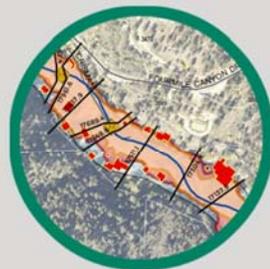
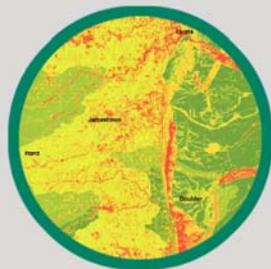




# Creating Room For The River Final Report



February 28, 2018

**Michael Baker**  
INTERNATIONAL



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## Acronyms and Abbreviations

AICP	American Institute of Certified Planners
ASFPM	Association of State Floodplain Managers
BCA	Benefit Cost Analysis
BOCC	Board of County Commissioners
BOR	Bureau of Reclamation
CAP	Continuing Authorities Program
CDBG-DR	Community Development Block Grant – Disaster Recovery
CFM	Certified Floodplain Manager
CGMS	Certified Grants Management Specialist
CGS	Colorado Geologic Survey
CRS	Community Rating System
DHSEM	Division of Homeland Security and Emergency Management
DOLA	Department of Labor and Affairs
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FHZ	Fluvial Hazard Zone
FMA	Flood Mitigation Assistance
GIS	Geographic Information System
HMA	Hazard Mitigation Assistance
HMGP	Hazard Mitigation Program
HUD	Housing and Urban Development
LLC	Limited Liability Company
MARS	Mitigation and Recovery Section
NFIP	National Flood Insurance Program
NGMA	National Grants Management Association
NRCS	Natural Resources Conservation Service
PDM	Pre-Disaster Mitigation
PE	Professional Engineer
PLS	Professional Land Surveyor
POC	Point of Contact
POS	Parks and Open Space
ROI	Return on Investment
SBA	Small Business Administration
SMART	Specific, Measurable, Attainable, Relevant, Time-Oriented
SME	Subject Matter Expert
USACE	United States Army Corps of Engineers



## Executive Summary

The Room for the River final report was prepared in response to a request from Boulder County, Colorado to 1) develop prospective approaches to reducing public and private risk to river-related hazards that could be integrated within a long-term mitigation program, and 2) consider the feasibility of running such a program for voluntary participation by Boulder County residents, property owners, and business owners. The report outlines recommended program elements and other contextual information that should be considered and vetted by the public, as well as Boulder County staff and officials, to determine whether a program of this nature is both practical and prudent in Boulder County. Program elements are presented in-detail and include other community program examples, pros/cons, and factors that may influence discussion on ideal program strategies and framework. The information presented requires evaluation and decision making on the part of Boulder County to establish how desired outcomes like removing/reducing risk in hazardous areas and building capacity to create a more disaster-resilient community could be achieved. Recommended program elements include Risk Assessment, Mitigation Strategies, Funding Strategies, Staffing & Capabilities, Program Outreach, and Program Implementation.

Three main program elements- Risk Assessment, Mitigation Strategies, and Funding Strategies- are considered Program Drivers, in that they have the potential to influence all other program elements and help steer decision making on the part of the Boulder County. The risk assessment was conducted using a set of hazards considered integral to the context of the program. Those hazards include:

Risk Assessment Hazards	
1% and 0.2% annual-chance flood extents	Landslide susceptibility
1% annual-chance Flood Depth & Velocity	Rockfall hazards
Fluvial Hazard Zones	Steeply dipping bedrock
Debris Flow hazards	Wildfire threat

Mitigation and funding strategies were selected based on their history of success within other similar community programs, their potential for meeting program objectives, and their feasibility of implementation within Boulder County. Strategies included in the report are:

Mitigation Strategies	
Minor and infrastructure-related projects	Property acquisition
Structure elevation/relocation/reconstruction	Updating existing plans and policies
Deed restrictions/conservation easements	
Funding Strategies	
Federal and other grants	
Local funding	

The report culminates in a series of future steps towards program implementation, including immediate next steps essential to the decision-making process for program development, and a 3-year Action Plan focused on initiating and executing a program.



## I. Introduction

Boulder County experienced severe flooding in September of 2013, causing significant damage and requiring years of work to recover the functions, communities, and ecosystems that existed prior to the flood. In an effort to continuously improve the lives of Boulder County citizens and the environment, the Creating Room for the River project develops a voluntary property owner participation program that provides Boulder County citizens with an avenue to opt-in to projects that increase the County’s long-term resilience to natural hazards, the sustainability and diversity of the County’s watersheds, and the health and safety of the county’s residents and visitors. This document presents the outcomes of Michael Baker’s assessment of the county’s existing vulnerabilities to natural hazards and provides a framework for the county’s future decision making related to development of a mitigation program.

