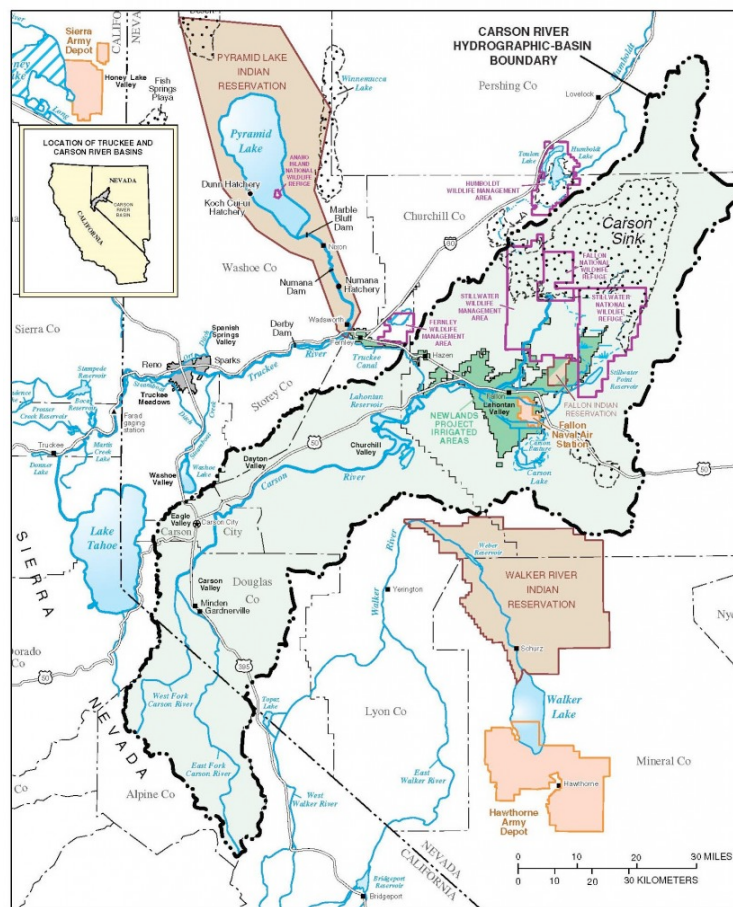




# Carson River Flood Mitigation Plan

For jurisdictions of Alpine County, Carson City, Douglas County, and Lyon County



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# CARSON RIVER FLOOD MITIGATION PLAN

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## Executive Summary

New Flood Insurance Rate Maps (FIRMs) are being generated for the Carson River watershed, which will establish special flood hazard areas along the entire Carson River. This Flood Mitigation Plan is a multi-jurisdictional effort led by the Carson Water Subconservancy District to prioritize mitigation measures implemented by each jurisdiction in conjunction with the new FIRMs. Affected jurisdictions include Alpine County, Carson City, Douglas County, and Lyon County.

New FIRMs will not change the nature of flood hazards within the Carson River basin, but will have a significant effect on the community, especially those properties mapped within the special flood hazard area. New FIRMs benefit the Carson River area by identifying flood hazards so that the community can better improve public safety and property protection during future flood events. New flood maps also bring flood insurance requirements and limitations on uses of property.

This plan recommends mitigation measures from a variety of flood management activities listed in existing hazard mitigation plans, comprehensive plans, and floodplain management plans from local communities within the Carson River watershed. These mitigation measures are prioritized according to the effectiveness of each activity based on the individual needs of each jurisdiction.

Activities are prioritized for each jurisdiction based on costs/benefit analysis according to the following factors:

- Level of support by the local community and its elected officials.
- Technical challenges, administrative support, and economic impacts compared to resources available
- Legal necessity or potential legal challenges associated with the activity.
- Anticipated environmental benefits.



This plan recommends the most cost-effective and beneficial activities to be implemented as mitigation measures by each jurisdiction in three implementation phases. Mitigation measures are separated into three categories: ordinances, programs, and projects. Ordinances are regulations to be adopted by each jurisdiction, mostly related to development and land use. Programs are community-led endeavors to improve each jurisdiction's floodplain management program through targeted use of finances and staff resources. Projects are construction-based solutions that are recommended to mitigate flood hazards.

This plan provides a convenient action plan that each jurisdiction can use to implement mitigation measures to improve public awareness, enhance public safety, and prevent loss of life and property.

## Table Of Contents

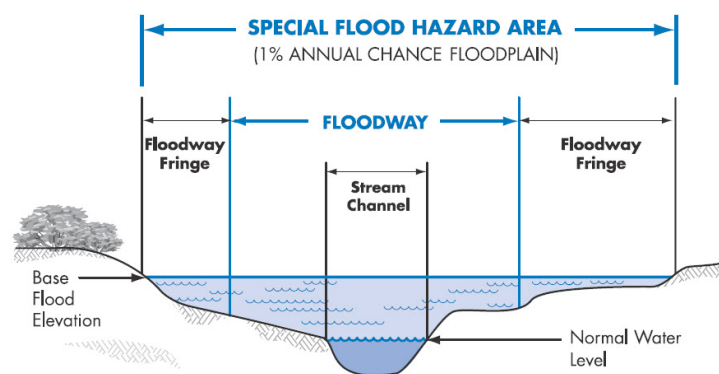
Executive Summary .....	1
Table of Contents .....	2
Introduction to Mitigation Measures .....	3
Recommended Mitigation Measures .....	5
All-Jurisdiction Implementation Plan .....	6
Alpine County Implementation Plan .....	8
Carson City Implementation Plan .....	9
Douglas County Implementation Plan .....	10
Lyon County Implementation Plan .....	11
Carson Water Subconservancy District Implementation Plan .....	12
Mitigation Measure Descriptions .....	13
Appendix A: Activity Summary .....	33
Appendix B: Activity Worksheets .....	38
Alpine County .....	39
Carson City .....	48
Douglas County .....	56
Lyon County .....	65
Carson Water Subconservancy District .....	74
Appendix C: Activities Eliminated from Consideration .....	83
Appendix D: Final Investigation Plan .....	88

# Introduction To Mitigation Measures

## National Flood Insurance Program (NFIP)

Through the NFIP, FEMA regulates flood insurance based on flood levels that have a one percent likelihood of being reached each year, otherwise known as the 100-year flood or base flood. FEMA creates Flood Insurance Rate Maps (FIRMs) that depict the best available information about flooding within a community. The area subject to flooding during a base flood event is called the special flood hazard area (SFHA). The SFHA consists of two primary regulatory areas: (1) floodway; and (2) floodway fringe, or floodplain. The floodway is the area of high velocity flow where most flood waters are being conveyed downstream; the floodplain is the area of low velocity and storage of flood waters.

While the nature of flooding does not change in an area that is newly mapped by FIRMs, a community undergoes significant changes as a result of new flood information. Flood insurance is available for all owners and residents in the community and is mandatory for most insurable buildings in the SFHA. The allowed uses in the SFHA are restricted, where new structures must be elevated and otherwise constructed to prevent flood damage.



## Flood Insurance

Flood insurance premiums are established and fixed at the federal level. Premium rates are based on multiple factors, such as flood zone, building valuation, contents valuation, and height above or below the base flood elevation. Flood insurance is available for all insurable buildings whether or not they are located in the special flood hazard area. However, flood insurance is required for all buildings that have federally backed mortgages within the special flood hazard area.

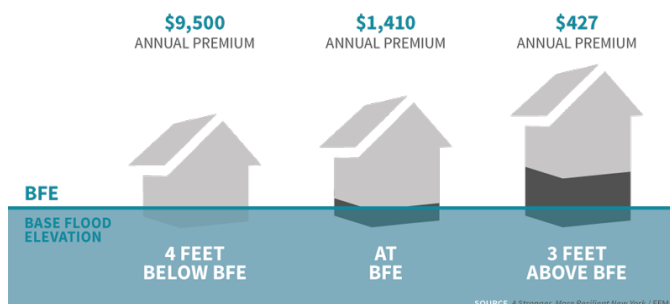
For most buildings, flood insurance premiums can be reduced only by making physical changes through elevating the structure on higher foundation walls, filling the basement, or relocating the structure outside the SFHA. Occasionally, additional survey information can bring a reduction in flood insurance rates where existing information was lacking or inaccurate.

## Development Regulations

The finish floor elevation of new buildings and substantial improvements, including mechanical and electrical equipment, must be elevated at or above the base flood (100-year) elevation. Most communities choose to require elevation of buildings one foot or more above the base flood elevation to account for cumulative impacts that can cause an incremental increase the base flood elevation over time. Buildings that existed prior to adoption of a FIRM do not need to be modified in order to meet current regulations unless they become substantially improved or substantially damaged.

Floodway areas have the greatest restrictions, where development activities are prohibited unless accompanied by certification from an engineer that the project will not cause a rise in the base flood elevation. Placement of fill materials is generally prohibited in the floodway and allowed within the floodplain. NFIP requirements do not address the potential

for increased runoff resulting from new impervious surfaces that accompany development projects. Base flood elevations generally increase slowly over time because of cumulative effects from additional fill materials in the floodplain and new impervious surfaces within the entire watershed.



## Mitigation Measures

For many years, engineers and government officials looked to dams, flood walls, concrete channels, and other structural measures in order to manage flood waters. Not only were these structural activities costly, but often they did not accomplish their intended purpose while also resulting in negative impacts to the environment. In order to provide a balanced approach to floodplain management, FEMA identifies six general categories of mitigation measures:

Preventive Activities	Activities that prevent flood problems from getting worse, generally through regulations. Land uses and development in flood-prone areas are limited through planning, land acquisition, or regulation. Regulations are usually administered by building, zoning, planning, and/or code enforcement offices.
Property Protection	Physical changes to property that are undertaken on a building-by-building or parcel basis, such as retrofitting, elevating, or relocating existing buildings.
Natural Resource Protection	Preservation or restoration of natural areas in order to preserve the natural functions of floodplain and watershed areas. These activities can be implemented by a variety of agencies, primarily parks, recreation, or conservation agencies or organizations.
Emergency Services Measures	Emergency management measures that are taken during a flood emergency to minimize its impact.
Structural Projects	Physical construction projects that keep flood waters away from an area with a levee, reservoir, or other flood control measures.
Public Information	Outreach efforts that advise property owners, potential property owners, residents, and visitors about the hazards, ways to protect people and property from the hazards, and the natural and beneficial functions of local floodplains.

# Recommended Mitigation Measures

## Selection Process

The process for selecting mitigation measures was initiated by reviewing floodplain management activities from existing plans and reports within all jurisdictions as shown in the Final Investigation Plan (Appendix D). The Investigation Plan eliminated activities from further consideration based on the following factors: (1) activities that have been fully implemented; (2) activities that provide limited benefit; and (3) activities that are challenging, expensive, or cost-prohibitive to implement.

Activities identified in the Investigation Plan as eligible for further consideration have been prioritized based on a scoring system unique to each jurisdiction. These activities have been analyzed based on each jurisdiction's unique preferences, characteristics, and resources as shown in Appendix B. The activity summary in Appendix A identifies the most cost-effective and beneficial activities to be implemented as mitigation measures by each jurisdiction based on their own individual needs. This report compiles those mitigation measures into an action plan that each jurisdiction can use to implement mitigation measures to improve public awareness, enhance public safety, and prevent loss of life and property.

Mitigation measures are separated into three categories: ordinances, programs, and projects. Ordinances are regulations to be adopted by each jurisdiction, mostly related to development and land use. Programs are community-led endeavors that improve each jurisdiction's floodplain management program through targeted use of finances and staff resources. Projects are construction-based solutions that are recommended to mitigate flood hazards. More detailed descriptions of each mitigation measure are included under the heading "Mitigation Measure Descriptions" below.

## Implementation Summary

Mitigation measures have been prioritized based on potential benefit and cost-effectiveness of implementation. Those measures that are most cost-effective and easiest to implement are generally recommended for early implementation, where those that are less desirable are recommended for later implementation.

Implementation is divided into three phases: (1) highest priority measures to be implemented within 2 years; (2) medium priority measures to be implemented within 3 to 5 years; and (3) lower priority mitigation measures to be implemented in the future, likely greater than 5 years. This implementation schedule should be evaluated yearly by each jurisdiction in order to accommodate changes in local priorities and resources.

Table 1 below is a summary of all mitigation measures and their recommended implementation schedules for all jurisdictions. This table demonstrates how ordinances, programs, and projects are recommended for implementation within each jurisdiction and illustrates how common mitigation measures will be coordinated. Table 1 below also specifies where individual jurisdictions have either completed specific mitigation measures or have considered them to not be applicable. Tables 2 through 6 display the same implementation schedules that are demonstrated in Table 1, but individually for each jurisdiction.

**Table 1 - All Jurisdiction Implementation Plan****Legend:**

- 1st: 1st Implementation Phase - Within 2 years
- 2nd: 2nd Implementation Phase - Within 3 to 5 years
- Future: Future Implementation Phase
- Done: Completed
- N/A: Not applicable

Ref.	Mitigation Measure	Alpn	Crnsn	Dgls	Lyon	CWSD
Ordinances						
1	Model Floodplain Ordinance	1st	1st	1st	1st	1st
2	Limit Increased Density	1st	1st	Future	1st	N/A
3	Critical facilities	1st	Done	1st	1st	N/A
4	Hazardous Materials	1st	Done	1st	1st	N/A
5	Low Impact Development Impediments	2nd	2nd	1st	2nd	1st
6	Low Impact Development Incentives	2nd	2nd	1st	2nd	1st
7	Low Impact Development Standards	1st	1st	1st	1st	1st
8	Road and Bridge Design	2nd	Done	Done	2nd	1st
9	Additional Freeboard	2nd	Done	Done	Future	N/A
10	Density Clustering	Done	Done	Done	2nd	N/A
11	BMPs for Riparian Habitat	Future	Done	Done	2nd	N/A
12	Protect Natural Channels	2nd	2nd	2nd	2nd	2nd
13	Transfer of Development Rights/Density	1st	1st	Done	1st	1st
14	Enclosures Below Base Flood Elevation	Future	2nd	Future	Future	N/A
15	Compensatory Storage	Future	Done	1st	Future	N/A
16	Floodway Standard	Future	1st	Done	Future	N/A
17	Subdivision Plats	1st	Done	Done	1st	N/A
18	Substantial Improvements/Damage	Future	Future	2nd	Future	N/A



Ref.	Mitigation Measure	Alpn	Crns	Dgls	Lyon	CWSD
Programs						
1	Public Outreach	1st	1st	1st	1st	1st
2	Retain Natural Floodplain Areas	Future	2nd	Done	Future	Future
3	Update Flood Management Plan	1st	1st	1st	2nd	1st
4	Real Estate Notification	Future	1st	2nd	1st	1st
5	Restore Natural Floodplain Functions	Future	Done	Future	Future	2nd
6	Low Impact Development GIS Data	Future	Future	Future	Future	2nd
7	Low Impact Development Promotion	Future	Future	Future	Future	Future
8	Flood Photo-Monitoring	Future	Future	Future	Future	2nd
9	Hazard Identification	Future	Future	Future	Future	2nd
10	Flood Response Coordination	2nd	Done	Done	2nd	N/A
11	Flood Warning System	Future	Future	2nd	Future	N/A
12	Watershed Outreach Plan	Future	2nd	2nd	Future	2nd
13	Flood Response Information Plan	2nd	1st	1st	1st	2nd
14	Website Information	1st	Done	Done	1st	Done
15	Flood Mitigation and Insurance Reduction	Future	Done	Future	Future	1st
16	Stormwater Master Plan	Future	2nd	2nd	Future	2nd
Projects						
1	Low Impact Development Projects	Future	Future	Future	Future	1st
2	Flood Reduction Projects	Future	Done	2nd	Future	2nd
3	Stream Rehabilitation Projects	Future	2nd	2nd	Future	2nd
4	Rain and Stream Gauge Installation	Future	Done	1st	Future	1st
5	Enhance Grade Control Structures	Future	2nd	2nd	Future	2nd



**Table 2 - Alpine County Implementation Plan**

Type	Ref.	Mitigation Measure
<b>1st Implementation Phase</b>		
Ordinance	1	Model Floodplain Ordinance
Ordinance	2	Limit Increased Density
Ordinance	3	Critical facilities
Ordinance	4	Hazardous Materials
Ordinance	7	Low Impact Development Standards
Ordinance	13	Transfer of Development Rights/Density
Ordinance	17	Subdivision Plats
Program	1	Public Outreach
Program	3	Update Flood Management Plan
Program	14	Website Information
<b>2nd Implementation Phase</b>		
Ordinance	5	Low Impact Development Impediments
Ordinance	6	Low Impact Development Incentives
Ordinance	8	Road and Bridge Design
Ordinance	9	Additional Freeboard
Ordinance	12	Protect Natural Channels
Program	10	Flood Response Coordination
Program	13	Flood Response Information Plan

**Table 3 - Carson City Implementation Plan**

Type	Ref.	Mitigation Measure
<b>1st Implementation Phase</b>		
Ordinance	1	Model Floodplain Ordinance
Ordinance	2	Limit Increased Density
Ordinance	7	Low Impact Development Standards
Ordinance	13	Transfer of Development Rights/Density
Ordinance	16	Floodway Standard
Ordinance	1	Public Outreach
Program	3	Update Flood Management Plan
Program	4	Real Estate Notification
Program	13	Flood Response Information Plan
<b>2nd Implementation Phase</b>		
Ordinance	5	Low Impact Development Impediments
Ordinance	6	Low Impact Development Incentives
Ordinance	12	Protect Natural Channels
Ordinance	14	Enclosures Below Base Flood Elevation
Program	2	Retain Natural Floodplain Areas
Program	12	Watershed Outreach Plan
Program	16	Stormwater Master Plan
Projects	3	Stream Rehabilitation Projects
Projects	5	Enhance Grade Control Structures

**Table 4 - Douglas County Implementation Plan**

Type	Ref.	Mitigation Measure
<b>1st Implementation Phase</b>		
Ordinance	1	Model Floodplain Ordinance
Ordinance	3	Critical facilities
Ordinance	4	Hazardous Materials
Ordinance	5	Low Impact Development Impediments
Ordinance	6	Low Impact Development Incentives
Ordinance	7	Low Impact Development Standards
Ordinance	15	Compensatory Storage
Program	1	Public Outreach
Program	3	Update Flood Management Plan
Program	13	Flood Response Information Plan
Projects	4	Rain and Stream Gauge Installation
<b>2nd Implementation Phase</b>		
Ordinance	12	Protect Natural Channels
Ordinance	18	Substantial Improvements/Damage
Program	1	Public Outreach
Program	4	Real Estate Notification
Program	11	Flood Warning System
Program	12	Watershed Outreach Plan
Program	16	Stormwater Master Plan
Projects	2	Flood Reduction Projects
Projects	3	Stream Rehabilitation Projects
Projects	5	Enhance Grade Control Structures

**Table 5 - Lyon County Implementation Plan**

Type	Ref.	Mitigation Measure
<b>1st Implementation Phase</b>		
Ordinance	1	Model Floodplain Ordinance
Ordinance	2	Limit Increased Density
Ordinance	3	Critical facilities
Ordinance	4	Hazardous Materials
Ordinance	7	Low Impact Development Standards
Ordinance	13	Transfer of Development Rights/Density
Ordinance	17	Subdivision Plats
Program	1	Public Outreach
Program	4	Real Estate Notification
Program	13	Flood Response Information Plan
Program	14	Website Information
<b>2nd Implementation Phase</b>		
Ordinance	5	Low Impact Development Impediments
Ordinance	6	Low Impact Development Incentives
Ordinance	8	Road and Bridge Design
Ordinance	10	Density Clustering
Ordinance	11	BMPs for Riparian Habitat
Ordinance	12	Protect Natural Channels
Program	3	Update Flood Management Plan
Program	10	Flood Response Coordination

**Table 6 - Carson Water Subconservancy District Implementation Plan**

Type	Ref.	Mitigation Measure
<b>1st Implementation Phase</b>		
Ordinance	1	Model Floodplain Ordinance
Ordinance	5	Low Impact Development Impediments
Ordinance	6	Low Impact Development Incentives
Ordinance	7	Low Impact Development Standards
Ordinance	8	Road and Bridge Design
Ordinance	13	Transfer of Development Rights/Density
Program	1	Public Outreach
Program	3	Update Flood Management Plan
Program	4	Real Estate Notification
Program	15	Flood Mitigation and Insurance Reduction
Projects	1	Low Impact Development Projects
Projects	4	Rain and Stream Gauge Installation
<b>2nd Implementation Phase</b>		
Ordinance	12	Protect Natural Channels
Program	5	Restore Natural Floodplain Functions
Program	6	Low Impact Development GIS Data
Program	8	Flood Photo-Monitoring
Program	9	Hazard Identification
Program	12	Watershed Outreach Plan
Program	13	Flood Response Information Plan
Program	16	Stormwater Master Plan
Projects	2	Flood Reduction Projects
Projects	3	Stream Rehabilitation Projects
Projects	5	Enhance Grade Control Structures

## Mitigation Measure Descriptions

MITIGATION MEASURE - ORDINANCE 1	
Title	Model Floodplain Ordinance
Summary:	Create a floodplain ordinance based on the statewide model ordinance and the watershed-wide hydraulic model in order to implement National Flood Insurance Program requirements
Implementation	<p>The same hydraulic flood model that is the source of the FEMA Flood Insurance Study and Flood Insurance Rate Maps will be used for regulating development projects throughout the watershed. The requirements for use of the hydraulic model will include thresholds for which the model will be used and requirements for mitigation consistent with the National Flood Insurance Program (NFIP).</p> <p>The ordinance will not only include requirements for using the hydraulic flood model, but will be consistent with the statewide model ordinance(s) for Nevada and/or California to ensure that all jurisdictions meet federal requirements. All jurisdictions may consider optional alternatives that are recommended by the State of Nevada and may be included or excluded at the discretion of each jurisdiction. State-recommended alternatives include:</p> <ul style="list-style-type: none"> <li>• Include a substantial daily fine for each day a violation continues</li> <li>• Establish specific guidelines for determining base flood elevations in unnumbered A zones</li> <li>• Limit increases in base flood elevation to one-half foot in flood prone areas where floodways have not been determined</li> <li>• Increase minimum freeboard to two feet above the base flood elevation</li> <li>• Limit the methods for determining market value for substantial improvements</li> <li>• Include repetitive loss provisions for Increased Cost of Compliance coverage</li> <li>• Require non-conversion agreements for enclosures below the base flood elevation</li> </ul>
Benefits	<p>NFIP compliance</p> <p>Consistent application of hydraulic model throughout watershed</p> <p>Consistency with statewide model flood ordinance</p>
Challenges	Technical complexity of hydraulic model
Activity Codes	PA-02

