurred since 1977.	Low
Matrix for Flood Risk Assessment	Churchill County	Risk Mapping would be more beneficial if there was a deeper analysis with specific methods and criteria. Criteria for risk should include more than only depth of the water and probability. The current approach is only a partial answer and does not consider areas where there are wells, sewer, water and other critical infrastructures that can multiply damages caused by flooding. Development of a criteria matrix that covers multiple risk components would be valuable and provide a more realistic risk assessment.	Low
Cleaning Out of Carson River	Churchill County	Removal of built up sedimentation will help to increase the capacity of the river.	High
Sunrise Pass, Buckbrush, & Johnson Lane Wash	Douglas County	FEMA Flood re-study and floodplain analysis of the Sunrise Pass, Buckbrush, and Johnson Lane Wash Watersheds, which were mapped by FEMA with technical errors in 2008 (NHC FIS). This work would complete the re-mapping of the area under the current effective FIRM dated January 2010. Anticipated total cost to re-study is approximately \$240,000.	High
Attenuation Area Studies	Douglas County	Douglas County is requesting to study the feasibility of potential attenuation areas for the washes that come out of the Pinenut Mountains, one specifically being the Pinenut Wash. The Pinenut Wash causes overtopping at all major intersections with homes on the east side of U.S. Highway 395. If the flood could be attenuated, the county may be able to maintain access to those residences during a 100-year event and reduce the local costs for repair and reconstruction of these roads.	Medium
“Zone A Base Flood Elevation Unknown”	Douglas County	Douglas County is requesting a restudy of areas classified as “Zone A Base Flood Elevation Unknown” in an effort to establish floodways (if they exist) and determine elevations in order to implement floodplain development regulations. It is anticipated that the establishing elevations may remove large areas from the floodplain. Areas to be included are the West Fork of the Carson River, east of State Route 88, and the Brockliss Slough.	Low
Studies of Other Washes and Sloughs	Douglas County	No further description.	Low
River Road Project	Lyon County	Due to the Carson River undercutting the bank adjacent to River Road in Dayton, Nevada, there is an immediate need to stabilize the bank. This will not only save the road infrastructure but will also protect a home in close proximity to area and at risk should the bank fail. This project is rate as Lyon County's #1 priority because there is an immediate need and immediate risk.	High

Carson River Watershed Discovery Project Recommended Watershed Projects

Project Name	Jurisdiction	Project Description	Project Priority
Superfund Site Resolution	Lyon County	Lyon County has several project needs along the Carson River for bank stabilization. Several of the projects, including the River Road Project and the Fort Churchill Project would be eligible under FEMA HMGA Program for grant funding; however, there is an issue with the area being designated as a Superfund Site. In a previous application, the Fort Churchill Project was selected for further review and then later denied based on being located in the Superfund site. Because funding for PDM was pulled shortly after this decision was made, it was left unclear what the basis of denial was. It would be worth to effort for the Charter to meet with representatives from FEMA, NDEP, DEM, and DWR to discuss whether with appropriate explanation, these sites could be eligible under FEMA's programs.	High
Alluvial Fan Drainage System	Lyon County	Lyon County has a need for a drainage system to improve conveyance of alluvial fan drainages to the Carson River. However, before such a system could be put into place, these alluvial fans would need to be studied and re-studied in order to analyze flows and thereby determine what kind of system is needed. Then conveyances would then need to be constructed and maintained.	Medium
Silver Springs Project	Lyon County	Division of Water Resources suggested potential project in Silver Springs that could include some type of channel or other means to increase the capacity to reduce back water effects. The project could also include re-mapping of the SFHA with better topo data. The project, however, does not meet the estimated cost-benefit analysis for the project.	Low
Restudy of Carson River Floodplain	Watershed-wide	CWSD's Multiyear plan to restudy Carson River.	High