### Purpose

Across the United States, natural disasters have led to mounting levels of casualties, injury, property damage, and disruption of business and government services. The effects of disasters on families and individuals can be enormous, and it is challenging for damaged businesses to contribute to the economy. Also, the time, money, and effort given to response and recovery efforts redirect public resources and attention away from other important programs and problems. One method for proactively managing hazard risks is mitigation planning. Mitigation planning includes identifying the policies, capabilities, activities, and tools necessary to implement successful and sustainable actions to reduce risk. Past events have proven that mitigation actions in the form of projects and programs can be a long-term, cost-effective means for reducing the effects of natural hazards.

Mitigation planning has great potential for producing long-term and recurring benefits by breaking the repetitive cycle of disaster loss. Pre-disaster hazard mitigation investments have proven to significantly reduce the threat to residents’ health and safety, the demand for disaster response, and post-disaster assistance. Furthermore, mitigation practices enable residents, businesses, and industries to more rapidly re-establish themselves in the wake of a disaster, getting the community economy back on track sooner and with less interruption.

### Authorization

The Colorado Department of Local Affairs (DOLA) is leading Colorado’s housing and economic recovery effort in response to severe flooding that occurred in September of 2013. On December 16, 2013, the U.S. Department of Housing and Urban Development (HUD) published a notice in the Federal Register at Fed. Reg. 76,154 – 76,160. The “Colorado Notice” allocated Community Development Block Grant-Disaster Recovery (CDBG-DR) funds to the State of Colorado. As a requirement of this funding, in cooperation with the affected communities, DOLA developed and HUD approved an action plan (the “Initial Action Plan”), which assessed the short-term and long-term housing, infrastructure, and economic needs in the flood-impacted areas and developed a strategy for addressing those needs. This project implements an element of the resiliency planning component of the Initial Action Plan for authorized disaster recovery activities.

### Project Objectives

Boulder County specified several objectives during the competitive bid process for the Room for the River project. This document provides the project stakeholders and other users with information and analysis that can help guide the county’s decision making as it considers launching a mitigation program to proactively remove the risk to properties and residents in the event of future natural hazards. The project objectives, which are listed below, generally cover the development of recommendations for implementing a mitigation program that focuses on the high-hazard areas of the county.



- Summarize the parameters that are most useful to the county in identifying and assessing risk.
- Use these parameters to gather and compile data into a platform suitable for risk assessment.
- Perform a risk assessment.
- Develop recommendations on program guidelines and policies.
- Develop a funding strategy.
- Recommend components for a 3-year implementation/action plan.
- Coordinate input from various departments in Boulder County.

## Planning Process

Immediately following the September 2013 floods, residents and stakeholders in Boulder County began the lengthy process of recovery. Part of the recovery process involved identifying future directions for the watersheds and proposing ways to not only build back better, but also better protect the county from future hazards. This project focuses on planning for disasters before they occur as a complement to effective response and recovery. By taking sustained mitigation actions to reduce or eliminate the long-term risk to human life and property, hazard risks can be proactively combatted in a systematic manner. This approach to risk management is much more effective than reacting to a hazard after it occurs.

An effective planning process typically begins with research and data collection, and ends with decision making guidance or recommendations for future mitigation activities that meet multiple stakeholders' needs, as well as a reference document that can be used for years to come. In between, the process includes technical analysis, engineering calculations, agency and public coordination, attention to the environment, and the use of sound judgement and common sense. This Creating Room for the River Plan reflects Boulder County's vision to develop sound plans, programs, and practices to foster resiliency to natural hazards; to help meet the goals outlined above; and, more specifically, to meet the goals outlined in Boulder County's Comprehensive Plan and other planning policies.

The planning process followed for this project included four general tasks:

- Phase I- Project Kickoff and Data Collection – Includes hosting a kickoff meeting; interviewing key staff, focusing on experiences with the 2013 flood and current buyout programs; reviewing similar programs and funding; and collecting existing datasets.
- Phase II- Hazard Identification and Risk Assessment – Includes evaluating and mapping hazards, developing depth and velocity grids, developing criteria for target assets, and creating the risk assessment tool.
- Phase III- Mitigation Program Framework – Includes developing mitigation strategies, developing program guidelines and concepts, developing the program outreach, and developing a program implementation plan and management structure.
- Phase IV- Room for the River Plan – Includes developing a draft and final plan and incorporating stakeholder feedback.

Input from the project stakeholders is a vital component of the planning process. In addition to the four project phases listed above, project team coordination, presentations, and internal stakeholder review meetings were held throughout the life of the project to maintain project manager lines of communication, to present content at various stages, and to gain knowledge on important local factors to consider while developing the plan. Meetings were held according to the meeting list in Table 1.