MITIGATION MEASURE - ORDINANCE 2	
Title	Limit Increased Density
Summary:	Restrict zone changes within the floodplain to limit density
Implementation	<p>Zoning ordinance criteria will be modified to restrict zone changes to a higher density within floodplains. This can be accomplished in low-density and open space zones by prohibiting zone changes except for natural, open-space uses. In zones with a variety of potential uses, zone change criteria shall limit uses in floodplains to those that have equal or less density than the original zone.</p> <p>The applicable zoning criteria include but are not limited to the following:</p> <ul style="list-style-type: none"> <li>• Alpine County Chapter 18.84.040 (Action by Planning Commission)</li> <li>• Carson City Title 18.02.070(7) (Master Plan - Review Procedures)</li> <li>• Douglas County Title 20.608.040 (Findings for Master Plan Amendments)</li> <li>• Lyon County Title 15.210.03 (Findings for Master Plan Amendments)</li> </ul>
Benefits	<p>Preserves open space</p> <p>Reduces density in floodplain areas</p>
Challenges	Reduces economic opportunity by limiting development
Activity Codes	PA-03

MITIGATION MEASURE - ORDINANCE 3	
Title	Critical facilities
Summary:	Prohibit critical facilities within the floodplain
Implementation	<p>Establish restrictions that prohibit construction of new critical facilities in the floodplain. Exceptions may apply for existing campuses (e.g., hospitals, schools) in floodplain areas where new facilities are essential to the proper function of the overall campus. Potential implementation options include:</p> <ul style="list-style-type: none"> <li>• Review community master plans to identify areas where critical facilities are allowed and limit allowed uses in floodplain areas.</li> <li>• Compile existing GIS information to locate existing critical facilities in floodplains. Identify potential safety problems related to building damage or street inundation.</li> <li>• Add critical facility definitions to floodplain ordinances</li> <li>• Adopt an ordinance prohibiting construction of new critical facilities</li> <li>• Adopt an ordinance limiting expansion of campuses where critical facilities are proposed</li> </ul>
Benefits	<p>Improves public safety and emergency response</p> <p>Eligible for Community Rating System credits</p>
Challenges	Limits opportunities for expansion of critical facilities
Activity Codes	PA-12



MITIGATION MEASURE - ORDINANCE 4	
Title	Hazardous Materials
Summary:	Limit storage or processing of hazardous materials in the floodplain
Implementation	<p>Restrict new uses within the floodplain that include storage or processing of hazardous materials. Identify limitations for existing uses that include hazardous material storage and processing. Potential implementation options include:</p> <ul style="list-style-type: none"> <li>• Investigate existing uses to determine where hazardous materials are being stored or processed in the floodplain</li> <li>• Coordinate with property owners to establish limitations for storage and processing of hazardous materials in the floodplain</li> <li>• Adopt an ordinance restricting storage and processing of hazardous materials, including a provision for exemption of existing non-conforming uses</li> </ul>
Benefits	Protect environment from hazardous materials in flood waters
Challenges	Limits economic endeavors where hazardous materials are used
Activity Codes	PA-16

MITIGATION MEASURE - ORDINANCE 5	
Title	Low Impact Development Impediments
Summary:	Eliminate existing policies and standards that inadvertently prohibit or discourage low impact development practices
Implementation	<p>All development codes, policies, and standards will be reviewed to identify and eliminate regulations that prohibit or discourage low impact development practices. Examples may include:</p> <ul style="list-style-type: none"> <li>• Standard street cross-sections require curb, gutter, and sidewalk configurations that do not allow for vegetative sales</li> <li>• Stormwater standards require piped drainage</li> <li>• Minimum block lengths and street connectivity standards mandate waterway crossings from new streets</li> <li>• Building storm drain piping must connect directly to a public storm drain system</li> </ul>
Benefits	<p>Maximizes opportunity for stormwater benefits from LID techniques</p> <p>Eligible for Community Rating System credits</p>
Challenges	Staff resources needed to research codes and standards and adopt ordinances
Activity Codes	PA-18

MITIGATION MEASURE - ORDINANCE 6	
Title	Low Impact Development Incentives
Summary:	Provide incentives for developers to use low impact development practices
Implementation	<p>Adopt ordinance or standards identifying incentives that may encourage the use of low impact development practices including but not limited to the following:</p> <ul style="list-style-type: none"> <li>• Reduce or eliminate applicable permit fees based on the percentage of LID used</li> <li>• Allow higher densities to offset additional open space needed for LID facilities.</li> <li>• Satisfy stormwater flow control and quality standards through installation of LID facilities without the need for detailed stormwater calculations.</li> </ul>
Benefits	<p>Reduced stormwater discharge from impervious surfaces Improved stormwater through natural filtration and groundwater recharge Eligible for Community Rating System credits</p>
Challenges	Staff resources needed to implement new programs
Activity Codes	PA-20

MITIGATION MEASURE - ORDINANCE 7	
Title	Low Impact Development Standards
Summary:	Incorporate low impact development into projects throughout the development planning process
Implementation	<p>Modify development codes and handouts to require incorporation of low impact development practices into development, re-development, and retrofit projects. Establish thresholds where LID elements are required as part of the overall stormwater design. Potential implementation options include:</p> <ul style="list-style-type: none"> <li>• Adopt LID construction standards applicable to the Carson River watershed</li> <li>• Adopt an ordinance establishing thresholds for which new developments trigger installation of LID facilities, generally based on amount of new or replaced impervious surface and/or overall project cost</li> <li>• Adopt an ordinance establishing minimum landscaping/open space requirements to ensure that LID facilities are installed to the maximum extent feasible.</li> <li>• Create a public outreach program to educate development professionals about new LID requirements</li> </ul>
Benefits	<p>Reduced stormwater discharge from impervious surfaces Improved stormwater through natural filtration and groundwater recharge Eligible for Community Rating System credits</p>
Challenges	<p>Additional development costs for LID facilities Staff resources needed to implement new programs</p>
Activity Codes	PA-17, PA-19

MITIGATION MEASURE - ORDINANCE 8	
Title	Road and Bridge Design
Summary:	Design future bridges and roads to protect floodplain, accommodate and not restrict changing river course, and minimize back up of flood water.
Implementation	<p>Review construction standards for roads and bridges to ensure adequate protection of natural channels and flow of flood waters:</p> <ul style="list-style-type: none"> <li>• Identify critical transportation corridors that may be affected by flood waters</li> <li>• Create critical route maps for emergency service providers during a flood.</li> <li>• Adopt an ordinance establishing criteria for when roads/bridges should be elevated to remain passable during major floods</li> <li>• Adopt a construction standard establishing thresholds on larger streams to determine when bridges are preferred instead of culverts to maximize stream health</li> </ul>
Benefits	<p>Improve transportation safety  Maintain stream flows at street crossings  Eligible for Community Rating System credits</p>
Challenges	<p>Staff resources needed to implement program  Additional costs for installation of road/bridge projects</p>
Activity Codes	SP-02

MITIGATION MEASURE - ORDINANCE 9	
Title	Additional Freeboard
Summary:	Require additional freeboard to elevate building floors higher above the base flood elevation
Implementation	Require building floors and mechanical/electrical equipment to be elevated higher above the base floor than the minimum FEMA standard. The State of Nevada recommends that buildings be elevated two foot above the base flood elevation
Benefits	<p>Reduces risk of flood damage  Accommodates for incremental increases in flood levels over time  Eligible for Community Rating System credits</p>
Challenges	Additional development costs
Activity Codes	PA-10

MITIGATION MEASURE - ORDINANCE 10	
Title	Density Clustering
Summary:	Allow development on flood prone properties to be clustered out of the floodplain
Implementation	<p>Provide flexibility in lot sizes and density requirements on properties subject to flooding in order to allow increased density outside the flood prone areas in exchange for open space or low density in floodplains. The goal is that all buildings and lots are clustered outside of the regulatory floodplain.</p> <p>Modify subdivision, zoning, and/or planned unit development ordinances to require or encourage developments to be restricted in the floodplain, while allowing increased density and modified development standards in the portions of the development site located outside the floodplain. All of the land in the regulatory floodplain is preserved as open space.</p>
Benefits	<p>Preserves open space</p> <p>Eligible for Community Rating System credits</p>
Challenges	Limits development opportunities
Activity Codes	PA-09

MITIGATION MEASURE - ORDINANCE 11	
Title	BMPs for Riparian Habitat
Summary:	Promote and utilize best management practices as a means of protecting riparian habitat.
Implementation	<p>Establish best management practices (BMPs) within riparian areas to support the “living river” concept. BMPs may include tree protection/planting, preservation of natural vegetation, stormwater controls, additional erosion control measures, and other related measures. Potential implementation options include the following:</p> <ul style="list-style-type: none"> <li>• Tabulate natural riparian areas and where riparian protection is warranted</li> <li>• Create a riparian action plan to specify appropriate BMPs</li> <li>• Adopt an ordinance establishing use limitations and BMP standards in riparian areas</li> </ul>
Benefits	Supports “living river” concept
Challenges	Limits development opportunities
Activity Codes	NR-03

<b>MITIGATION MEASURE - ORDINANCE 12</b>	
Title	Protect Natural Channels
Summary:	Identify methods for protecting natural channels
Implementation	<p>Natural channels can be degraded through removal of natural vegetation, construction of culvert crossings, or other impediments. Encourage reestablishment of natural channels where large piped systems have been installed in place of historical stream channels. Implementation may include one or more of the following:</p> <ul style="list-style-type: none"> <li>• Review existing codes and standards for impediments to protection of natural channels. Adopt ordinances to encourage channel protection.</li> <li>• Establish construction standards that encourage use of non-structural bioengineering techniques along natural channels. Limit the use of future management measures such as dams, levees, and flood walls.</li> </ul>
Benefits	<p>Supports “living river” concept Eligible for Community Rating System credits</p>
Challenges	Limits engineering solutions and increases costs along natural channels
Activity Codes	NR-06, NR-20, NR-21, NR-22

<b>MITIGATION MEASURE - ORDINANCE 13</b>	
Title	Transfer of Development Rights/Density
Summary:	Property owners may transfer density between properties to preserve open space
Implementation	<p>Use Douglas County’s current regulations for transfer of density or property rights as a model for other jurisdictions to use as a means for preserving open space. Douglas County’s Transfer of Development Rights program is described in Title 20.500</p>
Benefits	<p>Preserves open space Eligible for Community Rating System credits</p>
Challenges	Staff resources needed to administer program
Activity Codes	NR-01

MITIGATION MEASURE - ORDINANCE 14	
Title	Enclosures Below Base Flood Elevation
Summary:	Prohibit first floor enclosures below the base flood elevation, except crawlspaces
Implementation	Adopt an ordinance prohibiting construction of new enclosed areas beneath elevated structures, except for crawlspaces constructed pursuant to FEMA guidelines. Crawlspace heights are limited to 4 feet maximum. Taller crawlspace or basement areas would need to be backfilled to limit interior height or be constructed on piles without rigid foundation walls.
Benefits	Eligible for Community Rating System credits
Challenges	Limits available options for building construction techniques
Activity Codes	PA-13

MITIGATION MEASURE - ORDINANCE 15	
Title	Compensatory Storage
Summary:	Require compensatory storage for new fill materials in the floodplain
Implementation	When fill is proposed within the floodplain, require compensatory storage at hydrologically equivalent sites up to a ratio of 1.5 to 1. Carson City's Title 12.09.080(9) (Protection of Floodplain Storage Capacity) may be used as a basis for ordinances in other jurisdictions.
Benefits	Preserves flood storage capacity Reduces likelihood of incremental increases to flood heights over time Eligible for Community Rating System credits
Challenges	Limits development opportunities in the floodplain
Activity Codes	PA-14, PA-15

MITIGATION MEASURE - ORDINANCE 16	
Title	Floodway Standard
Summary:	Restrict the floodway standard to less than one foot of elevation increase
Implementation	Develop future flood studies by using a floodway standard less than one foot of elevation increase. The requirement would not affect existing floodway designations until modified through a new flood insurance study. Douglas County Title 20.50.100 (Floodplain development permits) may be used as a template for other jurisdictions
Benefits	Limits incremental increases in flood heights Eligible for Community Rating System credits
Challenges	Larger floodway places greater restrictions on land use and development
Activity Codes	PA-26

MITIGATION MEASURE - ORDINANCE 17	
Title	Subdivision Plats
Summary:	Require that floodplain boundaries be shown on subdivision plats
Implementation	<p>Adopt an ordinance requiring regulatory floodplain boundaries to be shown on final subdivision plat maps. Applicable ordinances include the following:</p> <p>Alpine County Chapter 17.08.020 - Filing of the final map—Review and submittal  Carson City 17.06.030(4) - Final map contents required.  Douglas County Title 20.708.060(C)(5) - Procedures for final subdivision map  Lyon County Title 15.607.06(B)(10) - Procedures for Final Subdivision Map</p>
Benefits	Improved disclosure to potential buyers of floodplain properties
Challenges	Staff resources to implement ordinance
Activity Codes	PA-01

MITIGATION MEASURE - ORDINANCE 18	
Title	Substantial Improvements/Damage
Summary:	Provide more restrictive definition of substantial improvement and/or damage
Implementation	<p>Modify the floodplain ordinance to amend the definition of substantial improvement and/or damage under the minimum FEMA threshold of 50 percent of market value. The modification can include a provision for tracking improvements/damage cumulatively or decrease the overall threshold below 50 percent. The recommended option is to decrease the overall threshold to 40 percent. Cumulative tracking has greater Community Rating System credits, but generally creates more challenges for staff and property owners.</p>
Benefits	<p>Buildings are upgraded more quickly to meet current NFIP requirements</p> <p>Lower flood insurance premiums for elevated structures</p> <p>Eligible for Community Rating System credits</p>
Challenges	<p>Additional cost to property owners may prevent structural improvements</p> <p>Staff resources to implement ordinance</p>
Activity Codes	PA-04, PA-05



MITIGATION MEASURE - PROGRAM 1	
Title	Public Outreach
Summary:	Conduct public outreach to publicize new FEMA maps and regulations and educate regarding flood protection measures
Implementation	<p>Public outreach is a critical component of a map update process because property owners and residents are greatly affected by the new requirements and few understand NFIP regulations. Property owners may be limited on allowed uses and development opportunities. Property owners and residents may be required to purchase flood insurance. Limited options may be available for property owners to mitigate the new requirements.</p> <p>The public outreach program would create handouts and training materials for property owners and residents of properties within the floodplain to explain:</p> <ul style="list-style-type: none"> <li>• FEMA maps and regulations</li> <li>• Measures to be taken during a flood event to minimize loss of life and property</li> <li>• Activities that may reduce risks of flood damage and lower flood insurance rates</li> </ul>
Benefits	<p>Less confusion and frustration from citizens</p> <p>Property owners make more knowledgeable decisions for mitigating flood hazards</p> <p>Eligible for Community Rating System credits</p>
Challenges	<p>Staff resources to implement program</p> <p>Mailing costs</p>
Activity Codes	PI-01, PI-02, PI-09

MITIGATION MEASURE - PROGRAM 2	
Title	Retain Natural Floodplain Areas
Summary:	Protect floodplain lands with acquisition, easements, and other protection methods
Implementation	<p>Retain lands that provide floodplain storage and maintain or restore connection of the river with the floodplain through land acquisition, conservation easements, local open space programs, and other protection methods.</p> <p>This program may involve dedication of financial resources from local jurisdictions or federal grants to preserve open space through acquiring fee title, conservation easements or other methods. The program would include identifying critical lands for acquisition, prioritizing properties with key natural functions and other potential community benefits (e.g., recreation, parks), establishing a funding program, prioritizing the lands to be acquired, and looking for opportunities to complete the acquisition process for each property.</p>
Benefits	<p>Preserves natural and beneficial of floodplains as open space</p> <p>Reduces flood damages by limiting development in the floodplain</p> <p>Eligible for Community Rating System credits</p>
Challenges	<p>Requires funding source for land acquisitions</p> <p>Staff resources to administer program</p>
Activity Codes	NR-07, NR-14, NR-15, NR-17, NR-18, PA-28

MITIGATION MEASURE - PROGRAM 3	
Title	Update Flood Management Plan
Summary:	Conduct an additional revision/update of the Flood Management Plan once the MAS phases are finalized and the updated maps are adopted
Implementation	The Flood Management Plan was created in 2008 and updated in 2013. Plans of this type are generally reviewed and updated every five years. Once the MAS phases are finalized, a considerable amount of additional information will be available that warrants an additional update to the plan.
Benefits	Ensures that mitigation measures are being coordinated through the watershed Eligible for Community Rating System credits
Challenges	Staff resources and funding needed to perform the update
Activity Codes	PA-27

MITIGATION MEASURE - PROGRAM 4	
Title	Real Estate Notification
Summary:	Real estate agents notify prospective buyers that properties are located in the floodplain
Implementation	<p>Coordinate with Nevada Real Estate Division, Northern Nevada Regional Multiple Listing Service, and local real estate companies to require all property listings to indicate whether or not properties are in the floodplain</p> <p>The program may begin as a voluntary program through supplemental funding of a flood determination consultant that is made available to real estate agents at a reduced cost. Outreach will be needed with real estate company representatives to create a program that is effective for the local real estate market.</p>
Benefits	<p>Uniformity among all real estate listings</p> <p>Predictability for purchasers of property in the floodplain</p> <p>Better ability to budget for flood insurance costs during home buying process</p> <p>Eligible for Community Rating System credits</p>
Challenges	Staff resources needed to coordinate with stakeholders
Activity Codes	PA-07

MITIGATION MEASURE - PROGRAM 5	
Title	Restore Natural Floodplain Functions
Summary:	Maintain or restore the connection of the river to the floodplain
Implementation	Identify locations where floodplain areas are disconnected from the riverine system and can be reconnected in order to restore natural floodplain function. Create a funding program. This program may include an ordinance that incorporates mitigation from new development projects to restore floodplain functions where applicable.
Benefits	Preserves natural and beneficial of floodplains as open space Reduces incremental increases in flood heights
Challenges	Funding source for projects Staff resources to administer program
Activity Codes	NR-05

MITIGATION MEASURE - PROGRAM 6	
Title	Low Impact Development GIS Data
Summary:	Expand mapping layers to include USDA soil types, depth to groundwater, source water protection areas, hydrography, existing stormwater systems, and zoning.
Implementation	As LID ordinances are adopted and projects are being construction using LID construction techniques, this program ensures that GIS data is consistently being updated to reflect as much information as possible to assist in LID design efforts. Sources of information may include local, state, or federal agencies or private consultants with specific technical knowledge.
Benefits	Improves LID design and reduces design costs
Challenges	Funding and staff resources to implement program
Activity Codes	PA-21

MITIGATION MEASURE - PROGRAM 7	
Title	Low Impact Development Promotion
Summary:	Promote installation of development-related LID projects through financial subsidies, contests, recognition, and other outreach efforts
Implementation	<p>Local jurisdictions review their capital improvement programs for opportunities to feature LID construction techniques. Capital project budgets would include funding for outreach and promotion.</p> <p>For development projects, the program would offer opportunities to showcase innovative LID construction techniques through outreach and recognition. An award ceremony may be conducted annually to promote LID innovation.</p>
Benefits	<p>Improves LID design</p> <p>Raises social awareness of LID construction techniques</p>
Challenges	Funding and staff resources to implement program
Activity Codes	NR-09, NR-10

MITIGATION MEASURE - PROGRAM 8	
Title	Flood Photo-Monitoring
Summary:	Develop and coordinate a photo-monitoring program on a watershed level to document flooding and flood hazards in a consistent manner
Implementation	This program involves coordinating people throughout the Carson River Watershed to take pictures at certain locations during flood events. This may include developing an app or database where people can upload their pictures.
Benefits	Enhances public awareness and documents flood occurrences in the Carson River Watershed. Provides Emergency Managers with photos that can be gps/time stamped to plot against flood timing and help in emergency planning.
Challenges	Recruit volunteers who are willing to go out in bad weather events and safely take flood photos
Activity Codes	PA-24

<b>MITIGATION MEASURE - PROGRAM 9</b>	
Title	Hazard Identification
Summary:	Identify and document hazard areas, including channel migration zones, unstable stream banks, high erosion potential, and fluvial erosion hazard zones
Implementation	This program involves creation of technical studies by professional consultants to research and document one or more category of hazard areas. Once hazards are identified and mapped, the information may be used by capital improvement programs to prioritize mitigation projects and by developers to avoid hazards.
Benefits	Improves stream health and public safety
Challenges	Funding and staff resources to administer program
Activity Codes	PA-25, NR-11, NR-12

<b>MITIGATION MEASURE - PROGRAM 10</b>	
Title	Flood Response Coordination
Summary:	Coordinate flood warning and response activities with operators of critical facilities
Implementation	This program incorporates with existing emergency management programs to identify critical facilities, compile contact information from emergency management staff for each of those facilities, and then share key flood warning and response activities. Flood warning and response may be coordinated through quarterly meetings and annual practice exercises with emergency managers from all jurisdictions.
Benefits	Improve public safety through emergency management planning Eligible for Community Rating System credits
Challenges	Staff resources to administer program
Activity Codes	ES-04

MITIGATION MEASURE - PROGRAM 11	
Title	Flood Warning System
Summary:	Implement a flood warning system that predicts flood elevations and arrival times at specific locations within the community
Implementation	This program incorporates weather forecasts, rain gauges, stream gauges, hydrologic and hydraulic modeling, and community alert systems to predict flood events. Notifications of flood warnings can be sent to residents of threatened properties, emergency responders, media, and other key stakeholders within hours of the event.
Benefits	Improves public safety Eligible for Community Rating System credits
Challenges	Technical complexity Funding and staff resources to implement program
Activity Codes	ES-02

MITIGATION MEASURE - PROGRAM 12	
Title	Watershed Outreach Plan
Summary:	Develop and implement a watershed-wide outreach and education program about flood hazards, property protection, and public safety through coordination with community stakeholders within and outside local governments
Implementation	This program provides key messages to the entire community regarding flood hazards and floodplain management. Community-wide resources are coordinated so that messages can be sent out most effectively. Key audiences and stakeholders are identified to ensure that messages are targeted to the right community groups. Specific outreach projects are established to optimize resources and measure results.
Benefits	Community-wide coordination of outreach efforts Public is better informed about floodplain management Eligible for Community Rating System credits
Challenges	Staff resources needed to administer program
Activity Codes	PI-03, PI-05, PI-06

MITIGATION MEASURE - PROGRAM 13	
Title	Flood Response Information Plan
Summary:	Create a pre-flood plan of public information activities in order to expedite delivery of information to be disseminated to the public during and after the next flood event
Jurisdictions	Alpine County, Carson City, Douglas County, Lyon County, CWSD
Implementation	During and after flood events, emergency management staffing resources can become very limited, especially for major regional disasters. This program prepares in advance by generating a variety of typical flood-related public information activities long before the flood event. These public information activities provide templates for public information officers to use for future press releases that may be sent to a variety of news media during and after the next flood event.
Benefits	Uses resources before the flood event when they are more available Eligible for Community Rating System credits
Challenges	Staff resources needed to administer program
Activity Codes	PI-04