Early Warning	Watershed-wide	Install additional gauges for the watershed.	High
Floodplain Preservation	Watershed-wide	Easements/leave floodplain as open areas/other means to incentivize floodplain preservation.	High
Build wisely! Codes	Watershed-wide	Develop Build wisely! Codes	Medium
Public Awareness Campaign	Watershed-wide	Create a public awareness campaign to communicate risk to residents and public agencies.	Medium
ERM Gap Analysis	Watershed-wide	Determine if Elevation Reference Marks (ERM) are adequate, or if additional ERMs need to be located or they need replacement.	Low
DFIRM Update Procedure	Watershed-wide	Develop a consistent procedure with GIS, planning, and engineering departments for updating DFIRMS on a watershed-wide basis. This also relates to updating the floodplain model with each new CLOMR/LOMR to ensure cumulative analysis remains consistent (timing, procedure, etc.)	Low
Photo Monitoring	Watershed-wide	Create and establish protocols, applications for photo monitoring of flood events both on-ground and from the air.	Low
Hazard Areas	Watershed-wide	Investigate areas for establishment of setbacks and buffer zones in highly hazardous areas.	High
Infrastructure Design/Replacement	Watershed-wide	Coordinate with NDOT and local jurisdictions to identify, design, investigate options on all future placement or replacement of infrastructure to ensure it is compatible/consistent with the Regional Floodplain Management Plan.	Medium
Carson River Inundation Mapping	Watershed-wide	Development of inundation mapping for the Carson River.	High
Groundwater Quality Impacts	Watershed-wide	Evaluation of groundwater quality impacts due to flooding.	Medium

Draft Discovery Report Comments Table

Date	Page	Comment By Kim Davis, Division of Water Resources	Agency	Response
8/17/2012	9	According to California Department of Water Resources, Alpine County is consider to be in a Zone 'D' with just one panel printed which is a map index. According to DWR records, Alpine County has never had a CAV since they entered into the program in 1989.	KD-DWR	Alpine County information was added to Discovery Report.
9/13/2012	Flood Map	Also, can provide additional information from the Nevada CAVs for the other communities besides Douglas County, if needed. Suggestion to add repetitive loss properties, including one in Churchill County near duck club. Forwarded information on all RLP's.	KD-DWR	Change has been made.

Date	Page	Comment By Milorad Misha Stojicevic, Churchill County	Agency	Response
8/20/2012	Risk Map	Risk Mapping would be more beneficial if there was a deeper analysis with specific methods and criteria. Criteria for risk should include more than only depth of the water and probability. The current approach is only a partial answer and does not consider areas where there are wells, sewer, water and other critical infrastructures that can multiply damages caused by flooding. Development of a criteria matrix that covers multiple risk components would be valuable and provide a more realistic risk assessment.	MMS-CH	Added to Project List
	Risk Map	Matrix for Flood Risk Assessment - Mapping of flood risk is complex task and requires multiple risk factors to be included. Mapping only natural depressions or low elevation terrains in rural area could be insufficient and not complete. In some cases, flooding has positive impact such as: bringing material with more nutrients, recharging groundwater, etc. In case of agricultural usage several days flooding might or might not have impact to the harvest. On opposite side, flooding of unstable lands (landslide sensitive area), with houses can be in some cases tragic. In nowadays engineering science, risk of the flooding is connected to damages caused by flooding. This matrix is a SAMPLE ONLY and should not be used as a code or regulatory lead. Local entities should establish their own criteria based on local conditions and this is just draft. 1. Depression depth related to the flood elevation from existing FEMA maps and revised FEMA elevation documents. Three categories should be generally established: 0 to 1ft; 1 to 3ft; more than 3ft. 2. Groundwater depth in the area where flood zone are established. This will indicate potential hazard to foundation, individual septic systems, back flow to the houses from flooded septic systems and other conduits installed by homeowners. Additional attention should be to populated area where water supply source is GW. Three categories should be developed; 0 to 3ft – high impact; 3 to 10ft – moderate impact and more than 10ft – insignificant impact to groundwater. 