Table 1: Meetings

Meeting	Date	Details
Project Kickoff Meeting	7/19/17	<ul style="list-style-type: none"> <li>Refined the scope and objectives for the plan</li> <li>Obtained feedback on the project approach</li> <li>Clarified project team coordination</li> </ul>
Project Steering Meeting	8/2/17	<ul style="list-style-type: none"> <li>Discussed program vision</li> <li>Potential barriers to program success</li> <li>Communication channels</li> <li>Other county departments/programs with which the program should interact</li> </ul>
Targeted Interview – <b>Boulder County Parks &amp; Open Space (POS) Acquisitions</b>	9/7/17	<ul style="list-style-type: none"> <li>Discussed the POS acquisition program</li> <li>Discussed funding sources</li> <li>Program outreach</li> </ul>
Targeted Interview- <b>City of Boulder Home Preparedness Assessment Program</b>	9/21/2017	<ul style="list-style-type: none"> <li>Discussed program elements- home assessments and minor mitigation subsidies</li> <li>Examples: smart landscaping; sump pump repair; check valve installation</li> </ul>
Staff Interview – Wildfire Partners Program	9/22/2017	<ul style="list-style-type: none"> <li>Discussed approach to outreach- changing homeowner/contractor/realtor mindset</li> <li>Discussed grant incentives</li> <li>Discussed integration across departments</li> </ul>
Post-Flood Buyout Program Lessons-Learned	8/16/17	<ul style="list-style-type: none"> <li>Discussed findings and lessons learned from current buyout program (draft report)</li> <li>Initiating the post-flood buyout program</li> <li>Funding sources and constraints</li> <li>Program risks/roadblocks/barriers to success</li> <li>Program outreach</li> </ul>
Risk Assessment Tool Criteria Meeting	10/9/17	<ul style="list-style-type: none"> <li>Risk assessment tool development</li> <li>Assessment criteria review</li> <li>Outreach and engagement plan</li> </ul>
Risk Assessment Tool Update Meeting	12/15/17	<ul style="list-style-type: none"> <li>Outreach and engagement analysis</li> <li>Risk assessment tool demonstration</li> <li>Initial review of program metrics</li> <li>Room for the River plan/toolkit overview</li> </ul>
Plan Framework Deep Dive Meeting	12/27/17	<ul style="list-style-type: none"> <li>Discussed toolkit/plan approach in greater detail</li> <li>Discussed required elements to satisfy DOLA grant</li> </ul>



## Acknowledgements

This plan was prepared in cooperation with Boulder County and Michael Baker. Representatives who contributed to this plan are listed in Table 2.

*Table 2. Plan Contributors*

Name	Representing	Project Role
Harry Katz	Boulder County Transportation	Project Manager
Nicole Wobus	Boulder County Land Use	Project Manager
Julie McKay	Boulder County Transportation	Stakeholder
Michael Downey	Boulder County Parks & Open Space	Stakeholder
Greg Jackson	Boulder County Land Use	Stakeholder
Gary Sanfacon	Boulder County Special Projects	Stakeholder
Janis Whisman	Boulder County Parks & Open Space	Stakeholder
Dale Case	Boulder County Land Use	Stakeholder
Varda Blum	Boulder County Transportation	Stakeholder
George Gerstle	Boulder County Transportation	Stakeholder
Ernst Strenge	Boulder County Parks & Open Space	Stakeholder
Eric Lane	Boulder County Parks & Open Space	Stakeholder
Kevin Doyle	Michael Baker	Project Manager
Ryan Carroll	Michael Baker	Plan Development Lead
Anne Kuechenmeister	Michael Baker	Outreach Lead
Aron Langley	Michael Baker	Hazard Evaluation Lead



## II. Room for the River Program Overview

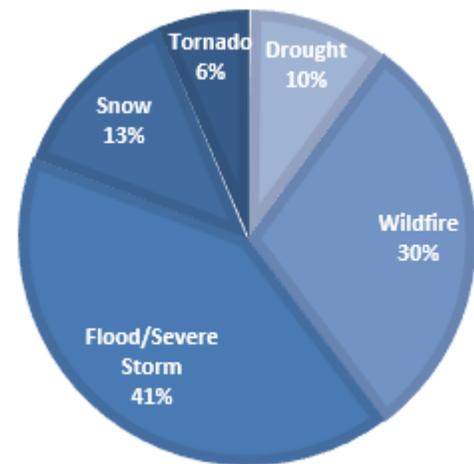
The focal point of this plan is to assist Boulder County with determining the steps it can take to mitigate the long-term risks from disasters by addressing both existing and future risks through the development of a river-focused mitigation program. Boulder County is not alone in its desire to address hazard risk through mitigation, but each community has details and nuances that may be unique and ultimately impact the community’s decision to pursue a program, and, if it does pursue a program, how it should be designed. Here, we’ll provide some context on why this potential program is a good idea and how other entities are focusing their efforts on mitigation, and introduce common elements of typical mitigation programs for Boulder County to consider.