MITIGATION MEASURE - PROGRAM 14	
Title	Website Information
Summary:	Provide flood protection information on the communities' websites
Implementation	Compile applicable flood information from existing flood outreach programs and publish the information on the community's website. The website can be advertised in flood-related handouts and other outreach materials not related to flooding. The website content may be prepared pursuant to FEMA's Community Rating System guidelines
Benefits	Public information and awareness Eligible for Community Rating System credits
Challenges	Funding and staff resources to administer program
Activity Codes	PI-07



MITIGATION MEASURE - PROGRAM 15	
Title	Flood Mitigation and Insurance Reduction
Summary:	Create a community-wide mitigation plan for properties in the floodway and floodplain that includes depth of flooding, recommended mitigation measures for each property, potential funding opportunities, and potential flood insurance reduction
Implementation	<p>The program includes the following elements:</p> <ul style="list-style-type: none"> <li>• Assemble GIS data showing ground contours, base flood elevations, building footprints, number of building stories, building valuations, and basements</li> <li>• Use GIS to tabulate building locations in the floodplain</li> <li>• Use FEMA insurance tables to determine estimated flood damage and flood insurance premiums for buildings in the floodplain</li> <li>• Determine the average depth of flooding for each building in the floodplain.</li> <li>• Approximate number of buildings that may be removed from floodplain through elevation certificate and LOMA process</li> <li>• Approximate number of buildings, flood insurance savings, and expense for elevating buildings that are below base flood elevation</li> <li>• Approximate number of buildings that warrant acquisition or relocation due to basements, depth of flooding, or building condition.</li> <li>• Identify available funding sources and prioritize expenditures</li> </ul>
Benefits	<p>Prevents blight for areas of rising flood insurance costs</p> <p>Provides long-term cost savings by reducing flood insurance premiums</p>
Challenges	<p>Technical complexity of program</p> <p>Funding and staff resources to administer program</p>
Activity Codes	PA-29

MITIGATION MEASURE - PROGRAM 16	
Title	Stormwater Master Plan
Summary:	Create a comprehensive stormwater master plan that identifies areas of flooding, mitigation projects to alleviate flooding, land use regulations to address cumulative impacts of development, and funding mechanisms for implementation
Implementation	<p>A stormwater master plan is generally a detailed plan of the community's comprehensive plan to address stormwater policies, deficiencies in the existing stormwater infrastructure, funding strategies, and capital project priorities. Creation of a stormwater master plan involves the following elements:</p> <ul style="list-style-type: none"> <li>• Formation of a policy committee of key stakeholders to establish community-wide goals related to development, land use, funding, and other key stormwater policies.</li> <li>• Selection of one or more technical consultants as needed for such issues as guiding the planning process, generating technical information, establishing financial plans, assessing infrastructure condition, and recommending capital projects</li> <li>• Recommendation of regulations concerning how stormwater requirements are incorporated into land use and development projects</li> <li>• Tabulation of a capital projects list and estimated project costs</li> <li>• Recommendation of a funding program to mitigate deficiencies in the stormwater systems and construct key capital projects</li> </ul>
Benefits	Reduces flood hazards through comprehensive stormwater planning Eligible for Community Rating System credits
Challenges	Technical complexity of planning process Funding for consultants and capital projects Staff resources to administer program
Activity Codes	PA-31

MITIGATION MEASURE - PROJECT 1	
Title	Low Impact Development Projects
Summary:	Implement LID demonstration projects as part of the capital improvement program for municipally funded street and stormwater projects
Implementation	Review capital improvement programs to identify potential opportunities for LID demonstration projects. Often, adding LID elements to a project will reduce overall project costs. As projects are being constructed, communities can raise awareness of LID by promoting the project as a demonstration of the benefits of LID in capital improvements. These projects are especially helpful for raising awareness about LID when new LID regulations are being implemented for private development projects.
Benefits	Reduces runoff and prevents increased flooding Benefits the environment through groundwater recharge and reduced runoff
Challenges	Funding needed to construct projects
Activity Codes	NR-08

<b>MITIGATION MEASURE - PROJECT 2</b>	
Title	Flood Reduction Projects
Summary:	Develop project proposals to improve storm water facilities and reduce flooding
Implementation	Structural flood control projects are often the best way to address regional flooding problems through construction of culverts, bridges, channel widening, levees, detention basins, or other significant capital projects. This mitigation measure requires a program for identifying flooding problems and engineering solutions. Funding sources also need to be available, generally through a community's capital improvement program.
Benefits	Improves public safety by reducing flood hazards Eligible for Community Rating System credits
Challenges	Funding needed to construct projects
Activity Codes	SP-01

<b>MITIGATION MEASURE - PROJECT 3</b>	
Title	Stream Rehabilitation Projects
Summary:	Construct river rehabilitation projects that encourage sediment capture and habitat enhancement
Implementation	This mitigation measure requires the use of technical staff or consultants to identify opportunities for stream rehabilitation along a waterway. Funding sources also need to be available, generally through a community's capital improvement program or through grants.
Benefits	Environmental benefits of improved stream health and habitat Eligible for Community Rating System credits
Challenges	Funding needed to construct projects Staff needed to administer program
Activity Codes	NR-19

MITIGATION MEASURE - PROJECT 4	
Title	Rain and Stream Gauge Installation
Summary:	Install additional rain and stream gauges to supplement existing flood warning systems
Implementation	The effectiveness of flood warning systems is dependent on the data available. Communities can greatly improve a system's effectiveness by installing rain and stream gauges. This mitigation measure involves creation of a watershed-wide plan for rain and stream gauge locations and then a prioritization for installation of new gauges.
Benefits	Improved public safety Increased response times through early flood warnings Eligible for Community Rating System credits
Challenges	Funding needed to construct projects Staff needed to administer program
Activity Codes	ES-01

MITIGATION MEASURE - PROJECT 5	
Title	Enhance Grade Control Structures
Summary:	Investigate opportunities to enhance grade control structures
Implementation	Over the years many of the irrigation diversion structures have indirectly become grade control structures in the river channel. The loss of these diversion structures would cause head cutting issues in the river channel. The way the diversion structures were constructed they do not allow sediment to move downstream. This causes sediment to build up above the diversion structures and causes erosion below the diversion structures. The mitigation would be to redesign the diversion structures so that sediment can move down the river channel.
Benefits	Enhance sediment movement through the river system.
Challenges	Funding needed to reconstruct irrigation diversion structures.
Activity Codes	SP-03

## Appendix A: Activity Summary

Legend:

PA - Preventive Activity

PP - Property Protection

NR - Natural Resource

ES - Emergency Services

SP - Structural Project

PI - Public Information

High - 1st Implementation Phase - High Cost/Benefit

Med - 2nd Implementation Phase - Medium Cost/Benefit

Low - Future Implementation - Low Cost/Benefit

Done - Completed by jurisdiction

N/A - Not applicable

N/R - Not recommended by jurisdiction staff

### SUMMARY OF DEVELOPMENT AND LAND USE REGULATIONS

	Activity	Alpn	Crnsn	Dgls	Lyon	CWSD
PA-01	Identify 100-year flood zones on subdivision maps	High	Done	Done	High	N/A
PA-02	Develop model watershed floodplain management ordinance language that can be adopted by counties to provide watershed-wide consistency.	High	High	High	High	High
PA-03	Restrict zone changes within the floodplain to limit density	High	High	N/R	High	N/A
PA-04	Provide more restrictive substantial improvement regulations through tracking cumulatively per building	N/R	N/R	Med	Low	N/A
PA-05	Provide more restrictive substantial improvement regulations through decreasing below 50% threshold	N/R	N/R	Med	N/R	N/A
PA-06	Remove the elevation exemption for manufactured homes placed in existing MH parks	N/R	Done	Low	Done	N/A
PA-07	Real estate agents notify prospective buyers that properties are located in the floodplain	N/R	High	Med	High	High
PA-08	Implement an impact fee based on new impervious surfaces as a funding mechanism for mitigation projects	N/R	N/R	Low	N/R	N/A
PA-09	Allow development on flood prone properties to be clustered out of the 100-year floodplain	Done	Done	Done	Med	N/A
NR-01	Property owners may transfer density (units) from one property to preserve open space.	High	High	Done	High	High

	<b>Activity</b>	<b>Alpn</b>	<b>Crnsn</b>	<b>Dgls</b>	<b>Lyon</b>	<b>CWSD</b>
PA-10	Require additional freeboard to elevate building floors higher above the base flood elevation	Med	Done	Done	Low	N/A
PA-11	Require engineered foundations for buildings in the floodplain	N/R	Done	N/R	N/R	N/A
PA-12	Prohibit critical facilities in the floodplain	High	Done	High	High	N/A
PA-13	Prohibit first floor enclosures below the base flood elevation, except crawlspaces.	N/R	Med	N/R	N/R	N/A
NR-02	Regulate to minimize erosion from land disturbed due to construction	N/R	Done	Done	N/R	N/A
NR-03	Promote and utilize other best management practices as a means of protecting riparian habitat.	N/R	Done	Med	Med	High
PA-14	Require compensatory storage for new fill materials in the floodplain	N/R	Done	High	Low	N/A
PA-15	Create a program for accounting for cumulative loss of floodplain storage volume and mitigating losses	N/R	N/R	Low	N/R	High
NR-04	Establish development buffer zones along all waterways	Low	N/R	N/R	Low	N/A
NR-05	Maintain or restore the connection of the river to the floodplain	N/R	Done	Low	N/R	High
NR-06	Establish and protect a continuous fish and riparian corridor along the river (e.g., replace diversions)	N/R	N/R	Low	N/R	Med
PA-16	Limit storage or processing of hazardous materials in the floodplain	High	Done	High	High	N/A
PA-17	Incorporate LID into projects throughout the development, re-development, and retrofit planning process.	High	High	High	High	N/A
PA-18	Eliminate existing policies and standards that inadvertently prohibit or discourage LID practices.	Med	Med	High	Med	High
PA-19	Modify development and construction standards to implement LID practices (e.g., roads, sidewalks, parking lots, landscaping)	High	High	High	High	High
PA-20	Provide incentives for developers to use LID practices, such as waiving or reducing permit fees, allowing higher density developments, or reducing local stormwater requirements.	Med	Med	High	Med	High

Activity		Alpn	Crns	Dgls	Lyon	CWSD
NR-07	Retain lands that provide floodplain storage and maintain or restore connection of river with floodplain through land acquisition, conservation easements, local open space programs, TDR and PDR Programs, and other protection methods	Low	Med	Done	Low	High

## SUMMARY OF COUNTY/WATERSHED-DRIVEN ACTIVITIES

Activity		Alpn*	Crns	Dgls	Lyon*	CWSD
	<b><u>Low Impact Development</u></b>					
PA-21	Expand mapping layers to include USDA soil types, depth to groundwater, source water protection areas, hydrography, existing stormwater systems, and zoning.	Low	Low	Low	Low	Med
NR-08	Implement LID demonstration projects	Low	Low	Low	Low	High
NR-09	Provide financial subsidies toward materials that are used in LID projects	Low	Low	N/R	Low	Low
NR-10	Promote LID design or installation contests and construct winner's design as a demonstration project.	Low	N/R	Low	N/R	Low
PA-22	Provide a stormwater fee discount or credit as an incentive for LID implementation	N/R	N/R	N/R	N/R	N/A
	<b><u>Map Information/Studies</u></b>					
PA-23	Maintain consistent data to ensure that flood studies are up-to-date and conduct studies for significant water courses and alluvial fan areas that have not been analyzed. This data should be used to update FEMA maps and fill data gaps.	Low	Done	Done	Low	Low
PA-24	Develop and coordinate a photo-monitoring program on a watershed level to document flooding and flood hazards in a consistent matter.	N/R	Low	Low	N/R	Med
PA-25	Document known and projected hazard areas, including channel migration zones, and incorporate into planning processes.	Low	Low	Low	Low	Med
NR-11	Identify unstable stream banks and areas with high potential for erosion.	Low	Low	Low	Low	Med
NR-12	Identify "Fluvial Erosion Hazard Zones".	Low	Low	Low	Low	Med
NR-13	Create maps of natural floodplain functions	Low	Done	N/R	Low	Low



	<b>Activity</b>	<b>Alpn*</b>	<b>Crsn</b>	<b>Dgls</b>	<b>Lyon*</b>	<b>CWSD</b>
PA-26	Restrict the floodway standard to less than one foot of elevation increase	N/R	High	Done	N/R	N/A
	<b><u>Open Space Preservation</u></b>					
NR-14	Create a program for acquiring agricultural easements where appropriate in flood-prone areas	Low	Low	Low	Low	Low
NR-15	Encourage and facilitate voluntary conservation easements in flood-prone areas	Med	Med	Med	Med	High
NR-16	Continue to explore creation of landowner incentive programs, such as a floodplain leasing program and conservation easements, that provide compensation to landowners for providing ecosystem services.	N/R	N/R	N/R	N/R	Low
NR-17	Create an inventory of open flood-prone properties to consider for acquisition, conservation easements, agricultural easements, or other flood protection. Include fundings and regulatory limitations.	Low	Low	Low	Low	Low
	<b><u>Outreach and Education</u></b>					
PI-01	Outreach to property owners to publicize new FEMA maps and regulations	High	Done	High	High	High
PI-02	Educate existing residents on appropriate measures to be taken to minimize the potential loss of life and property in the event of a natural disaster.	High	Done	Done	High	Done
PI-03	Develop watershed-wide outreach and education program about floodplain importance and flooding hazards.	Low	Done	High	Low	Done
PI-04	Create a pre-flood plan of public information activities ready for the next flood	Med	High	High	High	Med
PI-05	Complete and implement a comprehensive community-wide public outreach plan	Low	Med	Med	Low	Med
PI-06	Coordinate public outreach programs to be disseminated by people or groups from outside the local governments	Med	Med	Med	Med	Done
PI-07	Provide flood protection information on the communities' websites	High	Done	Done	High	Done
PI-08	Train administrative staff to obtain Certified Floodplain Manager certifications	N/R	Low	Done	N/R	N/R
	<b><u>Planning</u></b>					

	<b>Activity</b>	<b>Alpn*</b>	<b>Crsn</b>	<b>Dgls</b>	<b>Lyon*</b>	<b>CWSD</b>
PA-27	Conduct an additional revision/update of the Flood Management plan once the MAS phases are finalized and the updated maps are adopted.	High	High	High	Med	High
PA-28	Through community planning, identify floodplain areas that would provide other community benefits (e.g., recreation, parks)	Med	Done	Med	Med	High
PA-29	Adopt a community-wide mitigation plan that identifies properties in the floodway and floodplain, depth of flooding, recommended mitigation measures for each property, and potential funding opportunities	N/R	Done	Low	N/R	N/A
PA-30	Create a mitigation plan for repetitive loss properties	N/R	Low	N/R	N/R	N/A
NR-18	Adopt a plan that protects one or more natural functions within the community's floodplain	Low	Med	Med	Low	High
PA-31	Create a comprehensive stormwater master plan that identifies areas of flooding, mitigation projects to alleviate flooding, land use regulations to address cumulative impacts of development, and funding mechanisms for implementation	N/R	Med	Med	N/R	Med
	<b><u>Private Mitigation Projects</u></b>					
PI-09	Provide mitigation handouts and training for property owners in the floodway or floodplain	High	High	High	High	N/A
	<b><u>Public Safety</u></b>					
ES-01	Add rain gauges to existing warning system	N/R	Done	High	N/R	High
ES-02	Implement a flood warning system that predicts flood elevations and arrival times at specific locations within the community	N/R	Low	Med	N/R	N/A
ES-03	Disseminate flood warnings to the public	N/R	Done	Done	N/R	N/A
ES-04	Coordinate flood warning and response activities with operators of critical facilities	Med	Done	Done	Med	N/A
ES-05	Obtain designation by the National Weather Service as a StormReady community (CRS Communities only)	N/R	Done	N/R	N/R	N/A
	<b><u>Stream/Floodplain Restoration</u></b>					
SP-01	Develop project proposals to improve storm water facilities and reduce flooding	Low	Done	Med	Low	Med
PA-32	Conduct a sediment transport investigation	N/R	Low	N/R	N/R	Low

	<b>Activity</b>	<b>Alpn*</b>	<b>Crnsn</b>	<b>Dgls</b>	<b>Lyon*</b>	<b>CWSD</b>
NR-19	Construct river rehabilitation projects that encourage sediment capture and habitat enhancement	Low	Med	Med	Low	Med
NR-20	Promote the use of non-structural, bio-engineering techniques in river restoration projects	Med	High	High	Med	Done
NR-21	Limit the use of future management measures such as dams, levees, and floodwalls.	Med	N/R	Done	Med	High
SP-02	Design future bridges and roads to protect floodplain, accommodate and not restrict changing river course, and minimize back up of flood water.	Med	Done	Done	Med	High
SP-03	Investigate opportunities to enhance grade control structures	N/R	Med	Med	N/R	Med
NR-22	Identify methods for protecting natural channels	Med	High	High	Med	N/R

## Appendix B: Activity Worksheets

This section includes three tables for each jurisdiction: (1) a final list of prioritized activities in order of total score based on results from scoring tables; (2) a scoring table for Development and Land Use Regulations; and (3) a scoring table for County/Watershed Driven activities.

### ALPINE FINAL LIST

	Activity	SP x4	TE x3	AD x3	LE x4	EC x3	EN x2	CR x0	Total (57 max)
	<b><u>REGULATIONS</u></b>								
	<b>1st Implementation Phase</b>								
PA-02	Develop model watershed floodplain management ordinance language that can be adopted by counties to provide watershed-wide consistency.	12	9	6	12	9	4	0	52
PA-01	Identify 100-year flood zones on subdivision maps	12	9	6	8	9	2	0	46
PA-03	Restrict zone changes within the floodplain to limit density	12	6	6	8	9	4	0	45
PA-12	Prohibit critical facilities in the floodplain	12	9	6	8	6	4	0	45
PA-16	Limit storage or processing of hazardous materials in the floodplain	12	6	6	8	6	6	0	44
PA-17	Incorporate LID into projects throughout the development, re-development, and retrofit planning process.	12	6	6	8	6	6	0	44
PA-19	Modify development and construction standards to implement LID practices (e.g., roads, sidewalks, parking lots, landscaping)	12	6	6	8	6	6	0	44
NR-01	Property owners may transfer density (units) from one property to preserve open space.	12	6	6	8	6	6	0	44
	<b>2nd Implementation Phase</b>								
PA-18	Eliminate existing policies and standards that inadvertently prohibit or discourage LID practices.	12	6	3	8	6	6	0	41

Activity		SP x4	TE x3	AD x3	LE x4	EC x3	EN x2	CR x0	Total (57 max)
PA-20	Provide incentives for developers to use LID practices, such as waiving or reducing permit fees, allowing higher density developments, or reducing local stormwater requirements.	12	6	3	8	6	6	0	41
PA-10	Require additional freeboard to elevate building floors higher above the base flood elevation	8	9	6	8	6	2	0	39
<b>Future Implementation Phase</b>									
NR-04	Establish development buffer zones along all waterways	8	3	3	8	6	6	0	34
NR-07	Retain lands that provide floodplain storage and maintain or restore connection of river with floodplain through land acquisition, conservation easements, local open space programs, TDR and PDR Programs, and other protection methods	8	6	3	8	3	6	0	34
<b><u>COUNTY/WATERSHED ACTIVITIES</u></b>									
<b>1st Implementation Phase</b>									
PI-01	Outreach to property owners to publicize new FEMA maps and regulations	12	9	6	8	9	2	0	46
PI-02	Educate existing residents on appropriate measures to be taken to minimize the potential loss of life and property in the event of a natural disaster.	12	9	6	8	9	2	0	46
PI-09	Provide mitigation handouts and training for property owners in the floodway or floodplain	12	9	6	8	9	2	0	46
PI-07	Provide flood protection information on the communities' websites	8	9	6	8	9	4	0	44
<b>2nd Implementation Phase</b>									
NR-21	Limit the use of future management measures such as dams, levees, and floodwalls.	8	6	9	8	6	6	0	43
SP-02	Design future bridges and roads to protect floodplain, accommodate and not restrict changing river course, and minimize back up of flood water.	8	6	9	8	6	6	0	43
NR-22	Identify methods for protecting natural channels	8	6	6	8	9	6	0	43

	<b>Activity</b>	<b>SP x4</b>	<b>TE x3</b>	<b>AD x3</b>	<b>LE x4</b>	<b>EC x3</b>	<b>EN x2</b>	<b>CR x0</b>	<b>Total (57 max)</b>
PI-04	Create a pre-flood plan of public information activities ready for the next flood	12	6	6	8	9	2	0	43
PA-27	Conduct an additional revision/update of the Flood Management plan once the MAS phases are finalized and the updated maps are adopted.	12	6	6	8	6	4	0	42
PA-28	Through community planning, identify floodplain areas that would provide other community benefits (e.g., recreation, parks)	12	3	3	8	9	6	0	41
ES-04	Coordinate flood warning and response activities with operators of critical facilities	12	6	6	8	9	0	0	41
PI-06	Coordinate public outreach programs to be disseminated by people or groups from outside the local governments	8	9	3	8	9	2	0	39
NR-20	Promote the use of non-structural, bio-engineering techniques in river restoration projects	8	3	6	8	6	6	0	37
NR-15	Encourage and facilitate voluntary conservation easements in flood-prone areas	8	3	6	8	6	6	0	37
	<b>Future Implementation Phase</b>								
PA-21	Expand mapping layers to include USDA soil types, depth to groundwater, source water protection areas, hydrography, existing stormwater systems, and zoning.	8	3	3	8	6	6	0	34
PA-25	Document known and projected hazard areas, including channel migration zones, and incorporate into planning processes.	8	3	3	8	6	6	0	34
NR-11	Identify unstable stream banks and areas with high potential for erosion.	8	3	3	8	6	6	0	34
NR-12	Identify "Fluvial Erosion Hazard Zones".	8	3	3	8	6	6	0	34
NR-13	Create maps of natural floodplain functions	8	3	3	8	6	6	0	34
PI-03	Develop watershed-wide outreach and education program about floodplain importance and flooding hazards.	8	3	3	8	6	6	0	34
NR-18	Adopt a plan that protects one or more natural functions within the community's floodplain	8	3	3	8	6	6	0	34