3. Terrain slope plays big role in flooding considering sheet or concentrated flow and in case of high slope condition energy developed in flooding flow can destroy objects, cause erosion and life safety. In the same time low slope conditions will retain water longer with different effects to the flooded area. In this category erosion, landslides or liquefaction should be analyzed as subcategory considering soils, water velocity, vegetation and terrain roughness. Five categories should be developed; 0 to 1%; 1 to 3%; 3 to 10%; more than 10%. 4. Population density and land use risk factor is self-explanatory factor and hazard for agricultural lands comparing to populated area is significantly different. In some cases, flooding of agricultural lands has positive effect. Depending on season when flooding occur, some damages can be to the harvest reduction too. This should be addressed through different insurance program. Five categories should be developed base on population density; 5 or less per mi2; 5 to 100 per mi2; 100 to 500 per mi2; 500 to 2500 per mi2; more than 2500 persons per mi2. 5. Coincidence with other environmental risk will require some calculations and deeper analysis. Probability of heavy rain intensity, wind over 60 miles per hour, fast snow melting and deposits, rapid temperature change in time unit etc. This category should be analyzed locally, from the risk aspect and number of categories should be established based on historical risk analysis. 6. Infrastructure risk assessments criteria should be created considering existing and future local conditions. The list of critical infrastructures would include: water supply, sewage collection and treatment, roads and bridges, power plants and distribution, communication infrastructures, evacuation route etc. 7. Livestock and animals habitat risk assessment should be included as a possible category .	MMS-CH	More detail regarding above comment.

Date	Page	Comment By Robb Fellows, Carson City	Agency	Response
8/20/2012	Risk Map	Could a column be added to the loss table that shows the number of structures? Also with the same table - What does County Fips mean? The areas look to be larger than the floodplain.	RF-CC	The initial risk study prepared by Michael Baker for FEMA did not include detailed structure locations, so structure counts are not available at this time. The hazard areas shown on the Risk map are covering census block areas, and do not graphically depict the mapping extent of possible damage or loss. Further studies need to be completed to refine the extent of the Risk and Loss areas. FIPS stands for Federal Information Processing Standard. The numbers shown in the table under that column heading are the State/County codes defined by that standard.
8/20/2012	Hazard Map	The saliman, H&I, Voltaire and Kings SFHAs are missing. Add the levee locations on the map.	RF-CC	Change has been made.
8/20/2012	3	Under Table 1, are the deliverables/products suppose to be in the report? Or do they come later?	RF-CC	Community Fact Sheets and Discovery Map will be included in the final Discovery Report.
8/20/2012	6	1. Mitigation Plans/Status, Mitigation Projects - Remove this "Despite the efforts of each of the communities to involve members of the public, it was noted in the majority of the plans that public participation was almost nonexistent." Put in a more positive comment.	RF-CC	Change has been made.
8/20/2012	6	2. NFIP Mapping needs - the first and second paragraph appears out of order or in the wrong section.	RF-CC	Change has been made.
8/20/2012	9	Sii - there are other dams in the watershed.	RF-CC	Pursuant to discussions with FEMA, we will only be depicting dams that are used for flood control purposes. The two dams identified by Robb have been added.
8/20/2012	10	Watershed projects wording should be similar for each.	RF-CC	Change has been made.
8/20/2012	13	8ii Completed Projects - I'm sure there are other completed projects	RF-CC	A list of completed projects was requested from all stakeholders and we have included what we have received.
8/20/2012	21	Appendix is missing.	RF-CC	These will be part of the final report.
9/13/2012	Risk Map	Possible project would be to prepare a emergency action procedure (SOP) which would show locations where sandbags would be placed, evacuation routes, etc. Would show NIMS, contractor numbers, supplies, shelters. These plans would be developed for each community.	RF-CC	Added to Project List.