### Why should Boulder County consider developing and implementing a river-focused mitigation program?

Global and localized climates are undergoing changes that have both acute and lasting impacts on weather and natural hazards. As a result, communities must consider these impacts in their current and long-range planning processes, including land use, emergency management, and hazard mitigation planning, and should strive to meet goals such as:

- protecting life, health, and property
- protecting public and private infrastructure
- improving habitat and quality of life
- improving natural hazard risk awareness
- improving internal and inter-agency coordination/implementation
- reducing rescue and relief efforts
- reducing economic and social hardships
- complying with regulatory standards

While it’s important to consider all hazards and their impacts on community and watershed stakeholders, fresh in the minds of many are the wildfire and flood disasters that the county, its residents, and its visitors have endured. Disasters as significant as the Cold Springs and Fourmile Fires, as well as the September 2013 Flood Event, can stretch resources and expose local, state, and federal procedures, policies, and programs in need of attention. In the aftermath of these events, communities are motivated to create or strengthen programs and plans focused on meeting the aforementioned goals.



Colorado Disaster Declarations by Hazard, 1956-2016 (also 1 Dam Failure)

Boulder County has developed strong policies and rules related to planning, land use, and development in all areas of the county. Its development review standards carefully and thoroughly consider hazards and design standards. Still, areas exist throughout the county that were developed either a) prior to the existence of certain development guidelines and policies; b) prior to the existence of certain hazard data and understanding; or c) without the county’s comprehensive planning goals in mind.



The 2013 Extreme Rain and Flood Event highlighted many of these areas of existing risk along and within the river corridors of the county. Flood recovery was extensive, expensive, and uncharted territory for those impacted, from homeowners to visitors to county and contractor staff. Many lessons learned during the recovery phase of the 2013 Event, which continues into 2018 and beyond, will be applied to county programs, processes, and event response and recovery in the future. Hazard mitigation objectives following the 2013 Event included:

- removal of high hazard homes
- roadway and infrastructure repairs/replacement
- Septic system repair/replacement
- Home elevation projects
- Home acquisition projects

The county enacted an acquisition-focused program following the 2013 Event to provide an outlet for property owners who wanted another economically-viable option in addition to repairing or rebuilding their home. While this program was reactionary to the event itself, it provided county staff with extensive relevant experience with offering and running an acquisition-based mitigation program. This and other post-flood efforts have prepared staff for the potential for a long-term mitigation strategy to reduce risk to hazards throughout the county, increase the community’s resilience to natural hazards, and assure that future events will have short-lived and more manageable outcomes. Other similar mitigation strategies can have the same effect.

Mitigation represents a sound financial investment, while at the same time saves lives and spurs job growth. Boulder County has already made “investments” in hazard mitigation through planning, development review, and enhanced code requirements. These actions alone can represent a 5:1 benefit-cost ratio when considering future events that may have impacted development without these factors in-place. Taking steps to reduce existing risk through mitigation grant activities in riverine flooding areas

increase that ratio to 7:1. Investing in hazard mitigation has also been shown to reduce the number of injuries, deaths, and event-related diagnoses of Post-Traumatic Stress Disorder. The bottom line--investing in mitigation saves.

Considering the overall goals of a strong hazard mitigation program and the county’s plan to develop a program focused on river corridors, combined with the program influencers outlined in the section below, the following objectives have been identified for the Room for the River program:

National Benefit-Cost Ratio Per Peril <small>*BCR numbers in this study have been rounded</small>		Federally Funded	Beyond Code Requirements
<b>Overall Hazard Benefit-Cost Ratio</b>		<b>6:1</b>	<b>4:1</b>
 <b>Riverine Flood</b>		<b>7:1</b>	<b>5:1</b>
 <b>Hurricane Surge</b>		Too few grants	<b>7:1</b>
 <b>Wind</b>		<b>5:1</b>	<b>5:1</b>
 <b>Earthquake</b>		<b>3:1</b>	<b>4:1</b>
 <b>Wildland-Urban Interface Fire</b>		<b>3:1</b>	<b>4:1</b>

From Natural Hazard Mitigation Saves- 2017 Interim Report. National Institute of Building Sciences, 2017



Table 3. Program Objectives

Objective #	Description
1	Remove or reduce existing risk from river-related hazard areas
2	Build capacity to prepare for future disasters
3	TBD by Boulder County
4	TBD by Boulder County

### Program Influencers

The following subsections are focused on other relevant programs, state and federal efforts, and documents that may help the county align program goals and objectives and help focus their decision making for Room for the River program development.

#### **Boulder County Flood Recovery Buyout Program**

The Boulder County Flood Recovery Buyout Program was established shortly after the flood event of September 2013. The program served as a hazard mitigation tool, and it provided an option for property owners for whom rebuilding after the flood was not an option. Boulder County used funding from the FEMA Hazard Mitigation program (HMGP) and HUD Community Development Block Grants for Disaster Recovery (CDBG-DR) program to purchase properties impacted by the September 2013 flooding. Property owners who owned the property at the time of the event were offered the pre-disaster market value of the property (for buyouts) or current fair market value (for acquisitions) as determined by two independent and state-licensed appraisers. This was a voluntary program; Boulder County did not compel any property owners to participate nor did the county purchase property through eminent domain proceedings. Once the properties were purchased, the improvements were removed and the land was returned to its natural state. The property will remain in public ownership unless an alternative public use is identified that could be accommodated in a safe manner for future users of the site. Such alternative uses could include recreational areas, community gathering spaces, or public infrastructure such as road or bridge project needs.