	<b>Activity</b>	<b>SP x4</b>	<b>TE x3</b>	<b>AD x3</b>	<b>LE x4</b>	<b>EC x3</b>	<b>EN x2</b>	<b>CR x0</b>	<b>Total (57 max)</b>
NR-14	Create a program for acquiring agricultural easements where appropriate in flood-prone areas	8	3	3	4	9	6	0	33
PI-05	Complete and implement a comprehensive community-wide public outreach plan	8	3	3	8	6	4	0	32
NR-08	Implement LID demonstration projects	8	3	3	8	3	6	0	31
NR-17	Create an inventory of open flood-prone properties to consider for acquisition, conservation easements, agricultural easements, or other flood protection. Include fundings and regulatory limitations.	8	3	3	8	3	6	0	31
SP-01	Develop project proposals to improve storm water facilities and reduce flooding	8	3	3	8	3	6	0	31
NR-19	Construct river rehabilitation projects that encourage sediment capture and habitat enhancement	8	3	3	8	3	6	0	31
NR-09	Provide financial subsidies toward materials that are used in LID projects	8	6	3	4	3	6	0	30
NR-10	Promote LID design or installation contests and construct winner's design as a demonstration project.	8	3	0	8	3	6	0	28
PA-23	Maintain consistent data to ensure that flood studies are up-to-date and conduct studies for significant water courses and alluvial fan areas that have not been analyzed. This data should be used to update FEMA maps and fill data gaps.	8	3	3	8	6	0	0	28

## ALPINE COUNTY - DEVELOPMENT AND LAND USE REGULATIONS

	Activity	SP x4	TE x3	AD x3	LE x4	EC x3	EN x2	CR x0	Total (57 max)
	<b><u>General Development Regulations</u></b>								
PA-01	Identify 100-year flood zones on subdivision maps	12	9	6	8	9	2	0	46
PA-02	Develop model watershed floodplain management ordinance language that can be adopted by counties to provide watershed-wide consistency.	12	9	6	12	9	4	0	52
PA-03	Restrict zone changes within the floodplain to limit density	12	6	6	8	9	4	0	45
	<b><u>Limit new development in flood-prone areas</u></b>								
NR-01	Property owners may transfer density (units) from one property to preserve open space.	12	6	6	8	6	6	0	44
PA-10	Require additional freeboard to elevate building floors higher above the base flood elevation	8	9	6	8	6	2	0	39
PA-12	Prohibit critical facilities in the floodplain	12	9	6	8	6	4	0	45
	<b><u>Floodplain Storage/Setback</u></b>								
NR-04	Establish development buffer zones along all waterways	8	3	3	8	6	6	0	34
NR-05	Maintain or restore the connection of the river to the floodplain	8	3	3	8	3	6	0	31
NR-06	Establish and protect a continuous fish and riparian corridor along the river (e.g., replace diversions)	8	3	0	8	3	6	0	28
	<b><u>Land Use Restriction</u></b>								
PA-16	Limit storage or processing of hazardous materials in the floodplain	12	6	6	8	6	6	0	44
	<b><u>Low Impact Development</u></b>								
PA-17	Incorporate LID into projects throughout the development, re-development, and retrofit planning process.	12	6	6	8	6	6	0	44



Activity		SP x4	TE x3	AD x3	LE x4	EC x3	EN x2	CR x0	Total (57 max)
PA-18	Eliminate existing policies and standards that inadvertently prohibit or discourage LID practices.	12	6	3	8	6	6	0	41
PA-19	Modify development and construction standards to implement LID practices (e.g., roads, sidewalks, parking lots, landscaping)	12	6	6	8	6	6	0	44
PA-20	Provide incentives for developers to use LID practices, such as waiving or reducing permit fees, allowing higher density developments, or reducing local stormwater requirements.	12	6	3	8	6	6	0	41
	<b>Open Space Preservation</b>								
NR-07	Retain lands that provide floodplain storage and maintain or restore connection of river with floodplain through land acquisition, conservation easements, local open space programs, TDR and PDR Programs, and other protection methods	8	6	3	8	3	6	0	34

## ALPINE COUNTY - COUNTY/WATERSHED-DRIVEN ACTIVITIES

Activity		SP x4	TE x3	AD x3	LE x4	EC x3	EN x2	CR x0	Total (57 max)
<b><u>Low Impact Development</u></b>									
PA-21	Expand mapping layers to include USDA soil types, depth to groundwater, source water protection areas, hydrography, existing stormwater systems, and zoning.	8	3	3	8	6	6	0	34
NR-08	Implement LID demonstration projects	8	3	3	8	3	6	0	31
NR-09	Provide financial subsidies toward materials that are used in LID projects	8	6	3	4	3	6	0	30
NR-10	Promote LID design or installation contests and construct winner's design as a demonstration project.	8	3	0	8	3	6	0	28
PA-22	Provide a stormwater fee discount or credit as an incentive for LID implementation	8	3	0	4	3	6	0	24
<b><u>Map Information/Studies</u></b>									
PA-23	Maintain consistent data to ensure that flood studies are up-to-date and conduct studies for significant water courses and alluvial fan areas that have not been analyzed. This data should be used to update FEMA maps and fill data gaps.	8	3	3	8	6	0	0	28
PA-25	Document known and projected hazard areas, including channel migration zones, and incorporate into planning processes.	8	3	3	8	6	6	0	34
NR-11	Identify unstable stream banks and areas with high potential for erosion.	8	3	3	8	6	6	0	34
NR-12	Identify "Fluvial Erosion Hazard Zones".	8	3	3	8	6	6	0	34
NR-13	Create maps of natural floodplain functions	8	3	3	8	6	6	0	34
<b><u>Open Space Preservation</u></b>									
NR-14	Create a program for acquiring agricultural easements where appropriate in flood-prone areas	8	3	3	4	9	6	0	33
NR-15	Encourage and facilitate voluntary conservation easements in flood-prone areas	8	3	6	8	6	6	0	37

	<b>Activity</b>	<b>SP x4</b>	<b>TE x3</b>	<b>AD x3</b>	<b>LE x4</b>	<b>EC x3</b>	<b>EN x2</b>	<b>CR x0</b>	<b>Total (57 max)</b>
NR-16	Continue to explore creation of landowner incentive programs, such as a floodplain leasing program and conservation easements, that provide compensation to landowners for providing ecosystem services.	8	3	3	4	3	6	0	24
NR-17	Create an inventory of open flood-prone properties to consider for acquisition, conservation easements, agricultural easements, or other flood protection. Include fundings and regulatory limitations.	8	3	3	8	3	6	0	31
	<b><u>Outreach and Education</u></b>								
PI-01	Outreach to property owners to publicize new FEMA maps and regulations	12	9	6	8	9	2	0	46
PI-02	Educate existing residents on appropriate measures to be taken to minimize the potential loss of life and property in the event of a natural disaster.	12	9	6	8	9	2	0	46
PI-03	Develop watershed-wide outreach and education program about floodplain importance and flooding hazards.	8	3	3	8	6	6	0	34
PI-04	Create a pre-flood plan of public information activities ready for the next flood	12	6	6	8	9	2	0	43
PI-05	Complete and implement a comprehensive community-wide public outreach plan	8	3	3	8	6	4	0	32
PI-06	Coordinate public outreach programs to be disseminated by people or groups from outside the local governments	8	9	3	8	9	2	0	39
PI-07	Provide flood protection information on the communities' websites	8	9	6	8	9	4	0	44
	<b><u>Planning</u></b>								
PA-27	Conduct an additional revision/update of the Flood Management plan once the MAS phases are finalized and the updated maps are adopted.	12	6	6	8	6	4	0	42
PA-28	Through community planning, identify floodplain areas that would provide other community benefits (e.g., recreation, parks)	12	3	3	8	9	6	0	41

	Activity	SP x4	TE x3	AD x3	LE x4	EC x3	EN x2	CR x0	Total (57 max)
NR-18	Adopt a plan that protects one or more natural functions within the community's floodplain	8	3	3	8	6	6	0	34
	<b><u>Private Mitigation Projects</u></b>								
PI-09	Provide mitigation handouts and training for property owners in the floodway or floodplain	12	9	6	8	9	2	0	46
	<b><u>Public Safety</u></b>								
ES-04	Coordinate flood warning and response activities with operators of critical facilities	12	6	6	8	9	0	0	41
ES-05	Obtain designation by the National Weather Service as a StormReady community (CRS Communities only)	8	0	0	8	6	0	0	22
	<b><u>Stream/Floodplain Restoration</u></b>								
SP-01	Develop project proposals to improve storm water facilities and reduce flooding	8	3	3	8	3	6	0	31
NR-19	Construct river rehabilitation projects that encourage sediment capture and habitat enhancement	8	3	3	8	3	6	0	31
NR-20	Promote the use of non-structural, bio-engineering techniques in river restoration projects	8	3	6	8	6	6	0	37
NR-21	Limit the use of future management measures such as dams, levees, and floodwalls.	8	6	9	8	6	6	0	43
SP-02	Design future bridges and roads to protect floodplain, accommodate and not restrict changing river course, and minimize back up of flood water.	8	6	9	8	6	6	0	43
NR-22	Identify methods for protecting natural channels	8	6	6	8	9	6	0	43

## CARSON CITY - FINAL LIST

Activity		SP x3	TE x3	AD x4	LE x3	EC x4	EN x3	CR x3	Total (69 max)
	<b><u>REGULATIONS</u></b>								
	<b>1st Implementation Phase</b>								
NR-01	Property owners may transfer density (units) from one property to preserve open space.	9	6	8	6	8	9	9	55
PA-02	Develop model watershed floodplain management ordinance language that can be adopted by counties to provide watershed-wide consistency.	9	9	8	9	12	6	0	53
PA-17	Incorporate LID into projects throughout the development, re-development, and retrofit planning process.	9	6	8	6	8	9	3	49
PA-19	Modify development and construction standards to implement LID practices (e.g., roads, sidewalks, parking lots, landscaping)	9	6	8	6	8	9	3	49
PA-07	Real estate agents notify prospective buyers that properties are located in the floodplain	6	9	12	6	12	0	3	48
PA-03	Restrict zone changes within the floodplain to limit density	9	6	8	6	12	6	0	47
	<b>2nd Implementation Phase</b>								0
PA-13	Prohibit first floor enclosures below the base flood elevation, except crawlspaces.	6	9	8	6	4	3	9	45
PA-18	Eliminate existing policies and standards that inadvertently prohibit or discourage LID practices.	9	6	4	6	8	9	3	45
PA-20	Provide incentives for developers to use LID practices, such as waiving or reducing permit fees, allowing higher density developments, or reducing local stormwater requirements.	9	6	4	6	8	9	3	45
NR-07	Retain lands that provide floodplain storage and maintain or restore connection of river with floodplain through land acquisition, conservation easements, local open space programs, TDR and PDR Programs, and other protection methods	6	6	4	6	4	9	9	44
	<b><u>COUNTY/WATERSHED ACTIVITIES</u></b>								

Activity		SP x3	TE x3	AD x4	LE x3	EC x4	EN x3	CR x3	Total (69 max)
<b>1st Implementation Phase</b>									
PI-09	Provide mitigation handouts and training for property owners in the floodway or floodplain	9	9	8	6	12	3	9	56
NR-22	Identify methods for protecting natural channels	6	6	8	6	12	9	9	56
PA-27	Conduct an additional revision/update of the Flood Management plan once the MAS phases are finalized and the updated maps are adopted.	9	6	8	6	8	6	9	52
PA-26	Restrict the floodway standard to less than one foot of elevation increase	3	9	12	6	4	6	9	49
PI-04	Create a pre-flood plan of public information activities ready for the next flood	9	6	8	6	12	3	3	47
NR-20	Promote the use of non-structural, bio-engineering techniques in river restoration projects	6	3	8	6	8	9	6	46
<b>2nd Implementation Phase</b>									
NR-15	Encourage and facilitate voluntary conservation easements in flood-prone areas	6	3	8	6	8	9	3	43
PI-06	Coordinate public outreach programs to be disseminated by people or groups from outside the local governments	6	9	4	6	12	3	3	43
NR-18	Adopt a plan that protects one or more natural functions within the community's floodplain	6	3	4	6	8	9	6	42
PA-31	Create a comprehensive stormwater master plan that identifies areas of flooding, mitigation projects to alleviate flooding, land use regulations to address cumulative impacts of development, and funding mechanisms for implementation	6	3	8	6	8	0	9	40
PI-05	Complete and implement a comprehensive community-wide public outreach plan	6	3	4	6	8	6	6	39
NR-19	Construct river rehabilitation projects that encourage sediment capture and habitat enhancement	6	3	4	6	4	9	6	38
SP-03	Investigate opportunities to enhance grade control structures	6	3	4	6	4	9	6	38

Activity		SP x3	TE x3	AD x4	LE x3	EC x4	EN x3	CR x3	Total (69 max)
<b>Future Implementation Phase</b>									
PI-08	Train administrative staff to obtain Certified Floodplain Manager certifications	9	6	4	6	8	0	3	36
PA-21	Expand mapping layers to include USDA soil types, depth to groundwater, source water protection areas, hydrography, existing stormwater systems, and zoning.	6	3	4	6	8	9	0	36
PA-24	Develop and coordinate a photo-monitoring program on a watershed level to document flooding and flood hazards in a consistent matter.	6	3	4	6	8	9	0	36
PA-25	Document known and projected hazard areas, including channel migration zones, and incorporate into planning processes.	6	3	4	6	8	9	0	36
NR-11	Identify unstable stream banks and areas with high potential for erosion.	6	3	4	6	8	9	0	36
NR-12	Identify "Fluvial Erosion Hazard Zones".	6	3	4	6	8	9	0	36
NR-14	Create a program for acquiring agricultural easements where appropriate in flood-prone areas	6	3	4	3	8	9	3	36
ES-02	Implement a flood warning system that predicts flood elevations and arrival times at specific locations within the community	9	3	4	6	8	0	6	36
PA-30	Create a mitigation plan for repetitive loss properties	6	3	4	6	8	0	9	36
PA-32	Conduct a sediment transport investigation	6	3	4	6	8	9	0	36
NR-08	Implement LID demonstration projects	6	3	4	6	4	9	0	32
NR-09	Provide financial subsidies toward materials that are used in LID projects	6	6	4	3	4	9	0	32
NR-17	Create an inventory of open flood-prone properties to consider for acquisition, conservation easements, agricultural easements, or other flood protection. Include fundings and regulatory limitations.	6	3	4	6	4	9	0	32

## CARSON CITY - DEVELOPMENT AND LAND USE REGULATIONS

	Activity	SP x3	TE x3	AD x4	LE x3	EC x4	EN x3	CR x3	Total (69 max)
	<b><u>General Development Regulations</u></b>								
PA-02	Develop model watershed floodplain management ordinance language that can be adopted by counties to provide watershed-wide consistency.	9	9	8	9	12	6	0	53
PA-03	Restrict zone changes within the floodplain to limit density	9	6	8	6	12	6	0	47
PA-07	Real estate agents notify prospective buyers that properties are located in the floodplain	6	9	12	6	12	0	3	48
	<b><u>Limit new development in flood-prone areas</u></b>								
NR-01	Property owners may transfer density (units) from one property to preserve open space.	9	6	8	6	8	9	9	55
NR-03	Promote and utilize other best management practices as a means of protecting riparian habitat.	9	3	8	6	8	9	0	43
PA-13	Prohibit first floor enclosures below the base flood elevation, except crawlspaces.	6	9	8	6	4	3	9	45
PA-15	Create a program for accounting for cumulative loss of floodplain storage volume and mitigating losses	6	3	4	6	4	9	0	32
	<b><u>Floodplain Storage/Setback</u></b>								
NR-06	Establish and protect a continuous fish and riparian corridor along the river (e.g., replace diversions)	6	3	0	6	4	9	0	28
	<b><u>Low Impact Development</u></b>								
PA-17	Incorporate LID into projects throughout the development, re-development, and retrofit planning process.	9	6	8	6	8	9	3	49
PA-18	Eliminate existing policies and standards that inadvertently prohibit or discourage LID practices.	9	6	4	6	8	9	3	45



Activity		SP x3	TE x3	AD x4	LE x3	EC x4	EN x3	CR x3	Total (69 max)
PA-19	Modify development and construction standards to implement LID practices (e.g., roads, sidewalks, parking lots, landscaping)	9	6	8	6	8	9	3	49
PA-20	Provide incentives for developers to use LID practices, such as waiving or reducing permit fees, allowing higher density developments, or reducing local stormwater requirements.	9	6	4	6	8	9	3	45
	<b><u>Open Space Preservation</u></b>								
NR-07	Retain lands that provide floodplain storage and maintain or restore connection of river with floodplain through land acquisition, conservation easements, local open space programs, TDR and PDR Programs, and other protection methods	6	6	4	6	4	9	9	44

## CARSON CITY - COUNTY/WATERSHED-DRIVEN ACTIVITIES

	Activity	SP x3	TE x3	AD x4	LE x3	EC x4	EN x3	CR x3	Total (69 max)
	<b><u>Low Impact Development</u></b>								
PA-21	Expand mapping layers to include USDA soil types, depth to groundwater, source water protection areas, hydrography, existing stormwater systems, and zoning.	6	3	4	6	8	9	0	36
NR-08	Implement LID demonstration projects	6	3	4	6	4	9	0	32
NR-09	Provide financial subsidies toward materials that are used in LID projects	6	6	4	3	4	9	0	32
NR-10	Promote LID design or installation contests and construct winner's design as a demonstration project.	6	3	0	6	4	9	0	28
PA-22	Provide a stormwater fee discount or credit as an incentive for LID implementation	6	3	0	3	4	9	0	25
	<b><u>Map Information/Studies</u></b>								
PA-24	Develop and coordinate a photo-monitoring program on a watershed level to document flooding and flood hazards in a consistent matter.	6	3	4	6	8	9	0	36
PA-25	Document known and projected hazard areas, including channel migration zones, and incorporate into planning processes.	6	3	4	6	8	9	0	36
NR-11	Identify unstable stream banks and areas with high potential for erosion.	6	3	4	6	8	9	0	36
NR-12	Identify "Fluvial Erosion Hazard Zones".	6	3	4	6	8	9	0	36
PA-26	Restrict the floodway standard to less than one foot of elevation increase	3	9	12	6	4	6	9	49
	<b><u>Open Space Preservation</u></b>								
NR-14	Create a program for acquiring agricultural easements where appropriate in flood-prone areas	6	3	4	3	8	9	3	36
NR-15	Encourage and facilitate voluntary conservation easements in flood-prone areas	6	3	8	6	8	9	3	43

	<b>Activity</b>	<b>SP x3</b>	<b>TE x3</b>	<b>AD x4</b>	<b>LE x3</b>	<b>EC x4</b>	<b>EN x3</b>	<b>CR x3</b>	<b>Total (69 max)</b>
NR-16	Continue to explore creation of landowner incentive programs, such as a floodplain leasing program and conservation easements, that provide compensation to landowners for providing ecosystem services.	6	3	4	3	4	9	0	26
NR-17	Create an inventory of open flood-prone properties to consider for acquisition, conservation easements, agricultural easements, or other flood protection. Include fundings and regulatory limitations.	6	3	4	6	4	9	0	32
	<b><u>Outreach and Education</u></b>								
PI-04	Create a pre-flood plan of public information activities ready for the next flood	9	6	8	6	12	3	3	47
PI-05	Complete and implement a comprehensive community-wide public outreach plan	6	3	4	6	8	6	6	39
PI-06	Coordinate public outreach programs to be disseminated by people or groups from outside the local governments	6	9	4	6	12	3	3	43
PI-08	Train administrative staff to obtain Certified Floodplain Manager certifications	9	6	4	6	8	0	3	36
	<b><u>Planning</u></b>								
PA-27	Conduct an additional revision/update of the Flood Management plan once the MAS phases are finalized and the updated maps are adopted.	9	6	8	6	8	6	9	52
PA-29	Adopt a community-wide mitigation plan that identifies properties in the floodway and floodplain, depth of flooding, recommended mitigation measures for each property, and potential funding opportunities	6	3	8	6	8	0	0	31
PA-30	Create a mitigation plan for repetitive loss properties	6	3	4	6	8	0	9	36
NR-18	Adopt a plan that protects one or more natural functions within the community's floodplain	6	3	4	6	8	9	6	42

Activity		SP x3	TE x3	AD x4	LE x3	EC x4	EN x3	CR x3	Total (69 max)
PA-31	Create a comprehensive stormwater master plan that identifies areas of flooding, mitigation projects to alleviate flooding, land use regulations to address cumulative impacts of development, and funding mechanisms for implementation	6	3	8	6	8	0	9	40
	<b><u>Private Mitigation Projects</u></b>								
PI-09	Provide mitigation handouts and training for property owners in the floodway or floodplain	9	9	8	6	12	3	9	56
	<b><u>Public Safety</u></b>								
ES-02	Implement a flood warning system that predicts flood elevations and arrival times at specific locations within the community	9	3	4	6	8	0	6	36
	<b><u>Stream/Floodplain Restoration</u></b>								
PA-32	Conduct a sediment transport investigation	6	3	4	6	8	9	0	36
NR-19	Construct river rehabilitation projects that encourage sediment capture and habitat enhancement	6	3	4	6	4	9	6	38
NR-20	Promote the use of non-structural, bio-engineering techniques in river restoration projects	6	3	8	6	8	9	6	46
SP-03	Investigate opportunities to enhance grade control structures	6	3	4	6	4	9	6	38
NR-22	Identify methods for protecting natural channels	6	6	8	6	12	9	9	56

## DOUGLAS COUNTY - FINAL LIST

Activity		SP x4	TE x1	AD x2	LE x4	EC x2	EN x2	CR x3	Total (48 max)
	<b><u>REGULATIONS</u></b>								
	<b>1st Implementation Phase</b>								
PA-02	Develop model watershed floodplain management ordinance language that can be adopted by counties to provide watershed-wide consistency.	12	3	4	12	6	4	0	41
PA-12	Prohibit critical facilities in the floodplain	12	3	4	8	4	4	6	41
PA-17	Incorporate LID into projects throughout the development, re-development, and retrofit planning process.	12	2	4	8	4	6	3	39
PA-19	Modify development and construction standards to implement LID practices (e.g., roads, sidewalks, parking lots, landscaping)	12	2	4	8	4	6	3	39
PA-14	Require compensatory storage for new fill materials in the floodplain	8	1	4	8	2	6	9	38
PA-18	Eliminate existing policies and standards that inadvertently prohibit or discourage LID practices.	12	2	2	8	4	6	3	37
PA-20	Provide incentives for developers to use LID practices, such as waiving or reducing permit fees, allowing higher density developments, or reducing local stormwater requirements.	12	2	2	8	4	6	3	37
PA-16	Limit storage or processing of hazardous materials in the floodplain	12	2	4	8	4	6	0	36
	<b>2nd Implementation Phase</b>								
NR-03	Promote and utilize other best management practices as a means of protecting riparian habitat.	12	1	4	8	4	6	0	35
PA-07	Real estate agents notify prospective buyers that properties are located in the floodplain	8	3	6	8	6	0	3	34
PA-04	Provide more restrictive substantial improvement regulations through tracking cumulatively per building	8	2	4	8	4	0	6	32
	<b>Future Implementation Phase</b>								