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Date	Page	Comment by Elizabeth Ashby & Karen Johnson, DEM	Agency	Response
8/20/2012	4 & Community Fact Sheets	Mitigation projects have been initial HM planning grant and current HM planning update grant. Mitigation project to put in a culvert along 395 has been selected for further review but not yet funded. FEMA 1153 - 1997 Flood - Douglas (371,552), Storey (277,842), Lyon (651,966), Carson (792,368) and Churchill (30,149) declared. FEMA 1629 - 2006 Flood - Douglas (\$598,207.53), Storey (\$893,703.69), Lyon (\$392,872.27) and Carson (\$2,307,542.49 which includes Carson Water Sub conservancy District) declared. Churchill did not. These amounts are the FEMA 75% and County 25% costs that were recorded on reimbursements through this office. They do not include loss of business, tax or other. These amounts were to get the counties back to before the event. They do not include any NDEM, NDEP, NDOT, NDF assistance.	EEH & KJ - DEM	The report and Community Fact Sheets have been updated.
9/13/2012	Risk Map	Public awareness campaign to communicate risk to residents	EA-DEM	Added to Project List.
Date	Sheet	Comment by Luke Opperman, Division of Water Resources	Agency	Response
8/21/2012	Risk Map	Possible additional flood related things to consider (if time and budget allows): Past flood loss claims Critical Facilities in the SFHAs? Roadways overtopped in storm events? Detention Basins in Carson City • Shenandoah Heights • Others	LO-DWR	Repetitive Loss Claims have been added, roadways were identified in Alpine County and included in projects list, Carson City's Dams for flood control purposes were added.
8/21/2012	Risk Map	Potentially use images in the Discovery Map like sample provided.	LO-DWR	It was decided that at the scale of the Discovery Map orthophotos would not improve delineation of the features that are displayed.
Date	Page	Comment By Paul Pugsley	Agency	Response
8/22/2012	Risk Map	In looking at the map, Alpine county appears to have the largest area that will suffer damage. However, they really have the least flooding.	PP	Luke explained how the model used Census block tracts and that may be why the whole area is green even though they would only receive 1-400 million in damage. So the thought was that maybe we can fade back that green color and make it look less important. We also discussed adding a section to the report that explains this map data, as Eric, I think you previously suggested. Also Luke suggested maybe we show all repetitive loss claims by pinpoints and in a table, which will visually show where damage really has occurred. Luke is going to get me that data, but Eric, he may call you to see what format would be best for the map.
Date	Page	Comment By Barbra Resnik, Douglas County Community Development	Agency	Response
8/30/2012	Risk Map	Provided comments on the Risk Map regarding whether 1) whether MGSD's wastewater ponds were considered in the analysis and reflect the correct hatching; 2) identified an area that is an A flood Zone but shows no risk; 3) identified Meridian Business Park in a AE flood zone which shows they are not a risk; 4) identified some areas that show as risk but are not even in a flood zone. Regarding the AAL table, what does "content" represent? Need to correct CWSCD to CWSD.	BR-DC	Most of these items are addressed in comments to Churchill County above. There was no information regarding the definition of "Contents" in the GIS Metadata. There was table information with the header "Contents" in the GIS attribute information. The example Discovery maps showed this column, so we added it to our Discovery map.
8/30/2012 & 9/13/2012	Hazard Map	This is not reflecting the January 20, 2010 FIRM. Maybe there should be a clearer explanation as to what this map is supposed to be reflecting. Need to correct CWSCD to CWSD.	BR-DC	The Douglas County GIS Flood Zones were reacquired on 11/19/2012. This is the best available information to us. Although it would be preferable to obtain from FEMA it was not accomplishable in a timely fashion.
8/30/2012	2	Recommended change - Outreach to community officials and stakeholders were conducted as part of the Discovery process.	BR-DC	No change made.
8/30/2012	3	Recommended change - The data was recorded and reviewed to determine usefulness.	BR-DC	No change made.
8/30/2012	5	Recommended change - Therefore, in 2010, the LiDAR dataset was reviewed and field data collected to validate the topographic dataset according to FEMA guidelines for topographic data to be used for floodplain analyses		Change has been made.