This program was constructed from the ground up and managed by multi-departmental staff, with assistance from experienced consultants used for certain program activities such as site assessments and construction oversight. Boulder County staff opined a number of takeaways from this program that should be considered as the Room for the River Program is developed. These takeaways include, among others: *setting proper expectations on grant and project timelines, ensuring staffing and capabilities are in-place, and enabling a clear path to program entry.*

A complete synopsis of the Boulder County Flood Recovery Buyout Program can be found in Appendix A.

#### **Other Program Research**

Boulder County is venturing down a path to resilience that other communities in the State of Colorado and across the country have similarly considered, and even implemented. Many of the community mitigation programs that have been established were influenced by single large events, but also by experiencing repeated losses in hazardous areas. Certain programs stand out for their success, visibility, and local support. This plan provides a look into some of these programs in the Program Framework section.

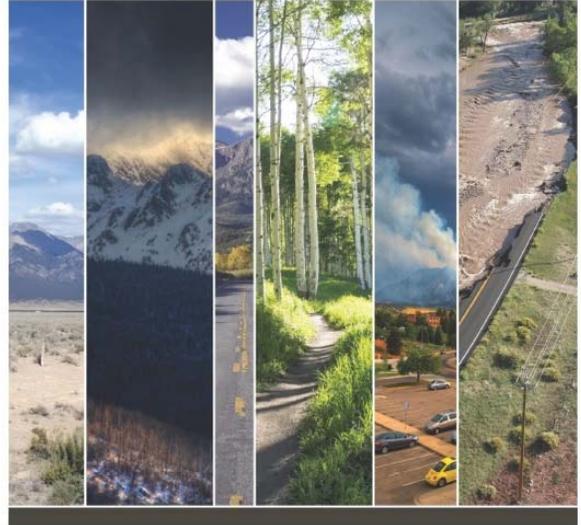
#### **Where does the State of Colorado stand with respect to hazard mitigation planning?**

In March 2016, the State of Colorado Department of Local Affairs (DOLA) completed a guide titled *Planning for Hazards- Land Use Solutions for Colorado*. According to the guide, it “enables counties and municipalities to

prepare for and mitigate multiple hazards by integrating resilience and hazard mitigation principles into plans, codes, and standards related to land use and the built environment” and “provides detailed, Colorado-specific information about how to assess a community’s risk level to hazards and how to implement numerous land use planning tools and strategies for reducing a community’s risk.”

Boulder County’s land use and development review practices serve to protect future development from hazards; however, the reality is that there are limitations to the level of hazard mitigation the county can accomplish through development review processes. Further, existing development in hazardous areas poses the highest threat to people, property, infrastructure, and the local economy, as well as cultural and social patterns. At the highest level, DOLA has grouped strategies to address risk into the following categories:

- Addressing hazards in plans and policies
- Strengthening incentives
- Protecting sensitive areas
- Improving site development standards
- Improving buildings and infrastructure
- Enhancing administration and procedures



DOLA’s *Planning for Hazards* guide should be an integral part of the county’s decisions related to implementing a program such as Room for the River, and has directed some of the content strategies outlined in this guide. For a copy of the full guide, follow the link provided in the reference section of this plan.

**Annual Planning Guidance from FEMA Administrator W. Brock Long**

An invigorated federal focus on planning, disaster preparedness, and mitigation has weaved its way into FEMA’s immediate spending as well as their Strategic Plan that covers the next 5 years. On December 22, 2017, W. Brock Long released an annual planning memorandum that outlined three focus areas that staff are expected to deliver on. These are: Building a Culture of Preparedness; Readyng the Nation for Catastrophic Disasters; and Reducing the Complexity of FEMA. Multiple initiatives within each focus area serve to guide FEMA staff to implement approaches that align with each focus area. Two initiatives that stood out that merit observation as Boulder County considers a program geared toward flood hazard mitigation are:

- **Incentivize Investments that Reduce Risk, Including Pre-Disaster Mitigation, and Reduce Disaster Costs at All Levels.** Meaningfully reducing future disaster risk requires the concerted efforts and investments of all levels of government and sectors of our communities. We will build more resilient communities by making larger investments in mitigation before disasters occur. We will also explore and pursue innovative new programs that encourage our partners to invest in buying down risk and building resilience.
- **Streamline the Disaster Survivor and Grantee Experience.** We must make survivor and grantee services more efficient and customer-friendly from first contact through closeout. Whether it is the inspections



process for survivors or state, local, and tribal management of pre- and post-disaster grants, FEMA must streamline processes and policies to reduce the complexity of disaster assistance and emergency management.