	<b>Activity</b>	<b>SP x4</b>	<b>TE x1</b>	<b>AD x2</b>	<b>LE x4</b>	<b>EC x2</b>	<b>EN x2</b>	<b>CR x3</b>	<b>Total (48 max)</b>
PA-05	Provide more restrictive substantial improvement regulations through decreasing below 50% threshold	8	3	6	8	4	0	3	32
PA-06	Remove the elevation exemption for manufactured homes placed in existing MH parks	4	3	6	8	4	0	3	28
PA-15	Create a program for accounting for cumulative loss of floodplain storage volume and mitigating losses	8	1	2	8	2	6	0	27
NR-05	Maintain or restore the connection of the river to the floodplain	8	1	2	8	2	6	0	27
NR-06	Establish and protect a continuous fish and riparian corridor along the river (e.g., replace diversions)	8	1	0	8	2	6	0	25
PA-08	Implement an impact fee based on new impervious surfaces as a funding mechanism for mitigation projects	4	0	2	8	2	2	0	18
	<b><u>COUNTY/WATERSHED ACTIVITIES</u></b>								
	<b>1st Implementation Phase</b>								
PI-01	Outreach to property owners to publicize new FEMA maps and regulations	12	3	4	8	6	2	9	44
PI-09	Provide mitigation handouts and training for property owners in the floodway or floodplain	12	3	4	8	6	2	9	44
PA-27	Conduct an additional revision/update of the Flood Management plan once the MAS phases are finalized and the updated maps are adopted.	12	2	4	8	4	4	9	43
NR-22	Identify methods for protecting natural channels	8	2	4	8	6	6	9	43
PI-03	Develop watershed-wide outreach and education program about floodplain importance and flooding hazards.	8	1	2	8	4	6	9	38
PI-04	Create a pre-flood plan of public information activities ready for the next flood	12	2	4	8	6	2	3	37
NR-20	Promote the use of non-structural, bio-engineering techniques in river restoration projects	8	1	4	8	4	6	6	37

	<b>Activity</b>	<b>SP x4</b>	<b>TE x1</b>	<b>AD x2</b>	<b>LE x4</b>	<b>EC x2</b>	<b>EN x2</b>	<b>CR x3</b>	<b>Total (48 max)</b>
ES-01	Add rain gauges to existing warning system	12	2	4	8	4	0	6	36
	<b>2nd Implementation Phase</b>								
PA-28	Through community planning, identify floodplain areas that would provide other community benefits (e.g., recreation, parks)	12	1	2	8	6	6	0	35
NR-18	Adopt a plan that protects one or more natural functions within the community's floodplain	8	1	2	8	4	6	6	35
NR-15	Encourage and facilitate voluntary conservation easements in flood-prone areas	8	1	4	8	4	6	3	34
PA-31	Create a comprehensive stormwater master plan that identifies areas of flooding, mitigation projects to alleviate flooding, land use regulations to address cumulative impacts of development, and funding mechanisms for implementation	8	1	4	8	4	0	9	34
PI-05	Complete and implement a comprehensive community-wide public outreach plan	8	1	2	8	4	4	6	33
ES-02	Implement a flood warning system that predicts flood elevations and arrival times at specific locations within the community	12	1	2	8	4	0	6	33
SP-01	Develop project proposals to improve storm water facilities and reduce flooding	8	1	2	8	2	6	6	33
NR-19	Construct river rehabilitation projects that encourage sediment capture and habitat enhancement	8	1	2	8	2	6	6	33
SP-03	Investigate opportunities to enhance grade control structures	8	1	2	8	2	6	6	33
PI-06	Coordinate public outreach programs to be disseminated by people or groups from outside the local governments	8	3	2	8	6	2	3	32
	<b>Future Implementation Phase</b>								0
PA-21	Expand mapping layers to include USDA soil types, depth to groundwater, source water protection areas, hydrography, existing stormwater systems, and zoning.	8	1	2	8	4	6	0	29

	<b>Activity</b>	<b>SP x4</b>	<b>TE x1</b>	<b>AD x2</b>	<b>LE x4</b>	<b>EC x2</b>	<b>EN x2</b>	<b>CR x3</b>	<b>Total (48 max)</b>
PA-24	Develop and coordinate a photo-monitoring program on a watershed level to document flooding and flood hazards in a consistent matter.	8	1	2	8	4	6	0	29
PA-25	Document known and projected hazard areas, including channel migration zones, and incorporate into planning processes.	8	1	2	8	4	6	0	29
NR-11	Identify unstable stream banks and areas with high potential for erosion.	8	1	2	8	4	6	0	29
NR-12	Identify "Fluvial Erosion Hazard Zones".	8	1	2	8	4	6	0	29
PA-32	Conduct a sediment transport investigation	8	1	2	8	4	6	0	29
NR-14	Create a program for acquiring agricultural easements where appropriate in flood-prone areas	8	1	2	4	4	6	3	28
NR-08	Implement LID demonstration projects	8	1	2	8	2	6	0	27
NR-17	Create an inventory of open flood-prone properties to consider for acquisition, conservation easements, agricultural easements, or other flood protection. Include fundings and regulatory limitations.	8	1	2	8	2	6	0	27
NR-10	Promote LID design or installation contests and construct winner's design as a demonstration project.	8	1	0	8	2	6	0	25
PA-29	Adopt a community-wide mitigation plan that identifies properties in the floodway and floodplain, depth of flooding, recommended mitigation measures for each property, and potential funding opportunities	8	1	4	8	4	0	0	25



## DOUGLAS COUNTY - DEVELOPMENT AND LAND USE REGULATIONS

Activity		SP x4	TE x1	AD x2	LE x4	EC x2	EN x2	CR x3	Total (48 max)
	<b><u>General Development Regulations</u></b>								
PA-02	Develop model watershed floodplain management ordinance language that can be adopted by counties to provide watershed-wide consistency.	12	3	4	12	6	4	0	41
PA-04	Provide more restrictive substantial improvement regulations through tracking cumulatively per building	8	2	4	8	4	0	6	32
PA-05	Provide more restrictive substantial improvement regulations through decreasing below 50% threshold	8	3	6	8	4	0	3	32
PA-06	Remove the elevation exemption for manufactured homes placed in existing MH parks	4	3	6	8	4	0	3	28
PA-07	Real estate agents notify prospective buyers that properties are located in the floodplain	8	3	6	8	6	0	3	34
PA-08	Implement an impact fee based on new impervious surfaces as a funding mechanism for mitigation projects	4	0	2	8	2	2	0	18
	<b><u>Limit new development in flood-prone areas</u></b>								
PA-12	Prohibit critical facilities in the floodplain	12	3	4	8	4	4	6	41
NR-03	Promote and utilize other best management practices as a means of protecting riparian habitat.	12	1	4	8	4	6	0	35
PA-14	Require compensatory storage for new fill materials in the floodplain	8	1	4	8	2	6	9	38
PA-15	Create a program for accounting for cumulative loss of floodplain storage volume and mitigating losses	8	2	4	8	2	6	0	30
	<b><u>Floodplain Storage/Setback</u></b>								
NR-05	Maintain or restore the connection of the river to the floodplain	8	1	2	8	2	6	0	27

Activity		SP x4	TE x1	AD x2	LE x4	EC x2	EN x2	CR x3	Total (48 max)
NR-06	Establish and protect a continuous fish and riparian corridor along the river (e.g., replace diversions)	8	1	0	8	2	6	0	25
	<b><u>Land Use Restriction</u></b>								
PA-16	Limit storage or processing of hazardous materials in the floodplain	12	2	4	8	4	6	0	36
	<b><u>Low Impact Development</u></b>								
PA-17	Incorporate LID into projects throughout the development, re-development, and retrofit planning process.	12	2	4	8	4	6	3	39
PA-18	Eliminate existing policies and standards that inadvertently prohibit or discourage LID practices.	12	2	2	8	4	6	3	37
PA-19	Modify development and construction standards to implement LID practices (e.g., roads, sidewalks, parking lots, landscaping)	12	2	4	8	4	6	3	39
PA-20	Provide incentives for developers to use LID practices, such as waiving or reducing permit fees, allowing higher density developments, or reducing local stormwater requirements.	12	2	2	8	4	6	3	37

## DOUGLAS COUNTY - COUNTY/WATERSHED-DRIVEN ACTIVITIES

Activity		SP x4	TE x1	AD x2	LE x4	EC x2	EN x2	CR x3	Total (48 max)
<b><u>Low Impact Development</u></b>									
PA-21	Expand mapping layers to include USDA soil types, depth to groundwater, source water protection areas, hydrography, existing stormwater systems, and zoning.	8	1	2	8	4	6	0	29
NR-08	Implement LID demonstration projects	8	1	2	8	2	6	0	27
NR-09	Provide financial subsidies toward materials that are used in LID projects	8	2	2	4	2	6	0	24
NR-10	Promote LID design or installation contests and construct winner's design as a demonstration project.	8	1	0	8	2	6	0	25
PA-22	Provide a stormwater fee discount or credit as an incentive for LID implementation	8	1	0	4	2	6	0	21
<b><u>Map Information/Studies</u></b>									
PA-24	Develop and coordinate a photo-monitoring program on a watershed level to document flooding and flood hazards in a consistent matter.	8	1	2	8	4	6	0	29
PA-25	Document known and projected hazard areas, including channel migration zones, and incorporate into planning processes.	8	1	2	8	4	6	0	29
NR-11	Identify unstable stream banks and areas with high potential for erosion.	8	1	2	8	4	6	0	29
NR-12	Identify "Fluvial Erosion Hazard Zones".	8	1	2	8	4	6	0	29
<b><u>Open Space Preservation</u></b>									
NR-14	Create a program for acquiring agricultural easements where appropriate in flood-prone areas	8	1	2	4	4	6	3	28
NR-15	Encourage and facilitate voluntary conservation easements in flood-prone areas	8	1	4	8	4	6	3	34

	<b>Activity</b>	<b>SP x4</b>	<b>TE x1</b>	<b>AD x2</b>	<b>LE x4</b>	<b>EC x2</b>	<b>EN x2</b>	<b>CR x3</b>	<b>Total (48 max)</b>
NR-16	Continue to explore creation of landowner incentive programs, such as a floodplain leasing program and conservation easements, that provide compensation to landowners for providing ecosystem services.	8	1	2	4	2	6	0	23
NR-17	Create an inventory of open flood-prone properties to consider for acquisition, conservation easements, agricultural easements, or other flood protection. Include fundings and regulatory limitations.	8	1	2	8	2	6	0	27
	<b><u>Outreach and Education</u></b>								
PI-01	Outreach to property owners to publicize new FEMA maps and regulations	12	3	4	8	6	2	9	44
PI-03	Develop watershed-wide outreach and education program about floodplain importance and flooding hazards.	8	1	2	8	4	6	9	38
PI-04	Create a pre-flood plan of public information activities ready for the next flood	12	2	4	8	6	2	3	37
PI-05	Complete and implement a comprehensive community-wide public outreach plan	8	1	2	8	4	4	6	33
PI-06	Coordinate public outreach programs to be disseminated by people or groups from outside the local governments	8	3	2	8	6	2	3	32
	<b><u>Planning</u></b>								
PA-27	Conduct an additional revision/update of the Flood Management plan once the MAS phases are finalized and the updated maps are adopted.	12	2	4	8	4	4	9	43
PA-28	Through community planning, identify floodplain areas that would provide other community benefits (e.g., recreation, parks)	12	1	2	8	6	6	0	35
PA-29	Adopt a community-wide mitigation plan that identifies properties in the floodway and floodplain, depth of flooding, recommended mitigation measures for each property, and potential funding opportunities	8	1	4	8	4	0	0	25
NR-18	Adopt a plan that protects one or more natural functions within the community's floodplain	8	1	2	8	4	6	6	35

	Activity	SP x4	TE x1	AD x2	LE x4	EC x2	EN x2	CR x3	Total (48 max)
PA-31	Create a comprehensive stormwater master plan that identifies areas of flooding, mitigation projects to alleviate flooding, land use regulations to address cumulative impacts of development, and funding mechanisms for implementation	8	1	4	8	4	0	9	34
	<b><u>Private Mitigation Projects</u></b>								
PI-09	Provide mitigation handouts and training for property owners in the floodway or floodplain	12	3	4	8	6	2	9	44
	<b><u>Public Safety</u></b>								
ES-01	Add rain gauges to existing warning system	12	2	4	8	4	0	6	36
ES-02	Implement a flood warning system that predicts flood elevations and arrival times at specific locations within the community	12	1	2	8	4	0	6	33
ES-05	Obtain designation by the National Weather Service as a StormReady community (CRS Communities only)	8	0	0	8	4	2	3	25
	<b><u>Stream/Floodplain Restoration</u></b>								
SP-01	Develop project proposals to improve storm water facilities and reduce flooding	8	1	2	8	2	6	6	33
PA-32	Conduct a sediment transport investigation	8	1	2	8	4	6	0	29
NR-19	Construct river rehabilitation projects that encourage sediment capture and habitat enhancement	8	1	2	8	2	6	6	33
NR-20	Promote the use of non-structural, bio-engineering techniques in river restoration projects	8	1	4	8	4	6	6	37
SP-03	Investigate opportunities to enhance grade control structures	8	1	2	8	2	6	6	33
NR-22	Identify methods for protecting natural channels	8	2	4	8	6	6	9	43

## LYON COUNTY - FINAL LIST

Activity		SP x3	TE x3	AD x4	LE x3	EC x4	EN x1	CR x0	Total (54 max)
	<b><u>REGULATIONS</u></b>								
	<b>1st Implementation Phase</b>								
PA-02	Develop model watershed floodplain management ordinance language that can be adopted by counties to provide watershed-wide consistency.	9	9	8	9	12	2	0	49
PA-01	Identify 100-year flood zones on subdivision maps	9	9	8	6	12	1	0	45
PA-07	Real estate agents notify prospective buyers that properties are located in the floodplain	6	9	12	6	12	0	0	45
PA-03	Restrict zone changes within the floodplain to limit density	9	6	8	6	12	2	0	43
PA-12	Prohibit critical facilities in the floodplain	9	9	8	6	8	2	0	42
NR-01	Property owners may transfer density (units) from one property to preserve open space.	9	6	8	6	8	3	0	40
PA-16	Limit storage or processing of hazardous materials in the floodplain	9	6	8	6	8	3	0	40
PA-17	Incorporate LID into projects throughout the development, re-development, and retrofit planning process.	9	6	8	6	8	3	0	40
PA-19	Modify development and construction standards to implement LID practices (e.g., roads, sidewalks, parking lots, landscaping)	9	6	8	6	8	3	0	40
	<b>2nd Implementation Phase</b>								
PA-09	Allow development on flood prone properties to be clustered out of the 100-year floodplain	6	6	4	6	12	3	0	37
NR-03	Promote and utilize other best management practices as a means of protecting riparian habitat.	9	3	8	6	8	3	0	37
PA-18	Eliminate existing policies and standards that inadvertently prohibit or discourage LID practices.	9	6	4	6	8	3	0	36

	<b>Activity</b>	<b>SP x3</b>	<b>TE x3</b>	<b>AD x4</b>	<b>LE x3</b>	<b>EC x4</b>	<b>EN x1</b>	<b>CR x0</b>	<b>Total (54 max)</b>
PA-20	Provide incentives for developers to use LID practices, such as waiving or reducing permit fees, allowing higher density developments, or reducing local stormwater requirements.	9	6	4	6	8	3	0	36
	<b>Future Implementation Phase</b>								
PA-04	Provide more restrictive substantial improvement regulations through tracking cumulatively per building	6	9	4	6	8	0	0	33
PA-10	Require additional freeboard to elevate building floors higher above the base flood elevation	6	9	8	6	4	0	0	33
PA-14	Require compensatory storage for new fill materials in the floodplain	6	3	8	6	4	3	0	30
NR-04	Establish development buffer zones along all waterways	6	3	4	6	8	3	0	30
NR-07	Retain lands that provide floodplain storage and maintain or restore connection of river with floodplain through land acquisition, conservation easements, local open space programs, TDR and PDR Programs, and other protection methods	6	6	4	6	4	3	0	29
	<b><u>COUNTY/WATERSHED ACTIVITIES</u></b>								
	<b>1st Implementation Phase</b>								
PI-01	Outreach to property owners to publicize new FEMA maps and regulations	9	9	8	6	12	1	0	45
PI-02	Educate existing residents on appropriate measures to be taken to minimize the potential loss of life and property in the event of a natural disaster.	9	9	8	6	12	1	0	45
PI-09	Provide mitigation handouts and training for property owners in the floodway or floodplain	9	9	8	6	12	1	0	45
PI-07	Provide flood protection information on the communities' websites	6	9	8	6	12	2	0	43
PI-04	Create a pre-flood plan of public information activities ready for the next flood	9	6	8	6	12	1	0	42
	<b>2nd Implementation Phase</b>								0

	<b>Activity</b>	<b>SP x3</b>	<b>TE x3</b>	<b>AD x4</b>	<b>LE x3</b>	<b>EC x4</b>	<b>EN x1</b>	<b>CR x0</b>	<b>Total (54 max)</b>
ES-04	Coordinate flood warning and response activities with operators of critical facilities	9	6	8	6	12	0	0	41
NR-21	Limit the use of future management measures such as dams, levees, and floodwalls.	6	6	12	6	8	3	0	41
SP-02	Design future bridges and roads to protect floodplain, accommodate and not restrict changing river course, and minimize back up of flood water.	6	6	12	6	8	3	0	41
NR-22	Identify methods for protecting natural channels	6	6	8	6	12	3	0	41
PA-27	Conduct an additional revision/update of the Flood Management plan once the MAS phases are finalized and the updated maps are adopted.	9	6	8	6	8	2	0	39
PI-06	Coordinate public outreach programs to be disseminated by people or groups from outside the local governments	6	9	4	6	12	1	0	38
PA-28	Through community planning, identify floodplain areas that would provide other community benefits (e.g., recreation, parks)	9	3	4	6	12	3	0	37
NR-15	Encourage and facilitate voluntary conservation easements in flood-prone areas	6	3	8	6	8	3	0	34
NR-20	Promote the use of non-structural, bio-engineering techniques in river restoration projects	6	3	8	6	8	3	0	34
	<b>Future Implementation Phase</b>								
PA-21	Expand mapping layers to include USDA soil types, depth to groundwater, source water protection areas, hydrography, existing stormwater systems, and zoning.	6	3	4	6	8	3	0	30
PA-25	Document known and projected hazard areas, including channel migration zones, and incorporate into planning processes.	6	3	4	6	8	3	0	30
NR-11	Identify unstable stream banks and areas with high potential for erosion.	6	3	4	6	8	3	0	30
NR-12	Identify "Fluvial Erosion Hazard Zones".	6	3	4	6	8	3	0	30



	<b>Activity</b>	<b>SP x3</b>	<b>TE x3</b>	<b>AD x4</b>	<b>LE x3</b>	<b>EC x4</b>	<b>EN x1</b>	<b>CR x0</b>	<b>Total (54 max)</b>
NR-13	Create maps of natural floodplain functions	6	3	4	6	8	3	0	30
PI-03	Develop watershed-wide outreach and education program about floodplain importance and flooding hazards.	6	3	4	6	8	3	0	30
NR-18	Adopt a plan that protects one or more natural functions within the community's floodplain	6	3	4	6	8	3	0	30
PI-05	Complete and implement a comprehensive community-wide public outreach plan	6	3	4	6	8	2	0	29
PA-23	Maintain consistent data to ensure that flood studies are up-to-date and conduct studies for significant water courses and alluvial fan areas that have not been analyzed. This data should be used to update FEMA maps and fill data gaps.	6	3	4	6	8	0	0	27
NR-14	Create a program for acquiring agricultural easements where appropriate in flood-prone areas	6	3	4	3	8	3	0	27
NR-08	Implement LID demonstration projects	6	3	4	6	4	3	0	26
NR-09	Provide financial subsidies toward materials that are used in LID projects	6	6	4	3	4	3	0	26
NR-17	Create an inventory of open flood-prone properties to consider for acquisition, conservation easements, agricultural easements, or other flood protection. Include fundings and regulatory limitations.	6	3	4	6	4	3	0	26
SP-01	Develop project proposals to improve storm water facilities and reduce flooding	6	3	4	6	4	3	0	26
NR-19	Construct river rehabilitation projects that encourage sediment capture and habitat enhancement	6	3	4	6	4	3	0	26

## LYON COUNTY - DEVELOPMENT AND LAND USE REGULATIONS

	Activity	SP x3	TE x3	AD x4	LE x3	EC x4	EN x1	CR x0	Total (54 max)
	<b><u>General Development Regulations</u></b>								
PA-01	Identify 100-year flood zones on subdivision maps	9	9	8	6	12	1	0	45
PA-02	Develop model watershed floodplain management ordinance language that can be adopted by counties to provide watershed-wide consistency.	9	9	8	9	12	2	0	49
PA-03	Restrict zone changes within the floodplain to limit density	9	6	8	6	12	2	0	43
PA-04	Provide more restrictive substantial improvement regulations through tracking cumulatively per building	6	9	4	6	8	0	0	33
PA-07	Real estate agents notify prospective buyers that properties are located in the floodplain	6	9	12	6	12	0	0	45
PA-08	Implement an impact fee based on new impervious surfaces as a funding mechanism for mitigation projects	3	0	4	6	4	2	0	19
PA-09	Allow development on flood prone properties to be clustered out of the 100-year floodplain	6	6	4	6	12	3	0	37
	<b><u>Limit new development in flood-prone areas</u></b>								
NR-01	Property owners may transfer density (units) from one property to preserve open space.	9	6	8	6	8	3	0	40
PA-10	Require additional freeboard to elevate building floors higher above the base flood elevation	6	9	8	6	4	0	0	33
PA-12	Prohibit critical facilities in the floodplain	9	9	8	6	8	2	0	42
NR-03	Promote and utilize other best management practices as a means of protecting riparian habitat.	9	3	8	6	8	3	0	37
PA-14	Require compensatory storage for new fill materials in the floodplain	6	3	8	6	4	3	0	30
PA-15	Create a program for accounting for cumulative loss of floodplain storage volume and mitigating losses	6	3	4	6	4	3	0	26

Activity		SP x3	TE x3	AD x4	LE x3	EC x4	EN x1	CR x0	Total (54 max)
	<b><u>Floodplain Storage/Setback</u></b>								
NR-04	Establish development buffer zones along all waterways	6	3	4	6	8	3	0	30
NR-05	Maintain or restore the connection of the river to the floodplain	6	3	4	6	4	3	0	26
NR-06	Establish and protect a continuous fish and riparian corridor along the river (e.g., replace diversions)	6	3	0	6	4	3	0	22
	<b><u>Land Use Restriction</u></b>								
PA-16	Limit storage or processing of hazardous materials in the floodplain	9	6	8	6	8	3	0	40
	<b><u>Low Impact Development</u></b>								
PA-17	Incorporate LID into projects throughout the development, re-development, and retrofit planning process.	9	6	8	6	8	3	0	40
PA-18	Eliminate existing policies and standards that inadvertently prohibit or discourage LID practices.	9	6	4	6	8	3	0	36
PA-19	Modify development and construction standards to implement LID practices (e.g., roads, sidewalks, parking lots, landscaping)	9	6	8	6	8	3	0	40
PA-20	Provide incentives for developers to use LID practices, such as waiving or reducing permit fees, allowing higher density developments, or reducing local stormwater requirements.	9	6	4	6	8	3	0	36
	<b><u>Open Space Preservation</u></b>								
NR-07	Retain lands that provide floodplain storage and maintain or restore connection of river with floodplain through land acquisition, conservation easements, local open space programs, TDR and PDR Programs, and other protection methods	6	6	4	6	4	3	0	29