8/30/2012	10	Recommended Change - During this revision, floodways were developed or revised for the confined reaches of Bobwhite Wash, Buckeye Creek, Calle Hermosa Wash, Calle de Asco Wash, and Juniper Road Wash.	BR-DC	Change has been made.
8/30/2012	11	Recommended Change - In anticipation of another relatively wet year, the Lahontan Conservation District (LCD) performed debris removal of debris from the Carson River in their district to improve channel capacity.	BR-DC	Change has been made.
8/30/2012	12	Recommended Change - County officials have scheduled a meeting with FEMA representatives in early August-mid-September to discuss next steps, timing and funding for remapping the flood areas.	BR-DC	This sentence was removed based update that the 2010 maps will remain as best available information.
8/30/2012	12	Recommended Change - Douglas County Martin Slough Path — There is also work being done behind the Minden Inn that was identified as the CVIC pathway along the Martin Slough. This project needs to be mitigated in the floodway. Carson Valley Inn (CVI) has received approval from Douglas County for their Site Improvement Permit (SIP) #00675-02 for the North Parking Lot and Bike Trail Improvements. The Bike Trail will follow a path along the Martin Slough which is in an AE and AE (floodway) so the project has obtained an approval from FEMA for a Conditional Letter of Map Revision (CLOMR). Once US ACOE approval is obtained for work in the wetlands then construction is anticipated to commence.	BR-DC	Change has been made.
8/30/2012	16	Recommended Change - Douglas County is requesting a restudy of areas classified as "Zone A Base Flood Elevation Unknown" in an effort to establish floodways (if they exists) and determine elevations in order to implement floodplain development regulations.	BR-DC	Change has been made.
9/13/2012	Risk Map	Needs to reflect "current data", i.e.. Buildings, schools, Meridian Business Park, buildings at 395 & 88, CTH @ 395 & 88.	BR-DC	Added to Project List.
9/13/2012	Maps	Need to show street names.	BR-DC	Currently, only the large format plot will be included in the submittal. The scale of those maps is very large, and only allows for labeling the primary state routes. The smaller maps showing individual HUC locations were for discussion purposes during the discovery process, and will not be further updated at this time.

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Date	Page	Comment By Ron Juliff, Churchill County	Agency	Response
9/13/2012	Risk Map	Re-evaluate the 100 & 500 year flows and mapping with H&H study to include new development.	RJ-CC	Added to Project List.
9/13/2012	Risk Map	Additional communication/agreements with neighboring jurisdictions for flood control purposes.	RJ-CC	Added to Project List.
9/13/2012	Risk Map	Consider elevation/relocating properties at risk.	RJ-CC	Added to Project List.
Date	Page	Comment By Erik Nilssen, Douglas County Community Development	Agency	Response
9/13/2012	Flood Map	Use 2010 Maps.	EN-DC	See comments above under Barbra Resnik.
9/13/2012	Risk Map	DC has an interest in a regional flood control basin/structure on BLM land east of Ruhentroth to lower flows through Pine Nut Wash.	EN-DC	Added to Project List.
Date	Page	Comment By Patrick Fritchel, US Bureau of Reclamation	Agency	Response
9/12/2012	9	Lahontan Dam and Reservoir was constructed by the Bureau of Reclamation in 1911-1915 as part of the Newlands Project to divert and storm water from the Truckee River and Carson River basins to provide irrigation to lands near Fallon. It is located in Churchill County and is owned by the Bureau of Reclamation and operated by the Truckee-Carson Irrigation District. The dam also produces hydroelectric power. The total storage capacity of the Lahontan Reservoir is approximately 342,113,000 acre-feet to the top of the 20-inch high wooden flashboards on the spillways. It is located in Churchill County and is operated by the Truckee-Carson Irrigation District. The Lahontan Dam has a spillway elevation of 4162.0 feet and a top of flashboard elevation of 4163.67 (Lahontan Dam datum). The outlet works have a maximum discharge capacity of approximately 2250 cfs at a reservoir pool elevation of 4162. The two spillways are uncontrolled and have a combined maximum capacity of approximately 66,000 cfs at a reservoir pool elevation near the crest of the dam (elevation 4174). The dam is has a structural height of 162 feet in height and a crest length of 4,700 feet in length.	PF-USBR	Change has been made.