For a link to the full text of the December 22, 2017 Memorandum, see the references section.

### **Alignment with the National Mitigation Investment Strategy**

On January 11, 2018, the Department of Homeland Security released the first draft of the National Mitigation Investment Strategy. The investment strategy is an effort, at the federal level, to provide an approach to investments in mitigation activities and risk management for federal departments and agencies, state and local governments, and private/non-profit sector entities. The strategy is an attempt to foster coordination and streamlining of mitigation programs, program components, and outcomes, and includes recommendations that look to improve the coordination and effectiveness of mitigation investments such as the Room for the River Program. The fundamental principles of the strategy are:

- To catalyze private and non-profit sector mitigation investments and innovation;
- To improve collaboration between the federal government and state/local governments, while respecting local expertise in mitigation investing; and
- To make data- and risk-informed decisions that include lifetime costs and risks.

The strategy is broken down into six desired outcomes and a varying number of recommendations to achieve those outcomes. The six outcomes are:

- Outcome 1- Coordination of risk mitigation and management improves between and among the public, private, and non-profit sectors
- Outcome 2- The private and non-profit sectors increase their investments in and innovations related to resilience and mitigation
- Outcome 3- State/Local governments increasingly empowered to lead risk reduction activities and share responsibility and accountability with the federal government
- Outcome 4- Public, private, and non-profit sector entities develop and share more of the data and tools needed to make risk-informed mitigation investments
- Outcome 5- Public, private, and non-profit sector entities improve risk communication, leading to more risk-informed mitigation investments by individuals and communities; and
- Outcome 6- The built environment- whether grey or nature-based infrastructure, and including lifeline infrastructure, buildings, and homes- becomes more resilient and promotes community resilience

A complete table of outcomes and recommendations is included in Appendix A of this plan.

## Overview of Program Elements

Mitigation is most effective when it is based on a comprehensive, long-term plan that is developed before a disaster occurs. In order to properly define what a long-term mitigation program will look like and how it will function to achieve its objectives, strategies and options must be considered that best fit the needs of the community’s inhabitants, staff, and officials. This plan will examine six elements that together can help shape a Room for the River program and provide Boulder County with a foundation for decision-making as it considers building this program. These program elements include three distinct elements that will propel the program, known in this plan as Program Drivers. Program Drivers include the Risk Assessment, Mitigation Strategies, and Funding Strategies. The remaining program elements- Staffing & Capabilities, Program Implementation & Management, and Outreach- are essential to the program structure, but may vary depending on the differing alternatives that are possible within the Program Drivers.



**Risk Assessment.** To focus communication and mitigation strategies, communities must identify and understand the hazards that pose a risk to inhabitants, the economy, infrastructure, and the natural environment, making hazard identification and risk assessment instrumental pieces in any hazard mitigation plan. Similarly, communities must identify assets that would be differentially impacted by the identified and quantified hazard to determine risk throughout the community.



**Mitigation Strategies.** The types of projects performed in the program will truly serve as the long-term blueprint for achieving program objectives. In other words, mitigation strategies are where the real action takes place. It’s important to understand that there are multiple approaches, or strategies, available to communities to consider based on a number of variables, and that the strategies selected should be in-line with community comprehensive planning goals. Strategies that consider the natural and beneficial functions of riverine hazard areas are preferred to highly physical or structural protection measures such as levees or floodwalls. Each recommended strategy comes with its own set of considerations that will be examined in Section III.

**Funding Strategies.** Most mitigation strategies require financial backing. The program itself may also require funding for day-to-day operations. Funding can take the form of federal, state, or other agency grants and loans, financial resources established by the community, and possibly other in-kind contributions. Most superior



mitigation programs will consider some combination of funding sources in order to operate and execute mitigation projects. Section III will examine different possible funding strategies and how those may or may not relate to different mitigation strategies and project types.

**Staffing & Capabilities.** Determining the required level of staffing and required capabilities are essential elements of any local program. In the context of a program like Room for the River, the required staffing and capabilities will vary depending the Program Drivers; there will, however, be a need for general staffing for management and oversight of the program. For the program as a whole, an in-depth capabilities assessment should be considered to accompany the decision-making that's necessary during program development.

**Outreach.** Outreach spans the life of the program, and even begins during program development. Boulder County has already created a website that includes content on the creation of the Room for the River plan. Efforts can promote discussion about the program and its objectives, including the creation of a more disaster-resilient community. Outreach spans the life of the program and includes stakeholders at many different levels. General program outreach is necessary to increase program visibility to potential participants as well as other important program advocates like real estate agents, insurance agents, homeowners associations, and other similar entities. Targeted outreach will result from zeroing-in on geographic areas of interest or particular neighborhoods/parcels that the risk assessment steers towards, or by selecting specific mitigation or funding options. There's generally good support for continued public involvement during plan maintenance, and also a need to keep community officials updated over the life of the program.