## LYON COUNTY - COUNTY/WATERSHED-DRIVEN ACTIVITIES

	Activity	SP x3	TE x3	AD x4	LE x3	EC x4	EN x1	CR x0	Total (54 max)
	<b><u>Low Impact Development</u></b>								
PA-21	Expand mapping layers to include USDA soil types, depth to groundwater, source water protection areas, hydrography, existing stormwater systems, and zoning.	6	3	4	6	8	3	0	30
NR-08	Implement LID demonstration projects	6	3	4	6	4	3	0	26
NR-09	Provide financial subsidies toward materials that are used in LID projects	6	6	4	3	4	3	0	26
NR-10	Promote LID design or installation contests and construct winner's design as a demonstration project.	6	3	0	6	4	3	0	22
PA-22	Provide a stormwater fee discount or credit as an incentive for LID implementation	6	3	0	3	4	3	0	19
	<b><u>Map Information/Studies</u></b>								
PA-23	Maintain consistent data to ensure that flood studies are up-to-date and conduct studies for significant water courses and alluvial fan areas that have not been analyzed. This data should be used to update FEMA maps and fill data gaps.	6	3	4	6	8	0	0	27
PA-25	Document known and projected hazard areas, including channel migration zones, and incorporate into planning processes.	6	3	4	6	8	3	0	30
NR-11	Identify unstable stream banks and areas with high potential for erosion.	6	3	4	6	8	3	0	30
NR-12	Identify "Fluvial Erosion Hazard Zones".	6	3	4	6	8	3	0	30
NR-13	Create maps of natural floodplain functions	6	3	4	6	8	3	0	30
	<b><u>Open Space Preservation</u></b>								
NR-14	Create a program for acquiring agricultural easements where appropriate in flood-prone areas	6	3	4	3	8	3	0	27
NR-15	Encourage and facilitate voluntary conservation easements in flood-prone areas	6	3	8	6	8	3	0	34

	<b>Activity</b>	<b>SP x3</b>	<b>TE x3</b>	<b>AD x4</b>	<b>LE x3</b>	<b>EC x4</b>	<b>EN x1</b>	<b>CR x0</b>	<b>Total (54 max)</b>
NR-16	Continue to explore creation of landowner incentive programs, such as a floodplain leasing program and conservation easements, that provide compensation to landowners for providing ecosystem services.	6	3	4	3	4	3	0	20
NR-17	Create an inventory of open flood-prone properties to consider for acquisition, conservation easements, agricultural easements, or other flood protection. Include fundings and regulatory limitations.	6	3	4	6	4	3	0	26
	<b><u>Outreach and Education</u></b>								
PI-01	Outreach to property owners to publicize new FEMA maps and regulations	9	9	8	6	12	1	0	45
PI-02	Educate existing residents on appropriate measures to be taken to minimize the potential loss of life and property in the event of a natural disaster.	9	9	8	6	12	1	0	45
PI-03	Develop watershed-wide outreach and education program about floodplain importance and flooding hazards.	6	3	4	6	8	3	0	30
PI-04	Create a pre-flood plan of public information activities ready for the next flood	9	6	8	6	12	1	0	42
PI-05	Complete and implement a comprehensive community-wide public outreach plan	6	3	4	6	8	2	0	29
PI-06	Coordinate public outreach programs to be disseminated by people or groups from outside the local governments	6	9	4	6	12	1	0	38
PI-07	Provide flood protection information on the communities' websites	6	9	8	6	12	2	0	43
	<b><u>Planning</u></b>								
PA-27	Conduct an additional revision/update of the Flood Management plan once the MAS phases are finalized and the updated maps are adopted.	9	6	8	6	8	2	0	39
PA-28	Through community planning, identify floodplain areas that would provide other community benefits (e.g., recreation, parks)	9	3	4	6	12	3	0	37

	Activity	SP x3	TE x3	AD x4	LE x3	EC x4	EN x1	CR x0	Total (54 max)
NR-18	Adopt a plan that protects one or more natural functions within the community's floodplain	6	3	4	6	8	3	0	30
	<b><u>Private Mitigation Projects</u></b>								
PI-09	Provide mitigation handouts and training for property owners in the floodway or floodplain	9	9	8	6	12	1	0	45
	<b><u>Public Safety</u></b>								
ES-04	Coordinate flood warning and response activities with operators of critical facilities	9	6	8	6	12	0	0	41
ES-05	Obtain designation by the National Weather Service as a StormReady community (CRS Communities only)	6	0	0	6	8	0	0	20
	<b><u>Stream/Floodplain Restoration</u></b>								
SP-01	Develop project proposals to improve storm water facilities and reduce flooding	6	3	4	6	4	3	0	26
NR-19	Construct river rehabilitation projects that encourage sediment capture and habitat enhancement	6	3	4	6	4	3	0	26
NR-20	Promote the use of non-structural, bio-engineering techniques in river restoration projects	6	3	8	6	8	3	0	34
NR-21	Limit the use of future management measures such as dams, levees, and floodwalls.	6	6	12	6	8	3	0	41
SP-02	Design future bridges and roads to protect floodplain, accommodate and not restrict changing river course, and minimize back up of flood water.	6	6	12	6	8	3	0	41
NR-22	Identify methods for protecting natural channels	6	6	8	6	12	3	0	41

## CWSD - FINAL LIST

	Activity	SP x3	TE x2	AD x4	LE x4	EC x3	EN x3	CR x2	Total (63 max)
	<b><u>REGULATIONS</u></b>								
	<b>1st Implementation Phase</b>								
PA-02	Develop model watershed floodplain management ordinance language that can be adopted by counties to provide watershed-wide consistency.	9	6	8	12	9	6	0	50
NR-01	Property owners may transfer density (units) from one property to preserve open space.	9	4	8	8	6	9	6	50
PA-19	Modify development and construction standards to implement LID practices (e.g., roads, sidewalks, parking lots, landscaping)	9	4	8	8	6	9	2	46
NR-03	Promote and utilize other best management practices as a means of protecting riparian habitat.	9	2	8	8	6	9	0	42
PA-18	Eliminate existing policies and standards that inadvertently prohibit or discourage LID practices.	9	4	4	8	6	9	2	42
PA-20	Provide incentives for developers to use LID practices, such as waiving or reducing permit fees, allowing higher density developments, or reducing local stormwater requirements.	9	4	4	8	6	9	2	42
PA-07	Real estate agents notify prospective buyers that properties are located in the floodplain	6	6	9	8	9	0	2	40
NR-07	Retain lands that provide floodplain storage and maintain or restore connection of river with floodplain through land acquisition, conservation easements, local open space programs, TDR and PDR Programs, and other protection methods	6	4	4	8	3	9	6	40
	<b>2nd Implementation Phase</b>								
NR-05	Maintain or restore the connection of the river to the floodplain	6	2	4	8	3	9	0	32
NR-06	Establish and protect a continuous fish and riparian corridor along the river (e.g., replace diversions)	6	2	0	8	3	9	0	28
	<b><u>COUNTY/WATERSHED ACTIVITIES</u></b>								

Activity		SP x3	TE x2	AD x4	LE x4	EC x3	EN x3	CR x2	Total (63 max)
<b>1st Implementation Phase</b>									
PI-01	Outreach to property owners to publicize new FEMA maps and regulations	9	6	8	8	9	3	6	49
PA-27	Conduct an additional revision/update of the Flood Management plan once the MAS phases are finalized and the updated maps are adopted.	9	4	8	8	6	6	6	47
NR-21	Limit the use of future management measures such as dams, levees, and floodwalls.	6	4	12	8	6	9	0	45
SP-02	Design future bridges and roads to protect floodplain, accommodate and not restrict changing river course, and minimize back up of flood water.	6	4	12	8	6	9	0	45
NR-15	Encourage and facilitate voluntary conservation easements in flood-prone areas	6	2	8	8	6	9	2	41
PA-28	Through community planning, identify floodplain areas that would provide other community benefits (e.g., recreation, parks)	9	2	4	8	9	9	0	41
NR-08	Implement LID demonstration projects	9	4	4	8	6	9	0	40
NR-18	Adopt a plan that protects one or more natural functions within the community's floodplain	6	2	4	8	6	9	4	39
ES-01	Add rain gauges to existing warning system	9	4	8	8	6	0	4	39
PA-29	Adopt a community-wide mitigation plan that identifies properties in the floodway and floodplain, depth of flooding, recommended mitigation measures for each property, and potential funding opportunities	9	2	8	8	6	3	2	38
PA-15	Create a program for accounting for cumulative loss of floodplain storage volume and mitigating losses	6	4	8	8	3	9	0	38
NR-05	Maintain or restore the connection of the river to the floodplain	6	4	8	8	3	9	0	38
<b>2nd Implementation Phase</b>									
PI-04	Create a pre-flood plan of public information activities ready for the next flood	6	4	4	8	9	3	2	36



	<b>Activity</b>	<b>SP x3</b>	<b>TE x2</b>	<b>AD x4</b>	<b>LE x4</b>	<b>EC x3</b>	<b>EN x3</b>	<b>CR x2</b>	<b>Total (63 max)</b>
PI-05	Complete and implement a comprehensive community-wide public outreach plan	6	2	4	8	6	6	4	36
PA-31	Create a comprehensive stormwater master plan that identifies areas of flooding, mitigation projects to alleviate flooding, land use regulations to address cumulative impacts of development, and funding mechanisms for implementation	6	2	8	8	6	0	6	36
PA-21	Expand mapping layers to include USDA soil types, depth to groundwater, source water protection areas, hydrography, existing stormwater systems, and zoning.	6	2	4	8	6	9	0	35
PA-24	Develop and coordinate a photo-monitoring program on a watershed level to document flooding and flood hazards in a consistent matter.	6	2	4	8	6	9	0	35
PA-25	Document known and projected hazard areas, including channel migration zones, and incorporate into planning processes.	6	2	4	8	6	9	0	35
NR-11	Identify unstable stream banks and areas with high potential for erosion.	6	2	4	8	6	9	0	35
NR-12	Identify "Fluvial Erosion Hazard Zones".	6	2	4	8	6	9	0	35
SP-01	Develop project proposals to improve storm water facilities and reduce flooding	6	2	4	8	2	9	4	35
NR-19	Construct river rehabilitation projects that encourage sediment capture and habitat enhancement	6	2	4	8	2	9	4	35
SP-03	Investigate opportunities to enhance grade control structures	6	2	4	8	2	9	4	35
	<b>Future Implementation Phase</b>								
NR-14	Create a program for acquiring agricultural easements where appropriate in flood-prone areas	6	2	4	4	6	9	2	33
PA-32	Conduct a sediment transport investigation	6	2	4	8	4	9	0	33

	<b>Activity</b>	<b>SP x3</b>	<b>TE x2</b>	<b>AD x4</b>	<b>LE x4</b>	<b>EC x3</b>	<b>EN x3</b>	<b>CR x2</b>	<b>Total (63 max)</b>
NR-17	Create an inventory of open flood-prone properties to consider for acquisition, conservation easements, agricultural easements, or other flood protection. Include fundings and regulatory limitations.	6	2	4	8	3	9	0	32
NR-09	Provide financial subsidies toward materials that are used in LID projects	6	4	4	4	3	9	0	30
NR-10	Promote LID design or installation contests and construct winner's design as a demonstration project.	6	2	0	8	3	9	0	28
NR-16	Continue to explore creation of landowner incentive programs, such as a floodplain leasing program and conservation easements, that provide compensation to landowners for providing ecosystem services.	6	2	4	4	3	9	0	28
NR-13	Create maps of natural floodplain functions	6	2	4	8	6	1	0	27
PA-23	Maintain consistent data to ensure that flood studies are up-to-date and conduct studies for significant water courses and alluvial fan areas that have not been analyzed. This data should be used to update FEMA maps and fill data gaps.	6	2	4	8	6	0	0	26

## CWSD - DEVELOPMENT AND LAND USE REGULATIONS

	Activity	SP x3	TE x2	AD x4	LE x4	EC x3	EN x3	CR x2	Total (63 max)
	<b><u>General Development Regulations</u></b>								
PA-02	Develop model watershed floodplain management ordinance language that can be adopted by counties to provide watershed-wide consistency.	9	6	8	12	9	6	0	50
PA-07	Real estate agents notify prospective buyers that properties are located in the floodplain	6	6	9	8	9	0	2	40
PA-08	Implement an impact fee based on new impervious surfaces as a funding mechanism for mitigation projects	4	0	2	8	2	2	0	18
	<b><u>Limit new development in flood-prone areas</u></b>								
NR-01	Property owners may transfer density (units) from one property to preserve open space.	9	4	8	8	6	9	6	50
NR-03	Promote and utilize other best management practices as a means of protecting riparian habitat.	9	2	8	8	6	9	0	42
PA-15	Create a program for accounting for cumulative loss of floodplain storage volume and mitigating losses	6	4	8	8	3	9	0	38
	<b><u>Floodplain Storage/Setback</u></b>								
NR-05	Maintain or restore the connection of the river to the floodplain	6	4	8	8	3	9	0	38
NR-06	Establish and protect a continuous fish and riparian corridor along the river (e.g., replace diversions)	6	2	0	8	3	9	0	28
	<b><u>Low Impact Development</u></b>								
PA-18	Eliminate existing policies and standards that inadvertently prohibit or discourage LID practices.	9	4	4	8	6	9	2	42
PA-19	Modify development and construction standards to implement LID practices (e.g., roads, sidewalks, parking lots, landscaping)	9	4	8	8	6	9	2	46

Activity		SP x3	TE x2	AD x4	LE x4	EC x3	EN x3	CR x2	Total (63 max)
PA-20	Provide incentives for developers to use LID practices, such as waiving or reducing permit fees, allowing higher density developments, or reducing local stormwater requirements.	9	4	4	8	6	9	2	42
NR-07	Retain lands that provide floodplain storage and maintain or restore connection of river with floodplain through land acquisition, conservation easements, local open space programs, TDR and PDR Programs, and other protection methods	6	4	4	8	3	9	6	40

## CWSD - COUNTY/WATERSHED-DRIVEN ACTIVITIES

Activity		SP x3	TE x2	AD x4	LE x4	EC x3	EN x3	CR x2	Total (63 max)
<b><u>Low Impact Development</u></b>									
PA-21	Expand mapping layers to include USDA soil types, depth to groundwater, source water protection areas, hydrography, existing stormwater systems, and zoning.	6	2	4	8	6	9	0	35
NR-08	Implement LID demonstration projects	6	2	4	8	3	9	0	32
NR-09	Provide financial subsidies toward materials that are used in LID projects	6	4	4	4	3	9	0	30
NR-10	Promote LID design or installation contests and construct winner's design as a demonstration project.	6	2	0	8	3	9	0	28
<b><u>Map Information/Studies</u></b>									
PA-23	Maintain consistent data to ensure that flood studies are up-to-date and conduct studies for significant water courses and alluvial fan areas that have not been analyzed. This data should be used to update FEMA maps and fill data gaps.	6	2	4	8	6	0	0	26
PA-24	Develop and coordinate a photo-monitoring program on a watershed level to document flooding and flood hazards in a consistent matter.	6	2	4	8	6	9	0	35
PA-25	Document known and projected hazard areas, including channel migration zones, and incorporate into planning processes.	6	2	4	8	6	9	0	35
NR-11	Identify unstable stream banks and areas with high potential for erosion.	6	2	4	8	6	9	0	35
NR-12	Identify "Fluvial Erosion Hazard Zones".	6	2	4	8	6	9	0	35
NR-13	Create maps of natural floodplain functions	6	2	4	8	6	1	0	27
<b><u>Open Space Preservation</u></b>									
NR-14	Create a program for acquiring agricultural easements where appropriate in flood-prone areas	6	2	4	4	6	9	2	33

	<b>Activity</b>	<b>SP x3</b>	<b>TE x2</b>	<b>AD x4</b>	<b>LE x4</b>	<b>EC x3</b>	<b>EN x3</b>	<b>CR x2</b>	<b>Total (63 max)</b>
NR-15	Encourage and facilitate voluntary conservation easements in flood-prone areas	6	2	8	8	6	9	2	41
NR-16	Continue to explore creation of landowner incentive programs, such as a floodplain leasing program and conservation easements, that provide compensation to landowners for providing ecosystem services.	6	2	4	4	3	9	0	28
NR-17	Create an inventory of open flood-prone properties to consider for acquisition, conservation easements, agricultural easements, or other flood protection. Include fundings and regulatory limitations.	6	2	4	8	3	9	0	32
	<b><u>Outreach and Education</u></b>								
PI-01	Outreach to property owners to publicize new FEMA maps and regulations	9	6	8	8	9	3	6	49
PI-04	Create a pre-flood plan of public information activities ready for the next flood	6	4	4	8	9	3	2	36
PI-05	Complete and implement a comprehensive community-wide public outreach plan	6	2	4	8	6	6	4	36
	<b><u>Planning</u></b>								
PA-27	Conduct an additional revision/update of the Flood Management plan once the MAS phases are finalized and the updated maps are adopted.	9	4	8	8	6	6	6	47
PA-28	Through community planning, identify floodplain areas that would provide other community benefits (e.g., recreation, parks)	9	2	4	8	9	9	0	41
PA-29	Adopt a community-wide mitigation plan that identifies properties in the floodway and floodplain, depth of flooding, recommended mitigation measures for each property, and potential funding opportunities	9	2	8	8	6	3	2	38
NR-18	Adopt a plan that protects one or more natural functions within the community's floodplain	6	2	4	8	6	9	4	39

	<b>Activity</b>	<b>SP x3</b>	<b>TE x2</b>	<b>AD x4</b>	<b>LE x4</b>	<b>EC x3</b>	<b>EN x3</b>	<b>CR x2</b>	<b>Total (63 max)</b>
PA-31	Create a comprehensive stormwater master plan that identifies areas of flooding, mitigation projects to alleviate flooding, land use regulations to address cumulative impacts of development, and funding mechanisms for implementation	6	2	8	8	6	0	6	36
	<b><u>Public Safety</u></b>								
ES-01	Add rain gauges to existing warning system	9	4	8	8	6	0	4	39
	<b><u>Stream/Floodplain Restoration</u></b>								
SP-01	Develop project proposals to improve storm water facilities and reduce flooding	6	2	4	8	2	9	4	35
PA-32	Conduct a sediment transport investigation	6	2	4	8	4	9	0	33
NR-19	Construct river rehabilitation projects that encourage sediment capture and habitat enhancement	6	2	4	8	2	9	4	35
NR-21	Limit the use of future management measures such as dams, levees, and floodwalls.	6	4	12	8	6	9	0	45
SP-02	Design future bridges and roads to protect floodplain, accommodate and not restrict changing river course, and minimize back up of flood water.	6	4	12	8	6	9	0	45
SP-03	Investigate opportunities to enhance grade control structures	6	2	4	8	2	9	4	35

## Appendix C: Activities Eliminated From Consideration

This section shows the activities eliminated from being considered for prioritization. Through collaboration in the Investigation Plan Phase, these activities were eliminated because they were mostly completed or not being considered for implementation by the majority of jurisdictions:

### DEVELOPMENT AND LAND USE REGULATIONS

Activity	Alpn	Crnsn	Dgls	Lyon	CWSD
<b><u>General Development Regulations</u></b>					
Create residential zoning districts that require lot sizes of 5 acres or larger in floodplains	3	6	1	6	N
Ensure that new buildings are protected from shallow flooding	6	2	6	6	N
Adopt and enforce International Building Code Series	2	2	2	2	N
Establish inventory of mitigation projects that may offset negative impacts to floodway from new development	6	6	6	5	5
Share engineering cost of no-rise certifications for development in the floodway	6	6	6	6	N
<b><u>Limit new development in flood-prone areas</u></b>					
Prohibit all development in floodplain	6	6	6	6	N
Prohibit overnight human occupancy (e.g., homes, apartments, hotels) in floodplain	6	6	6	6	N
Land proposed for development in floodplain must not be feasible for agriculture, timber production or other use allowed in the Open Space designation.	2	5	6	6	N
Update the subdivision ordinance to encourage and provide incentives for subdivision design that limits floodplain development	2	2	2	4	N
<b><u>Best Management Practices</u></b>					
Regulate to minimize erosion from land disturbed due to farming	6	6	6	6	N
Regulate to improve the quality of stormwater runoff through best management practices	2	2	2	4	N
<b><u>Floodplain Storage/Setback</u></b>					
Establish building set-backs in flood hazard areas, where appropriate, to reduce severe hazards from channel migration.	6	5	2	6	N



<b>Activity</b>	<b>Alpn</b>	<b>Crnsn</b>	<b>Dgls</b>	<b>Lyon</b>	<b>CWSD</b>
Require maintenance easements along drainages subject to flooding	2	2	2	5	N
Incorporate principles of geomorphology, limiting total volumetric flow and duration from development projects	6	6	6	5	N
<b><u>Flow Control</u></b>					
Revise development standards to require stormwater control features in new subdivisions and new commercial and industrial development.	2	2	2	I	N
Regulate development to ensure that peak flow of stormwater runoff from each site will not exceed the pre-development runoff.	2	2	2	I	N
Revise development standards to require energy dissipation to limit increases to downstream erosion and channel incision	3	2	2	3	N
<b><u>Land Use Restriction</u></b>					
Control human activity within areas subject to flood inundation due to dam failure.	6	6	6	5	N
Limit overnight human occupancy and storage in the floodplain	6	6	6	6	N
Require that a portion of floodplain lands are dedicated as open space when a ranch is sold to a developer.	6	5	6	6	N

#### COUNTY/WATERSHED-DRIVEN ACTIVITIES (ELIMINATED THROUGH COLLABORATION)

<b>Activity</b>	<b>Alpn*</b>	<b>Crnsn</b>	<b>Dgls</b>	<b>Lyon*</b>	<b>CWSD</b>
<b><u>Drainage System Maintenance</u></b>					
Construct capital improvement projects that correct drainage problems	2	2	3	3	N
Inspect and maintain public drainage systems, removing debris as appropriate	3	2	2	3	N
Inspect private drainage systems to ensure proper functioning of stormwater facilities	6	2	3	6	N
<b><u>Flood Insurance (CRS Communities only)</u></b>					
Assess the community's current level of flood insurance coverage	6	I	5	6	N