9/12/2012	11	US Bureau of Reclamation (USBR) Safety of Dams Project — The USBR Safety of Dams project was scheduled to begin in April 2012. Models used to manage Lahontan Dam operations include the RiverWare RiverWare daily model. In 2011, the RiverWare RiverWare daily flow model was used to optimize storage in Lahontan Reservoir. The results were useful in avoiding downstream flooding during a normal snowmelt event. USBR developed a real-time hourly model for projecting flow conditions during a forward five-day scenario, which would assist assessment of short-term flooding conditions. USBR personnel are planning a Carson River basin study similar to the one in progress for the Truckee River. The scoping process is to begin next year. (According to Tom Scott from BOR, We initially were going to start a scoping process for a basin study, but that is no longer in the planning process. Arlan Nickel (program manager on Truckee River Basin Study) may have discussed this with Ed James. Tom Scott (or Arlan) can talk to Ed if he still feels this is in place.)	PF-USBR	Confirmed with Ed James and changes made.
Date	Page	Comment By Zach Wood, Alpine County	Agency	Response
9/13/2012	Flood Map	Difference between FEMA and DWR at stateline. Expect FEMA on Alpine County to come closer to match in the future.	ZW-AC	No action at this time.
9/13/2012	Flood Map	Woodfords-Highway 88 Bridge and STPUD mainline is a known structured flood hazard areas.	ZW-AC	Added to Project List.
9/13/2012	Flood Map	County road, bridges, Crystal Springs, Diamond Valley, Laramie with possible flood risk.	ZW-AC	Added to Project List.
9/13/2012	Flood Map	State Highway 89/4 known flood damage in the past.	ZW-AC	Added to Project List.
Date	Page	Comment By Mitchell Blum, HDR	Agency	Response
9/13/2012	Risk Map	Showing proposed land use and ownership may help identify areas that can be preserved as open space or purchased to keep development out of hazard areas.	MB-HDR	We believe this is outside bounds of this project. This is a good comment and would be very important to stakeholders who are trying to regulate development in the floodplains. We could potential include as a project if there are specific areas known where acquisition is desired.
9/13/2012	Flood Map	Lyon County portion needs revision based on PMR. He will provide us revised flood delineation by October 11 deadline.	MB-HDR	HDR is unable to disseminate this information, as the study has not yet been approved by FEMA.
Date	Page	Comment By Jean Stone, NDEP	Agency	Response
9/13/2012	Risk Map	Review Carson Watershed Maps for ideas for conservation from Stewardship Plan. AAL data is not specific enough; maybe start with land use. Need to start with current firms and flood extent to identify risks.	JS-NDEP	We believe review of the land use maps and ownership as shown in the Stewardship plan are not within the scope of this project. from a cursory review of that plan, it did not appear any specific areas have been identified for open space easements or acquisition. Perhaps this could be a separate project to be added to the list. The need for a more refined risk assessment has been added to the project list.
Date	Page	Comments by the group during Discovery Meeting	Agency	Response
9/13/2012		Install additional gauges for the watershed.	Discovery Meeting	Added to Project List.
		Easements/leave floodplain as open areas.	Discovery Meeting	Added to Project List.
		Build wisely! Codes	Discovery Meeting	Added to Project List.

Draft Discovery Report Comments Table

Date	Page	Comments by Eric Simmons, FEMA	Agency	Response
9/13/2012	Cover	Replace blue rectangle with Carson River watershed photo or map. Could add the CWSO logo and/or logos of counties.	ES-FEMA	Change has been made.