**Program Implementation.** There are a number of different ways that a mitigation program can be structured and administered. Considerations for how the program will operate, how both internal and external communication will take place, and what factors may influence a certain type of program focus or structure over another should be made. In Section III, we've broken down program implementation into a series of tables that looks at factors such as cost-effectiveness and community support potential and the influence that a particular mitigation or funding strategy may have on these factors. The information is based on research into other local programs and is meant to foster discussion on how Boulder County might score with respect to these factors, and how the county may want to operate the Room for the River program.

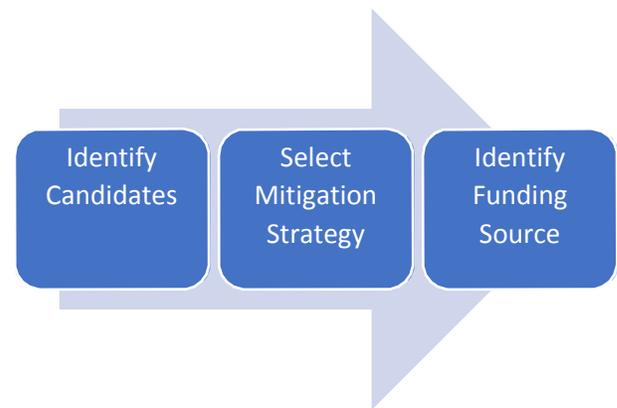
### III. Evaluating the Program Elements & Moving Forward

Presented in this section are detailed descriptions of six program elements outlined at the end of Section II, as well as recommended long-range, short-range, and immediate steps necessary for program development and execution. There are three Program Drivers- Risk Assessment, Mitigation Strategies, and Funding Strategies- that are the apex of where evaluation of options and decision making for program structure begin. The remaining three program elements- Staffing & Capabilities, Outreach, and Program Implementation- will provide an understanding of how these elements, and ultimately, the program, might shift based on the influence of Program Drivers. Program Implementation will account for a series of factors that stem from all program elements and provide insight into what may or may not be required to run the program effectively.



#### Risk Assessment

The Risk assessment can be an important Program Driver as it can influence decision-making on all program elements, including development of mitigation strategies and funding strategies, staffing & capabilities, outreach, and implementation. The assessment can provide a sense of scale, demonstrating to staff specifically what and who is at risk. It can help prioritize areas for mitigation, and forms a factual basis to support these efforts. It also can support other uses such as development review, permitting, emergency management, and so on.



In order to digest the proper data for Boulder County and help formulate the mitigation and outreach strategies outlined later in this plan, a Risk Assessment Tool was created. This tool is a GIS-based toolbox that processes the input datasets based on criteria reviewed and established during the Room for the River program planning process, and will help county staff zero-in on areas of mitigation interest and potential mitigation strategies. At this point in time, the tool is meant to provide the county with an initial screening of potential areas of mitigation interest that must be further-scrutinized.

This approach to analyzing and prioritizing areas for mitigation projects is not unique. In fact, assessment of vulnerability, including vulnerable assets and populations, to determine both outreach and mitigation strategies is viewed by FEMA, the State of Colorado, and many other entities involved in hazard mitigation as an essential step to mitigation plan and program development.

Other community programs have similarly conducted risk assessments and developed criteria for prioritizing areas for mitigation projects. A summary of those approaches is provided in the table below.



Table 4. Risk Assessments Performed by Other Communities

Community	Population	Risk assessment/project prioritization approach
<b>Charlotte-Mecklenburg County, NC</b>	1,054,835	Development of Flood Risk Property Score & Flood Mitigation Priority Scores
<b>Harris County, TX</b>	4,589,928	Prioritization based on hazard, potential for floodplain preservation, compatibility with community planning goals
<b>Boulder, CO</b>	108,090	Prioritization of homes in mapped High Hazard Zone
<b>Snohomish County, WA</b>	772,501	Prioritization based on level of hazard and experienced flooding/flood damage
<b>Jefferson County, WI</b>	83,686	Prioritization based on residence type: permanent/primary, rental properties, seasonal properties/vacation homes.
<b>Austin, MN</b>	24,720	Prioritization of repetitive flooding problems

Through the planning process, a number of datasets were considered for use within the Risk Assessment. All final datasets used in the assessment have been packaged in the Room for the River GeoDatabase. Datasets used in the assessment are as-follows:

**Natural Hazards.** There are a number of natural processes that result from the movement of water through the county’s watersheds. To provide and protect key areas where these processes can continue unhindered, one must first analyze existing flood hazards and add to that other river- and rainfall-related hazards and datasets. These hazards have been compiled into a hazard raster that assigns scoring (High) based on the presence or absence of hazard areas criteria for measuring variability within hazard areas, flood depth and flood velocity. A sample of the hazard mapping is available in the figure below.