Activity	Alpn*	Crns	Dgls	Lyon*	CWSD
Adopt and implement a committee-led plan for improving levels of flood insurance coverage	6	6	5	6	N
Train staff to advise citizens about flood insurance	6	2	2	6	N
Develop a public outreach program that educates property owners about preferred risk (voluntary) flood insurance	6	3	2	6	3
<b><u>Map Information/Studies</u></b>					
Identify flood-prone areas using GIS. Identify those community areas that have recurring losses and conduct detailed analysis of the hydrographic basins	2	2	2	2	2
Support FEMA's Map Modernization Program and encourage FEMA to update FIRMs with current and future conditions. Verify topography and other variables.	2	2	3	2	2
Establish and maintain Elevation Reference Marks (ERM) according to FEMA standards and make ERMs available to interested parties.	6	2	6	6	4
Maintain Elevation Certificates for pre-FIRM and post-FIRM buildings	3	2	2	3	N
Maintain FIRM information, flood depth data, historical flood information, and problems not shown on the FIRM.	5	2	2	3	N
Perform new flood studies that produce base flood elevations or floodways	2	2	2	2	3
Perform flood studies to standards higher than the FEMA mapping criteria	6	3	6	6	3
Create and regulate maps of special flood-related hazards	3	2	2	3	3
Implement digital or paper systems that improve access, quality, and/or ease of updating flood data within the community	5	2	2	5	N
Maintain copies of all FIRMs that have been issued for the community	3	2	2	3	N
<b><u>Open Space Preservation</u></b>					
Acquire or relocate buildings from the floodplain	6	5	6	6	N
Acquire or relocate buildings on the repetitive loss list	6	4	6	6	N
Acquire or relocate severe repetitive loss properties	6	6	6	6	N

<b>Activity</b>	<b>Alpn*</b>	<b>Crns</b>	<b>Dgls</b>	<b>Lyon*</b>	<b>CWSD</b>
Acquire or relocate critical facilities	6	6	6	6	N
Acquire land with buildings that have recurring loss or of land which could be used as catch basins for flood control projects	6	5	6	6	N
Acquire and preserve open space flood-prone properties that maintain and contribute to the existing character; resources, and sense of place	6	2	6	6	3
Give priority to flood-prone areas when considering open space acquisition targets and establishing management strategies for open spaces.	6	2	6	6	4
<b><u>Outreach and Education</u></b>					
Distribute brochures on a watershed level with flood-related information for the general public.	5	2	2	5	2
Conduct a watershed-wide media campaign	5	4	6	5	2
Conduct an education and awareness program geared to the general public, local governments, and natural resource managers on the "living river" concept and its importance.	5	3	3	3	2
Place local, state, and/or federal flood information in the public library	3	2	2	3	2
Provide one-on-one advice about property protection to citizens, including a site visit and financial assistance information	6	2	2	6	N
Provide FEMA training to individuals advising citizens about property protection	6	2	6	6	5
Publicize regulations prohibiting dumping in streams and ditches	3	2	2	3	3
<b><u>Planning</u></b>					
Adopt a community-wide floodplain management plan according to FEMA guidelines	1	1	1	1	1
<b><u>Private Mitigation Projects</u></b>					
Establish a funding program for mitigation to existing structures in the floodway or floodplain, such as flood proofing, elevation, or relocation	6	6	6	6	N
Provide mitigation handouts and training for property owners in the floodway or floodplain	5	5	5	5	N

Activity	Alpn*	Crns	Dgls	Lyon*	CWSD
Identify capital improvement or other mitigation projects that can be constructed by private parties as mitigation for development projects, especially in floodway	6	5	6	6	5
<b>Public Safety</b>					
Prepare failure hazard assessments and emergency plans before approving any development which may subject persons or property to hazards associated with dam failure.	6	2	6	6	N
Review and improve High Water Response program	6	6	6	6	4
Implement specific flood response tasks to reduce or prevent threats to health, safety, and property	6	2	2	6	N
Maintain and operate dams and levees according to a written maintenance plan.	6	2	6	6	2
Establish a dam and levee failure threat recognition system that advises the emergency manager when there is a threat of failure or overtopping	6	6	6	6	6
Disseminate dam and levee failure warnings to the public	6	2	6	6	6
Undertake dam and levee failure response actions to reduce or prevent threats to health, safety, and property	6	2	6	6	5
Coordinate dam and levee failure actions with operators of critical facilities	6	6	6	6	6
<b>Stream/Floodplain Restoration</b>					
Establish Channel Migration Zones that allow the river to meander and establish natural slope and width	6	6	6	6	4
Investigate areas where the implementation of stream zone buffers would provide multi-objective benefits for river system and downstream communities.	6	6	6	6	4
Update the 1996 Fluvial Geomorphic Assessment	6	6	6	6	4
Investigate opportunities to remove existing restrictions, such as berms, to allow flood waters to access floodplain.	6	5	6	6	4
Eliminate use of recreational-use pit toilets	6	6	6	6	4
Enhance signage along river, at vehicle points and at launch and take-out area	6	2	4	6	2
Create effective vehicle closure areas that have been used to cross the river	6	5	6	6	4

## Appendix D: Final Investigation Plan

### SUMMARY

This Final Investigation Plan is divided into three sections:

- I. A review of existing plans and reports within the jurisdictions. This section identifies all pertinent local plans and reports and tabulates the activities related to flood mitigation.
- II. The proposed activities to be considered as mitigation measures, organized into specific categories. The implementation status of each activity is included for all jurisdictions, which illustrates whether or not an activity is recommended for further consideration as a mitigation measure.
- III. The criteria to be used for prioritizing activities. This section identifies the relative importance jurisdictions give to each criteria based on needs and resources within each local community.
- IV. A summary of the next steps in the Action Plan Phase of the Mitigation Measure Project. how activities will be prioritized using the criteria in section III, along with an outline of the Action Plan

### ABBREVIATIONS

ACGP	Alpine County General Plan	DCHMP	Douglas County Hazard Mitigation Plan
ACNMHP	Alpine County Natural Hazard Mitigation Plan	DCMP	Douglas County Master Plan
CCHMP	Carson City Hazard Mitigation Plan	DCPTOSP	Douglas County Parks, Trails, and Open Space Plan
CCMP	Carson City Master Plan	FESVCV	Floodplain Ecosystem Services Valuation for Carson Valley
CRCASP	Carson River Coalition Adaptive Stewardship Plan	LCCMP	Lyon County Comprehensive Master Plan
CRS	FEMA's Community Rating System Coordinator's Manual	LCMHMP	Lyon County Multi-Hazard Mitigation Plan
CRWFMP	Carson River Watershed Flood Management Plan (2013 Update)	LIDCRW	Low Impact Development in Carson River Watershed
CRWLAP	Carson River Watershed Literacy Action Plan		

## I. REVIEW OF EXISTING REPORTS

### **Carson River Watershed Flood Management Plan - 2013 Update**

The 2013 update to the Carson River Watershed Flood Management Plan described the status of each jurisdiction toward implementation of the 38 recommended activities from the original 2008 plan. The 2013 update added four future steps to be implemented.

The results of the 2013 update for each jurisdiction are tabulated below. Potential activities being considered as mitigation measures are shown with a 3 or 4. Activities with a 1 or 2 are deemed complete.

Legend:

SA - Suggested action from 2008 plan

FS - Future step from 2013 update

1 - Fully implemented, one-time event

2 - Fully implemented, on-going activity

3 - Implementation in progress or partially complete

4 - Implementation not started

ID	Activity	Alpine County	Carson City	Douglas County	Lyon County	CWSD
SA-1	Living river approach	2	2	2	2	2
SA-2	Good neighbor policy	2	2	2	2	2
SA-3	Open space acquisition	4	3	3	3	2
SA-4	Stream zone buffers	4	4	4	4	4
SA-5	Mitigate cumulative effects	4	4	4	4	3
SA-6	Manage development	4	4	3	3	4
SA-7	Retain floodplain lands	3	3	3	3	2
SA-8	Low impact development	4	4	3	3	2
SA-9	Conservation easements	4	4	3	3	3
SA-10	Best management practices	4	4	4	4	4
SA-11	Enhance ordinances	4	3	4	4	3
SA-12	Additional regulatory measures	4	3	3	3	4
SA-13	Model ordinance language	4	4	4	4	4
SA-14	Unsteady-state modeling	3	2	3	3	3

ID	Activity	Alpine County	Carson City	Douglas County	Lyon County	CWSD
SA-15	Map modernization	3	3	3	3	3
SA-16	Cooperating Technical Partner	2	2	2	2	2
SA-17	Data collection/flood studies	3	2	3	3	3
SA-18	Update maps after flood events	2	2	2	2	4
SA-19	Elevation Reference Marks	4	2	4	4	2
SA-20	NAVD 88 datums	4	1	4	4	2
SA-21	ERM list	4	2	4	4	2
SA-22	Photo-monitoring program	3	4	4	3	3
SA-23	Channel migration	4	4	4	4	4
SA-24	LiDAR updates	2	2	2	2	2
SA-25	Building setbacks	4	4	4	4	4
SA-26	Channel surveys	1	1	1	1	1
SA-27	Identify erosion potential	4	4	4	4	4
SA-28	Bio-engineering	3	3	4	4	3
SA-29	Geomorphic assessment update	4	4	4	4	4
SA-30	Outreach/education	3	2	4	3	3
SA-31	Brochures	3	2	3	3	3
SA-32	Emergency contact info	1	1	1	1	1
SA-33	Flood Awareness Week	3	2	3	3	3
SA-34	Special outreach events	2	2	2	2	2
SA-35	Remove restrictions/berms	4	4	1	4	3
SA-36	Limit structural measures	4	3	1	4	2
SA-37	Road/bridge design	4	3	3	4	4
SA-38	Enhance grade control structures	4	4	4	4	4
FS-1	Watershed-wide floodplain education program	3	3	3	3	3

ID	Activity	Alpine County	Carson City	Douglas County	Lyon County	CWSD
FS-2	Fluvial Erosion Hazard Zones	4	4	4	4	4
FS-3	Mapping Area Statement #4	3	3	3	3	3
FS-4	Floodplain Management Plan Update	4	4	4	4	4

### **Reports and Plans Generated by Jurisdictions**

#### **Carson Water Subconservancy District**

##### **LID in Carson River Watershed (2015)**

Types of LID measures appropriate to the Carson River watershed and climate:

- LID Site Design and Layout
- Bioretention Systems
- Swales and Buffer Strips
- Rainwater Catchment Systems
- Permeable Pavers and Porous Pavement

Existing LID resources:

- Truckee Meadows LID Handbook, with LID practices that are applicable to the Northern Nevada climate.
- Structural Controls Design Manual, which provides a description, design considerations, limitations, maintenance considerations and examples for LID practices.
- City of Reno 2009 Structural Controls/LID Ordinance requires new developments to include LID features or other stormwater treatment on site where feasible.
- Washoe County 2010 LID ordinance, which allows for LID use but it is not mandatory.
- TRPA Best Management Practices Handbook, 2014.
- Home Landscaping Guide for Lake Tahoe and Vicinity by University of Nevada Cooperative Extension.
- TRPA Code of Ordinances, which mandates LID practices for all residential, commercial, and industrial properties.

Existing LID Outreach

- Conservation District technical assistance to homeowners has increased implementation success
- The Tahoe Resource Conservation District and the Nevada Tahoe Conservation District guide homeowners, contractors and property managers with LID implementation using workshops and other outreach methods.
- Existing outreach materials are available for use in the Carson River watershed for public outreach and education. This information includes photos and descriptions of the LID benefits that can be incentives for landowners to implement LID on their properties.

LID I: Incorporate LID into projects throughout the development, re-development, and retrofit planning process.



LID2: Add checklists to the pre-application process to identify opportunities for LID.
LID3: Some ordinances and design standards unrelated to LID or stormwater, can limit LID practices. A critical LID implementation step is to introduce LID friendly ordinances and, review existing policies and standards that encourage or inadvertently discourage LID practices.
LID4: Paving material requirements should allow for the use of porous and permeable pavers;
LID5: Road and sidewalk designs should allow for curb cuts and directed drainage into landscaped filtration areas;
LID6: A minimum of 10% of all parking and loading areas should be devoted to interior landscaping for water infiltration (Truckee Meadows LID Handbook, 2007);
LID7: Cul-de-sac designs should include provisions for center vegetation infiltration with paved surface grading directing water to center vegetated strips.
LID8: Alternate paving materials;
LID9: Plant trees and shrubs with a positive drainage;
LID10: Encourage water conservation through appropriate landscape and irrigation planning design and management
LID11: Preserve existing vegetation and disturb as small a footprint as possible.
LID12: The mapping layers can be expanded to include available digital data including USDA soil types, depth to groundwater, source water protection areas, hydrography, existing stormwater systems, and zoning. The mapping layers help to locate, select, and analyze the best locations for LID practices and determine those areas where LID practices may need to be limited or may not be appropriate (such as shallow depth to groundwater, saline soils, or wellhead protection areas).
LID13: LID demonstration projects may be used as community incentives to become more familiar with and see the benefits of LID practices. Local jurisdictions, including those with existing Stormwater Program Managers, may have interest in LID implementation on municipal parcels, such as the school properties, local parks, the county or city office lots, or NDEP or NDOT properties.
LID14: Grants, matching funds, low-interest loans, tax credits or reimbursements are available for LID practices. Communities may offer programs that subsidize the cost of plants, landscaping and other materials that are used in LID bioretention, swale and buffer strip applications.
LID15: LID design or installation contests may encourage local participation and innovation. Successful LID sites may be highlighted by featuring them in newspaper articles, on websites or in utility bill mailings. Yard signs can be issued to recognize property owners or companies.
LID16: The Water Environment Federation has put together a White Paper on how to host a LID Design Competition. Their website states, "LID design competitions give engineers, developers, landscape architects, and others a chance to gain experience with LID in a low-risk environment. Competitions can also break down perceived barriers to LID, such as performance and cost, and give the development and permitting community a chance to evaluate the benefits of using LID." This competition could be linked to a demonstration project by allowing the winner's design to be built.

LID I 7: Stormwater Fee Discount or Credit - In the Carson River watershed Carson City and Lyon County have fees relating to stormwater controls. Carson City charges a monthly stormwater fee with variable rates based on the zoning of the property. The City's revenues fund flood preservation and information, stormwater infrastructure, facility maintenance and water quality preservation.

LID I 8: Municipalities can offer incentives for developers to use LID practices. For example, municipalities might offer to waive or reduce permit fees, allow higher density developments, or reduce local stormwater requirements when LID practices are used and maintained.

Summary of LID Recommendations:

- Review existing ordinances and design standards
- Support LID measures in the planning process
- Review GIS planning tool
- Build and publicize demonstration areas
- Explore incentive options
- Provide LID public outreach and education

#### **Carson River Watershed-Literacy Action Plan (2015)**

26 existing environmental education programs

Objective 5: Conduct a watershed-wide media campaign

#### **Floodplain Ecosystem Services Valuation for Carson Valley (2010)**

Payment for ecosystem service

Agricultural easements/transfer of development rights

#### **CRC Adaptive Stewardship Plan (2007)**

*River Rehabilitation/Stabilization*

- Hot Springs Creek Streambank Stabilization Project
- Stabilize Stream through Faith Valley
- Restoration of Sub-Reach C-I
- Rolling A Restoration Project – Middle Carson River
- Lower Watershed Future River Rehabilitation Projects
- LiDAR
- Carson River Workdays
- Maintenance of Grade Controls
- High Water Response
- Sediment Transport Investigation

#### Programs for Retaining Agriculture and Open Space

- All of the counties in the watershed have components within their master plans aimed at preserving agriculture and open space.
- Mechanisms such as conservation easements are helping to provide the financial compensation to landowners so that they may remain in farming and ranching. TDR Programs are helping to steer development out of critical areas.
- Currently Douglas and Churchill Counties have TDR Programs. Open Space Programs, such as Carson City's, are very effective in acquiring sensitive lands and maintaining them for open space. BLM actively promotes open space opportunities through their land acquisition and exchange programs.
- Lyon County, which has been experiencing unprecedented growth, is now requiring that the floodplain lands are dedicated as open space when a ranch is sold to a developer.

#### Living River Strategy

- Incorporate principles of geomorphology:
- Maintaining or restoring the connection of the river to the floodplain
- Allow the river to meander as much as possible
- Maintaining a continuous fish and riparian corridor along the river
- Allow the river to establish and maintain natural slope and width
- Education and Awareness Program geared to the general public, local governments and natural resource managers on the "living river" concept and the importance of this type of strategy for issues such as flooding, and floodplain conservation.
- Utilizing "soft" bio-engineering approaches in river rehabilitation design
- Design of river rehabilitation projects that encourage sediment capture and habitat enhancement
- Conserve and protect floodplain lands through conservation easements and land acquisitions.

#### Outreach and Education

- NPS Pollution and Floodplain Conservation Awareness Campaign
- SnapShot Day on the Carson River
- Expansion of "Our Lifeline in the Desert" Watershed Map Program
- Reprint of "Our Lifeline in the Desert" Watershed Map

#### Noxious Weed Abatement

- Development of Database to Track Weed Infestations
- Community Outreach Programs
- Treatment and Monitoring

#### Recreational Use and Management

- Elimination of pit toilets to reduce sanitation problem
- Enhance signage along river; at vehicle points and at launch and take-out area
- Monitor websites, guidebooks, and publications for accurate information. If information is incorrectly provided USFS will send notices about legal accesses and river use restrictions.
- Create effective vehicle closures in areas that have been used to cross the river.
- Inventory cultural site in known recreational areas and adjust management measures as necessary to protect archeological resources.
- Implement standard practice river use requirements that are already in place on many other rivers.

## **Douglas County**

### **Douglas County Master Plan**

Transfer of development rights

LU Policy 3.6: Clustering of units at densities above the range shown on the Land Use Map may be approved on properties which include floodplains, steep slopes, or other environmentally sensitive areas, if the cluster results in the use of development potential outside these sensitive areas and includes easements (or other mechanisms) to permanently retain sensitive areas as open space. In no event shall clustering result in a higher density for the overall project than the density shown on the Land Use Map for the property, except as approved through density bonus provisions.

### **Douglas County Hazard Mitigation Plan**

5.A - Add rain gauges to existing warning system

5.B - Adopt or update policies that discourage growth in flood prone areas

5.D - Complete FEMA floodplain mapping of the entire Carson River from Alpine County to Churchill County

5.K - Education of public regarding flood hazards and damage potential

5.L - Continue to strictly enforce the County's building code Title 20, Open Space Plan, and Master Development Plan.

5.M - Evaluate the new FEMA criteria for repetitive loss properties within the County

### **Douglas County Parks, Trails, and Open Space Plan**

Goal OSI: Acquire and preserve open space properties that maintain and contribute to the existing character, resources, and sense of place within the County.

## **Lyon County**

### **Lyon County Comprehensive Master Plan**

NR 6.2: To the extent possible, Lyon County will avoid or mitigate increased risk from natural hazards to persons or property that are caused by development.

NR 6.2: Limit new development on steep slopes, along seismic fault lines, and in flood-prone areas.

NR 6.2: Strengthen floodplain management ordinance to prohibit development within the floodway and floodplain.

NR 6.2: Revise development standards to require stormwater control features in new subdivisions and new commercial and industrial development.

NR 6.2: Establish development buffer zones along all waterways and drainages subject to flooding.

NR 7.1: Identify unique natural resources of community-wide interest using the community planning process.
NR 7.1: Encourage and facilitate voluntary conservation easements on private property that protect unique natural resources
NR 7.1: Update the subdivision ordinance to encourage and provide incentives for subdivision design that accommodates new development while protecting unique natural resources.
NR 7.1: Consider acquiring strategic open space where necessary to protect unique natural resources of community-wide interest.
Ch 3: Clustering - To encourage the retention of larger parcels with the opportunity of continuing agricultural activities, relocating homes away from hazards or creating open space within or between communities, the Plan provides for clustering development.
Ch 3: Clustering - <u>Non-contiguous density transfer</u> : To conserve agricultural lands or other resources and to place development in locations closer to municipal services, community cores and development of similar density, property owners may transfer density (units) from one property to another.
Ch 3: Clustering - <u>Transfer of development rights</u> : In a TDR program, a community identifies an area which it would like to conserve (the "Sending Area") and another area where the community desires more town- or suburban-style development (the "Receiving Area").
Ch 3: Clustering - <u>Density transfer charges</u> : In a Density Transfer Charge program, the County would accept the payment of fees in lieu of the purchase and/or transfer of development rights.
<b><i>Lyon County Multi-Hazard Mitigation Plan</i></b>
No. 16: Acquire, relocate, elevate, and/or floodproof critical facilities that are located within the 100-year floodplain
No. 18: Work with the Division of Water Resources and FEMA Region IX to ensure that flood maps accurately reflect the flood history
No. 19: Develop a public outreach program that educates property owners about voluntary flood insurance (not on FEMA maps)
No. 23: Develop a public outreach that informs the public about the hazards of contamination of domestic wells/septic tanks due to overtopping

## **Alpine County**

### ***Alpine County General Plan***

Policy 23a: Subdivision Maps shall identify 100 year flood zones. Uses which include overnight human occupancy, storage or processing of hazardous materials, or encroachments into the flood plain which could adversely affect the velocity, volume or direction of flood flows in a manner which could create threat to public health and safety shall be prohibited in those zones

Policy 23b: No living quarters shall be allowed at ground level and commercial, industrial, and other human activities shall be controlled within areas possibly subject to flood inundation due to possible dam failure.

Policy 23c: Dam and irrigation ditch failure hazard assessments and emergency plans shall be prepared before any development which may subject persons or property to hazards associated with dam failure is approved.

Policy 23d: Any parcel map, or subdivision map subdividing lands near drainage in Alpine County, shall contain a notation warning that said area is possibly subject to flash flood occurrence.

Policy 25e: Areas proposed to contain structures for human occupancy shall not be located within an avalanche zone, seismic fault area or 100 year floodplain.

Policy 25g: If current General Plan designation is Open Space, then the land proposed for development must not be feasible for agriculture, timber production or other use allowed in the Open Space designation.

#### **Alpine County Natural Hazard Mitigation Plan**

Action 4.1: Review and update County ordinance to ensure no construction takes place in recognized flood-prone areas in the future

### **Carson City**

#### **Carson City Master Plan**

Guiding Principle 3: The City will identify and strive to conserve its natural, scenic, and environmentally sensitive areas including important wildlife habitat, the floodplains of the Carson River and other significant watercourses, and visually sensitive areas, such as prominent hillsides surrounding the community. In addition, the City will plan for future development to minimize the impacts of potential natural disaster events, such as wildfire and flooding, on the community.