9/13/2012	2	"Hydrologic code units" should be "hydrologic units code."	ES-FEMA	Change has been made.
9/13/2012	3	Do not believe there are facts sheets on all these. Happy to discuss.	ES-FEMA	Community Fact Sheets are included in Appendix.
9/13/2012	4	As a source for Hazard information add FEMA, NFHL, CA DWR, others?	ES-FEMA	Change has been made.
9/13/2012	4	As a source for Effective Models change to FEMA, NFHL?	ES-FEMA	Change has been made.
9/13/2012	5	Under topographic data, could add FEMA LIDAR in Douglas County.	ES-FEMA	Change has been made.
9/13/2012	6	According to FEMA's Region IX National Flood Insurance Program Website, Lyon County FEMA is currently working on the Walker River PMR, a new riverine analysis along the Walker River for 14.5 miles of detailed study on 14 panels in Lyon County.	ES-FEMA	Change has been made.
9/13/2012	8	Remove levees not in Carson River watershed.	ES-FEMA	Change has been made.
9/13/2012	9	Add "datum"? After 4162.0 feet.	ES-FEMA	Addressed in other edits.
9/13/2012	10	In September 2008, HDR Engineering Inc. was contracted by FEMA to complete a countywide DFIRM and FIS for the County of Churchill. This became effective on September 26, 2008.	ES-FEMA	Change has been made.
	10	During this revision, floodways were developed or revised for the confined reaches of Bobwhite...	ES-FEMA	Change has been made.
9/13/2012	10	Alpine County NO FIS Found. Add "The entire County is currently mapped by FEMA as Zone D."	ES-FEMA	Change has been made.
9/13/2012	10	Because of the Fernley levee canal breach, levees embankments associated with the extensive canal system in Churchill County are being reviewed by the Churchill County Engineer. Churchill County commissioned collection of a LiDAR topographic dataset of the levees and valleys throughout the Fallon area. The U.S. Army Corps of Engineers (USACE) is currently modeling portions of Churchill County using the LiDAR dataset. Some of the levees structures are 80-90...	ES-FEMA	Change has been made.
9/13/2012	11	If a levee breach canal failure similar to the Fernley breach occurs, the damage and cost could be great because commercial and residential buildings are in risk areas which were not previously developed. The goal is completion of the project before Sept. 30, 2012.	ES-FEMA	Change has been made.
9/13/2012	11	The statistical analysis of records from U.S. Geological Survey (USGS) streamgage records for the remainder of the Carson River watershed upstream from Lahontan Reservoir is in progress.	ES-FEMA	Change has been made.
9/13/2012	11	Suggestion - Could mention multi-year plan for remapping flood hazards along the Carson River?	ES-FEMA	Included in ongoing projects list.
9/13/2012	12	Douglas County FEMA Map Challenge - After four years of contesting the data used by the Federal Emergency Management Agency (FEMA) to develop flood maps for the Carson Valley, Douglas County successfully prevailed in a ruling from the Scientific Resolution Panel (SRP). FEMA would disagree with this sentence.	ES-FEMA	This has been modified based on update that the 2010 maps will remain as best available information.
9/13/2012	12	The panel has determined that FEMA's and Douglas County's data does not satisfy National Flood Insurance Program mapping standards.	ES-FEMA	This sentence was removed based on comment above.
9/13/2012	12	County officials have scheduled a meeting with FEMA representatives in early August on September 12, 2012, to discuss next steps, timing and funding for remapping the flood areas.	ES-FEMA	This sentence was removed based on comment above.
9/13/2012	12	The Pine Nut Pre-Disaster Mitigation (PRM-PDM) grant...	ES-FEMA	Correction was made to keep PMR but remove grant.
9/13/2012	13	They are creating website links which could serve the Carson River data through the USGS website.	ES-FEMA	Change has been made.
9/13/2012	13	CWSO is a part of an experimental in which FEMA technical partners sign a charter agreeing to work together on regional basis. Not sure that this sentence is intended to say. Rewrite to discuss RiskMAP Charter.	ES-FEMA	Change has been made.
9/13/2012	14	Could mention March 21, 2012, meeting and definitely September 13th meeting.	ES-FEMA	Change has been made.
9/13/2012	14	Discuss CWSO's Multiyear plan to restudy Carson River. Include graphics from HDR?	ES-FEMA	Added to Project List.
9/13/2012	15	Recently with the Freeway project and CLOMR, the 1% annual chance flood flow was revised to 1,232 cfs, but had not accounted for the flood control facilities. What does that mean?	ES-FEMA	Received clarification from Robb Fellows and change has been made.
9/13/2012	15	This tributary consists of drains (?) approximately 23 square miles and is located south end of Carson City and north border of Douglas County.	ES-FEMA	Change has been made.
9/13/2012	15	It is anticipated that the establishing elevations may remove large areas from the mapped floodplain.	ES-FEMA	Change has been made.
9/13/2012	15	Lahontan Reservoir was not designed as a flood control work.	ES-FEMA	Change has been made.
9/13/2012	16	Communities that stand to benefit from such a structure would be Silver Springs, Churchill County and the City of Fallon. The figures below are provided for reference. Add Figures?	ES-FEMA	Sentence regarding figures was removed as it was erroneously carried over from another area.
9/13/2012	17	Add restudy of Carson River as high priority.	ES-FEMA	Added to Project List.
9/13/2012	17	All projects are prioritized as medium?	ES-FEMA	Projects will be prioritized by the Discovery Charter group.
9/13/2012	18	Could also add (perhaps as low priority?). Update to Alpine County's lapsed mitigation plan, development of a mitigation plan in Lyon County, and others?	ES-FEMA	Added to Project List.
9/17/2012		Provided insurance policy information.	ES-FEMA	Added to Community Fact Sheets.

Date	Page	Comments by Rob Loveberg, Lyon County	Agency	Response
10/5/2012		Dayton Valley Conservation District and R.O. Anderson have completed numerous bank stabilization projects along the Carson River in Dayton Valley.	RL-L	Added to report under completed projects.
10/5/2012		The modeling and studies are complete for the Ramsey Canyon Project. The County is currently working on the hydrology only LOMR in order to get FEMA's approval of those numbers so that other engineers are comfortable using them.	RL-L	Added to report under on-going projects.
10/5/2012		Lyon County is currently working on their Hazard Mitigation Plan.	RL-L	Added to report under on-going projects.
10/5/2012		Due to the Carson River undercutting the bank adjacent to River Road in Dayton, Nevada, there is an immediate need to stabilize the bank. This will not only save the road infrastructure but will also protect a home in close proximity to the area and at risk should the bank fail. This project is rated as Lyon County's #1 priority because there is an immediate need and immediate risk.	RL-L	Added to Project List.
10/5/2012		Lyon County has several project needs along the Carson River for bank stabilization. Several of the projects, including the River Road Project and the Fort Churchill Project, would be eligible under FEMA HMGA Program for grant funding. However, there is an issue with the area being designated as a Superfund site. In a previous application, the Fort Churchill Project was selected for further review and then later denied based on being located in the Superfund site. Because funding for PDM was pulled shortly after this decision was made, it was left unclear what the basis of denial was. It would be worth the effort for the Charter to meet with representatives from FEMA, NDEP, DEM, and DWR to discuss whether with appropriate explanation, these sites could be eligible under FEMA's programs.		Added to Project List.
10/5/2012		Lyon County has a need for a drainage system to improve conveyance of alluvial fan drainages to the Carson River. However, before such a system could be put into place, these alluvial fans would need to be studied and re-studied in order to analyze flows and thereby determine what kind of system is needed. Then conveyances would then need to be constructed and maintained.		Added to Project List.
10/5/2012		Lyon County would like additional gages for flood warning.	RL-L	Included under Early Warning Project - Watershed-Wide on Project List.