1.4b—Cluster Development: Encourage the use of cluster development techniques at the Urban Interface to maintain views, preserve steep slopes, and maximize the preservation of open space. Update current cluster practices to ensure that the resulting density of the clustered development is consistent with the parcel's land use designation, the surrounding development pattern, and the level of roadway improvements that currently exist or will be required to be provided to the site. Cluster developments that result in urban levels of density in an area with an otherwise rural character and that do not represent progressive expansion of existing urban densities should be prohibited.

3.1a—Carson River Master Plan: Ensure that the goals and policies contained in the Master Plan and the uses designated on the Land Use Map are consistent with those contained in the Carson River Master Plan.

3.1b—Environmentally Sensitive Areas: Environmentally Sensitive Areas within the community should be protected using available tools, such as development setbacks, dedication, or other mechanisms.

3.3c—Public Awareness: Increase public awareness of the potential hazards presented by living and building within the Urban Interface by continuing to educate existing residents on appropriate measures to be taken to minimize the potential loss of life and property in the event of a wildfire or other natural disaster.

3.3d—Floodplain and Hazard Area Development: Continue to discourage development within the 100-year floodplain and other hazard areas and require development on flood prone properties to be clustered out of the 100-year floodplain as defined by FEMA.

**Carson City Hazard Mitigation Plan**

5.A: Identify flood-prone areas using GIS. Identify those community areas that have recurring losses and conduct detailed analysis of the hydrographic basins for planning, update storm water system plans, including erosion/sediment transport, and develop project proposals to improve storm water facilities and reduce flooding

5.B: Adopt or update policies that discourage growth in flood-prone areas

5.C: Review and update flood plans that would include coordination with adjacent counties, cities, and special districts supporting a regional approach to flood control

5.H: Develop a Flood Management Plan for the New Empire Area and install a new flood control facility for the area

5.L: Land acquisition of buildings with recurring loss or of land which could be used as catch basins for flood control projects

## II. LIST OF ACTIVITIES TO BE CONSIDERED

The following list of activities is compiled from various resources as documented in Section I of this plan. Activities are categorized as follows: (1) Development and Land Use Regulation includes activities that generally require adoption of an ordinance or other regulation that creates restrictions for development projects and/or the use of land; (2) County/Watershed Based Activities include activities that are accomplished through allocation of budgetary resources within each jurisdiction. Many activities have similar descriptions, but are not identical, so that jurisdictions can identify their preferred approach to a topic when multiple options are available.

As described in the Legend below, status numbers have been assigned to illustrate each jurisdiction's assessment of individual activities. To summarize, status numbers 1, 2, 6, and N indicate that no further consideration will be given to the activity because it is complete, on-going, not recommended, or not applicable. Status numbers 3, 4, and 5 indicate that the activity should be considered for evaluation as a future mitigation measure.

### Legend:

- 1 - Fully implemented, one-time event
- 2 - Fully implemented, on-going activity
- 3 - Implementation in progress or partially complete
- 4 - Implementation planned, but not started
- 5 - Implementation recommended but not planned
- 6 - Implementation not recommended
- N - Not applicable

### DEVELOPMENT AND LAND USE REGULATION

Activity	Alpn	Crnsn	Dgls	Lyon	CWSD
<b><u>General Development Regulations</u></b>					
Identify 100-year flood zones on subdivision maps	3	2	2	3	N
Develop model watershed floodplain management ordinance language that can be adopted by counties to provide watershed-wide consistency.	5	3	3	3	3
Create residential zoning districts that require lot sizes of 5 acres or larger in floodplains	3	6	1	6	N
Restrict zone changes within the floodplain to limit density	3	3	6	5	N
Provide more restrictive substantial improvement regulations through tracking cumulatively per building	6	6	5	5	N
Provide more restrictive substantial improvement regulations through decreasing below 50% threshold	6	6	5	6	N



Activity	Alpn	Crns	Dgls	Lyon	CWSD
Ensure that new buildings are protected from shallow flooding	6	2	6	6	N
Adopt and enforce International Building Code Series	2	2	2	2	N
Remove the elevation exemption for manufactured homes placed in existing MH parks	6	2	5	1	N
Real estate agents notify prospective buyers that properties are located in the floodplain	6	4	5	5	5
Implement an impact fee based on new impervious surfaces as a funding mechanism for mitigation projects	6	6	5	5	N
Establish inventory of mitigation projects that may offset negative impacts to floodway from new development	6	6	6	5	5
Share engineering cost of no-rise certifications for development in the floodway	6	6	6	6	N
<b><u>Limit new development in flood-prone areas</u></b>					
Prohibit all development in floodplain	6	6	6	6	N
Allow development on flood prone properties to be clustered out of the 100-year floodplain	2	2	2	4	N
Prohibit overnight human occupancy (e.g., homes, apartments, hotels) in floodplain	6	6	6	6	N
Property owners may transfer density (units) from one property to preserve open space.	3	5	2	4	5
Land proposed for development in floodplain must not be feasible for agriculture, timber production or other use allowed in the Open Space designation.	2	5	6	6	N
Require additional freeboard to elevate building floors higher above the base flood elevation	5	2	2	5	N
Require engineered foundations for buildings in the floodplain	5	2	6	5	N
Prohibit critical facilities in the floodplain	5	2	5	5	N
Prohibit first floor enclosures below the base flood elevation, except crawlspaces.	6	2	6	6	N
Update the subdivision ordinance to encourage and provide incentives for subdivision design that limits floodplain development	2	2	2	4	N
<b><u>Best Management Practices</u></b>					

<b>Activity</b>	<b>Alpn</b>	<b>Crns</b>	<b>Dgls</b>	<b>Lyon</b>	<b>CWSD</b>
Regulate to minimize erosion from land disturbed due to construction	4	2	2	3	N
Regulate to minimize erosion from land disturbed due to farming	6	6	6	6	N
Regulate to improve the quality of stormwater runoff through best management practices	2	2	2	4	N
Promote and utilize other best management practices as a means of protecting riparian habitat.	6	2	3	5	3
<b><u>Floodplain Storage/Setback</u></b>					
Require compensatory storage for fill materials in the floodplain	6	2	5	5	N
Account for cumulative loss of floodplain storage volume and mitigate losses	6	3	3	5	N
Establish building set-backs in flood hazard areas, where appropriate, to reduce severe hazards from channel migration.	6	5	2	6	N
Establish development buffer zones along all waterways	4	6	6	5	N
Require maintenance easements along drainages subject to flooding	2	2	2	5	N
Incorporate principles of geomorphology, limiting total volumetric flow and duration from development projects	6	6	6	5	N
Maintain or restore the connection of the river to the floodplain	3	2	3	5	3
Establish and protect a continuous fish and riparian corridor along the river (e.g., remove diversions)	6	5	5	5	3
<b><u>Flow Control</u></b>					
Revise development standards to require stormwater control features in new subdivisions and new commercial and industrial development.	2	2	2	I	N
Regulate development to ensure that peak flow of stormwater runoff from each site will not exceed the pre-development runoff.	2	2	2	I	N
Revise development standards to require energy dissipation to limit increases to downstream erosion and channel incision	3	2	2	3	N
<b><u>Land Use Restriction</u></b>					

Activity	Alpn	Crns	Dgls	Lyon	CWSD
Control human activity within areas subject to flood inundation due to dam failure.	6	6	6	5	N
Limit overnight human occupancy and storage in the floodplain	6	6	6	6	N
Limit storage or processing of hazardous materials in the floodplain	5	2	3	3	N
<b><u>Low Impact Development</u></b>					
Incorporate LID into projects throughout the development, re-development, and retrofit planning process.	5	4	5	3	N
Add checklists to the pre-application process to identify opportunities for LID.	5	5	5	3	N
Review existing policies and standards that encourage or inadvertently discourage LID practices.	5	5	5	3	5
Road and sidewalk designs should allow for curb cuts and directed drainage into landscaped filtration areas;	5	5	5	3	5
Devote a fixed minimum amount of all parking and loading areas to interior landscaping for water infiltration	5	5	5	3	5
Cul-de-sac designs should include provisions for center vegetation infiltration with paved surface grading directing water to center vegetated strips.	5	5	5	5	5
Use alternate paving materials;	5	5	5	3	5
Encourage water conservation through appropriate landscape and irrigation planning design and management	5	5	5	3	5
Preserve existing vegetation and disturb as small a footprint as possible.	5	5	5	3	5
Provide incentives for developers to use LID practices, such as waiving or reducing permit fees, allowing higher density developments, or reducing local stormwater requirements.	5	5	5	5	5
<b><u>Open Space Preservation</u></b>					
Retain lands that provide floodplain storage and maintain or restore connection of river with floodplain through land acquisition, conservation easements, local open space programs, TDR and PDR Programs, and other protection methods	3	3	2	3	3
Require that a portion of floodplain lands are dedicated as open space when a ranch is sold to a developer.	6	5	6	6	N

## COUNTY/WATERSHED-DRIVEN ACTIVITIES

Activity	Alpn*	Crns	Dgls	Lyon*	CWSD
<b>Development Regulation</b>					
Plan for and mitigate cumulative effects of watershed urbanization.	6	5	4	5	5
<b>Drainage System Maintenance</b>					
Construct capital improvement projects that correct drainage problems	2	2	3	3	N
Inspect and maintain public drainage systems, removing debris as appropriate	3	2	2	3	N
Inspect private drainage systems to ensure proper functioning of stormwater facilities	6	2	3	6	N
<b>Flood Insurance (CRS Communities only)</b>					
Assess the community's current level of flood insurance coverage	6	1	5	6	N
Adopt and implement a committee-led plan for improving levels of flood insurance coverage	6	6	5	6	N
Train staff to advise citizens about flood insurance	6	2	2	6	N
Develop a public outreach program that educates property owners about preferred risk (voluntary) flood insurance	6	3	2	6	3
<b>Low Impact Development</b>					
Expand mapping layers to include USDA soil types, depth to groundwater, source water protection areas, hydrography, existing stormwater systems, and zoning.	3	3	3	3	5
Implement LID demonstration projects	5	3	5	5	4
Provide financial subsidies toward materials that are used in LID projects	5	5	5	5	4
Promote LID design or installation contests and construct winner's design as a demonstration project.	5	5	5	5	4
Provide a stormwater fee discount or credit as an incentive for LID implementation	5	5	5	5	N

Activity	Alpn*	Crns	Dgls	Lyon*	CWSD
<b><u>Map Information/Studies</u></b>					
Identify flood-prone areas using GIS. Identify those community areas that have recurring losses and conduct detailed analysis of the hydrographic basins	2	2	2	2	2
Support FEMA's Map Modernization Program and encourage FEMA to update FIRMs with current and future conditions. Verify topography and other variables.	2	2	3	2	2
Maintain consistent data to ensure that flood studies are up-to-date and conduct studies for significant water courses and alluvial fan areas that have not been analyzed. This data should be used to update FEMA maps and fill data gaps.	5	2	2	3	3
Establish and maintain Elevation Reference Marks (ERM) according to FEMA standards and make ERMs available to interested parties.	6	2	6	6	4
Develop and coordinate a photo-monitoring program on a watershed level to document flooding and flood hazards in a consistent matter.	6	5	5	5	4
Document known and projected hazard areas, including channel migration zones, and incorporate into planning processes.	5	5	5	5	4
Identify unstable stream banks and areas with high potential for erosion.	5	5	5	5	4
Identify "Fluvial Erosion Hazard Zones".	5	5	5	5	4
Maintain Elevation Certificates for pre-FIRM and post-FIRM buildings	3	2	2	3	N
Maintain FIRM information, flood depth data, historical flood information, and problems not shown on the FIRM.	5	2	2	3	N
Create maps of natural floodplain functions	5	2	6	5	5
Perform new flood studies that produce base flood elevations or floodways	2	2	2	2	3
Perform flood studies to standards higher than the FEMA mapping criteria	6	3	6	6	3
Restrict the floodway standard to less than one foot of elevation increase	6	3	1	6	3
Create and regulate maps of special flood-related hazards	3	2	2	3	3

Activity	Alpn*	Crns	Dgls	Lyon*	CWSD
Implement digital or paper systems that improve access, quality, and/or ease of updating flood data within the community	5	2	2	5	N
Maintain copies of all FIRMs that have been issued for the community	3	2	2	3	N
<b><u>Open Space Preservation</u></b>					
Acquire or relocate buildings from the floodplain	6	5	6	6	N
Acquire or relocate buildings on the repetitive loss list	6	4	6	6	N
Acquire or relocate severe repetitive loss properties	6	6	6	6	N
Acquire or relocate critical facilities	6	6	6	6	N
Acquire land with buildings that have recurring loss or of land which could be used as catch basins for flood control projects	6	5	6	6	N
Acquire and preserve open space flood-prone properties that maintain and contribute to the existing character, resources, and sense of place	6	2	6	6	3
Give priority to flood-prone areas when considering open space acquisition targets and establishing management strategies for open spaces.	6	2	6	6	4
Create a program for acquiring agricultural easements where appropriate in flood-prone areas	5	5	4	5	4
Encourage and facilitate voluntary conservation easements in flood-prone areas	5	5	4	5	4
Continue to explore creation of landowner incentive programs, such as a floodplain leasing program and conservation easements, that provide compensation to landowners for providing ecosystem services.	5	5	5	5	4
Create an inventory of open flood-prone properties to consider for acquisition, conservation easements, agricultural easements, or other flood protection. Include fundings and regulatory limitations.	5	5	5	5	5
<b><u>Outreach and Education</u></b>					
Outreach to property owners to publicize new FEMA maps and regulations	5	2	5	5	4
Educate existing residents on appropriate measures to be taken to minimize the potential loss of life and property in the event of a natural disaster.	5	2	2	5	2

<b>Activity</b>	<b>Alpn*</b>	<b>Crnsn</b>	<b>Dgls</b>	<b>Lyon*</b>	<b>CWSD</b>
Develop watershed-wide outreach and education program about floodplain importance and flooding hazards.	5	2	5	5	2
Distribute brochures on a watershed level with flood-related information for the general public.	5	2	2	5	2
Conduct a watershed-wide media campaign(?)	5	4	6	5	2
Conduct an education and awareness program geared to the general public, local governments, and natural resource managers on the "living river" concept and its importance.	5	3	3	3	2
Create a pre-flood plan of public information activities ready for the next flood	5	3	3	5	3
Complete and implement a comprehensive community-wide public outreach plan	5	5	5	5	5
Coordinate public outreach programs to be disseminated by people or groups from outside the local governments	5	5	5	5	2
Place local, state, and/or federal flood information in the public library	3	2	2	3	2
Provide flood protection information on the communities' websites	5	2	2	5	2
Provide one-on-one advice about property protection to citizens, including a site visit and financial assistance information	6	2	2	6	N
Provide FEMA training to individuals advising citizens about property protection	6	2	6	6	5
Train administrative staff to obtain Certified Floodplain Manager certifications	6	5	2	6	5
Publicize regulations prohibiting dumping in streams and ditches	3	2	2	3	3
<b>Planning</b>					
Conduct an additional revision/update of the Flood Management plan once the MAS phases are finalized and the updated maps are adopted.	3	3	3	3	2
Through community planning, identify floodplain areas that would provide other community benefits (e.g., recreation, parks)	5	2	3	5	4
Adopt a community-wide floodplain management plan according to FEMA guidelines	1	1	1	1	1

Activity	Alpn*	Crnsn	Dgls	Lyon*	CWSD
Adopt a community-wide mitigation plan that identifies properties in the floodway and floodplain, depth of flooding, recommended mitigation measures for each property, and potential funding opportunities	6	4	4	6	N
Create a mitigation plan for repetitive loss properties	6	5	6	6	N
Adopt a plan that protects one or more natural functions within the community's floodplain	5	5	5	5	3
Create a comprehensive stormwater master plan that identifies areas of flooding, mitigation projects to alleviate flooding, land use regulations to address cumulative impacts of development, and funding mechanisms for implementation	6	4	4	6	5
<b><u>Private Mitigation Projects</u></b>					
Establish a funding program for mitigation to existing structures in the floodway or floodplain, such as flood proofing, elevation, or relocation	6	6	6	6	N
Provide mitigation handouts and training for property owners in the floodway or floodplain	5	5	5	5	N
Identify capital improvement or other mitigation projects that can be constructed by private parties as mitigation for development projects, especially in floodway	6	5	6	6	5
<b><u>Public Safety</u></b>					
Prepare failure hazard assessments and emergency plans before approving any development which may subject persons or property to hazards associated with dam failure.	6	2	6	6	N
Review and improve High Water Response program	6	6	6	6	4
Add rain gauges to existing warning system	6	1	3	6	4
Implement a flood warning system that predicts flood elevations and arrival times at specific locations within the community	6	3	3	5	N
Disseminate flood warnings to the public	6	2	2	5	N
Implement specific flood response tasks to reduce or prevent threats to health, safety, and property	6	2	2	6	N
Coordinate flood warning and response activities with operators of critical facilities	5	2	2	5	N



Activity	Alpn*	Crnsn	Dgls	Lyon*	CWSD
Obtain designation by the National Weather Service as a StormReady community (CRS Communities only)	5	2	5	5	N
Maintain and operate dams and levees according to a written maintenance plan.	6	2	6	6	2
Establish a dam and levee failure threat recognition system that advises the emergency manager when there is a threat of failure or overtopping	6	6	6	6	6
Disseminate dam and levee failure warnings to the public	6	2	6	6	6
Undertake dam and levee failure response actions to reduce or prevent threats to health, safety, and property	6	2	6	6	5
Coordinate dam and levee failure actions with operators of critical facilities	6	6	6	6	6
<b><u>Stream/Floodplain Restoration</u></b>					
Develop project proposals to improve storm water facilities and reduce flooding	5	2	3	5	3
Conduct a sediment transport investigation	6	3	6	6	4
Establish Channel Migration Zones that allow the river to meander and establish natural slope and width	6	6	6	6	4
Construct river rehabilitation projects that encourage sediment capture and habitat enhancement	5	4	5	5	3
Investigate areas where the implementation of stream zone buffers would provide multi-objective benefits for river system and downstream communities.	6	6	6	6	4
Promote the use of non-structural, bio-engineering techniques in river restoration projects	5	5	5	5	2
Update the 1996 Fluvial Geomorphic Assessment	6	6	6	6	4
Investigate opportunities to remove existing restrictions, such as berms, to allow flood waters to access floodplain.	6	5	6	6	4
Limit the use of future management measures such as dams, levees, and floodwalls.	5	6	2	5	4
Design future bridges and roads to protect floodplain, accommodate and not restrict changing river course, and minimize back up of flood water.	4	2	2	5	4
Investigate opportunities to enhance grade control structures	6	5	5	6	4

<b>Activity</b>	<b>Alpn*</b>	<b>Crns</b>	<b>Dgls</b>	<b>Lyon*</b>	<b>CWSD</b>
Eliminate use of recreational-use pit toilets	6	6	6	6	4
Enhance signage along river; at vehicle points and at launch and take-out area	6	2	4	6	2
Create effective vehicle closure areas that have been used to cross the river	6	5	6	6	4
Identify methods for protecting natural channels	5	5	5	5	6

\* Results for County-Driven Activities for Alpine and Lyon Counties were estimated by consultant and should be reviewed by jurisdictions to confirm accuracy

### **III. SCORING SYSTEM FOR SELECTING MITIGATION MEASURES**

#### **Categories to be Considered**

The activities will be scored in 8 categories in order to be prioritized for consideration as mitigation measures. Activities will be scored based on unique characteristics of each local community. A general description of each category is included below.

#### **Social**

- Does the activity have general acceptance within the community?
- Does the activity affect different segments of the population differently?

#### **Technical**

- Is the activity technically feasible?
- Has the activity been implemented successfully in other communities?

#### **Administrative**

- What short and long-term impact does the activity have on staff resources in the community?
- Are those staff resources available?
- Is funding available to provide those staff resources?

#### **Political**

- Does the activity have local political support?
- Has the activity already been adopted in a recognized plan or report?
- Is there a local champion who will advocate for the activity?
- Is there unanimous support, or is the support mixed based on special interests?

#### **Legal**

- Is there a state or federal mandate to implement the activity?
- Is the activity consistent with local, state, and federal regulations?
- Will the activity likely result in a lawsuit from a special interest group?

#### **Economic**

- What are the short-term and long-term costs to implement the activity?
- What are the short-term and long-term benefits?
- How much additional funding is needed to implement the activity?
- Does the activity contribute to the community's economic goals?

#### **Environmental**

- What is the activity's effect on the overall environment?
- Is the activity consistent with the community's environmental goals?

#### **CRS Eligible**

- What is the likely CRS credit if implemented?

### **Explanation of Scoring System**

Each category will be scored on a 0 to 3 scale. The score given for each activity has the potential to be discretionary and may not easily fit into a numeric system. Nonetheless, a numeric scoring system is the preferred method as the basis for creating a prioritized list. The explanation of each category's scoring system is described below.

<b>Category</b>	<b>0 Points</b>	<b>1 Point</b>	<b>2 Points</b>	<b>3 Points</b>
Social	Local community mostly in opposition	Mixture of support and opposition	Limited support or indifference	Supported by local majority
Technical	Not technically feasible	Significant challenges in implementation	Technically feasible with minor difficulties	No technical difficulties
Administrative	Required staff resources far exceed those available	Required staff resources likely to be made available	Staff resources required and available	Limited or no staff resources needed
Political	Mostly opposed by elected officials	Mixture of support and opposition by elected officials	Limited support or indifference by elected officials	Already adopted and supported by elected officials
Legal	Inconsistent with local, state, or federal laws	Legal challenges expected based on related activities	Consistent with local, state, and federal laws	Mandated by local, state, or federal laws
Economic	High cost compared to short and long-term benefits	Short or long-term benefit outweighs costs, but no funding	Short and long-term benefit outweighs cost, funding available	Little or no cost
Environmental	Environmental detriment	No environmental impact	Limited benefit to natural environment	Significant benefit to natural environment
CRS Eligible	0 points	1 to 50 points	51 to 100 points	Over 100 points

### **Explanation of Weighted Emphasis**

Each community has a unique perspective in emphasizing each category being scored. Although a community's priorities cannot be easily simplified into a numeric score, each community needs to illustrate weighted emphasis of each category to allow for activities to be prioritized.

The use of weighted numerical scores requires an iterative approach in order to properly prioritize activities. In general, those with mostly high scores will be the highest priority, where those with mostly low scores will be the lowest. However, an activity receiving mostly high scores but a 0 score in any of the 7 categories may not be given a high priority because it will be unlawful, unpopular, not cost effective, or otherwise unacceptable, despite having other benefits.

The final Investigation Plan will include weighted emphasis for each category as shown in the table below:

Weighted Emphasis/Importance (1 to 4)					
Category	Alpn	Crns	Dgls	Lyon	CWSD
Social	4	3	4	3	3
Technical	3	3	1	3	2
Administrative	3	4	2	4	4
Political	4	3	4	3	3
Legal	4	3	4	4	4
Economic	3	4	2	4	3
Environmental	2	3	2	1	3
CRS Eligible	1	3	3	1	2