In addition to the hazards inventoried and collected to-date, the risk assessment tool has been constructed to accept additional/updated hazard data. For example, the State of Colorado is working on production of countywide Fluvial Hazard Zone (FHZ) mapping, including identification of the modern valley bottom and erosion hazard zones, but the data will not become available until at least the Summer of 2018. The risk assessment was developed using an existing FHZ dataset that resulted in the *St. Vrain Watershed Master Plan* to ensure that the tool was constructed in a manner that would accept the state’s data, once available.

Hazards	Source
Flood	Boulder County/FEMA
Debris Flow	CGS/Cesare, Inc.
Fluvial Hazard Zones*	Round River Design, Inc.
Landslide Susceptibility	Cesare, Inc.
Rockfall	Cesare, Inc.
Steeply Dipping	Cesare, Inc.
*Additional data to be delivered by the State Summer 2018	
Flood Depth Grids	Baker
Flood Velocity Grids	Baker
Wildfire Threat	State of Colorado

(Low to as well as such as raster

Assets	Source
Parcels	Boulder County
Building Footprints	Boulder County
Assessors Data	Boulder County
NFIP Claims	NFIP/FEMA
Damage Estimates	Boulder County
Public Lands	Boulder County/Fed/State
Zoning	Boulder County
Comp Plan Mapping	Boulder County

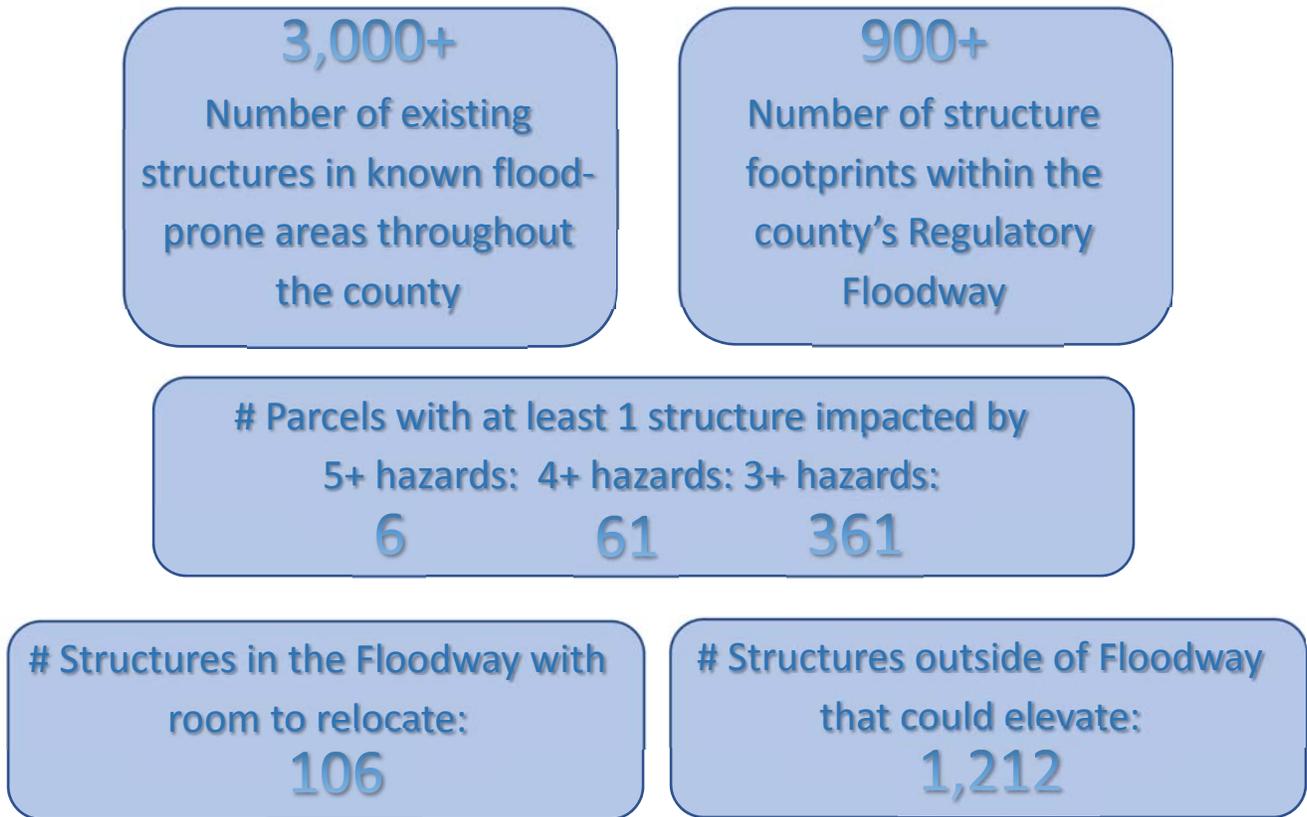


**Assets.** Other local datasets such as parcels and building footprints have been used within the tool to identify assets and refine the risk assessment. These datasets, paired with stats such as NFIP claims and assessor’s data, form the basis of analysis of risk in the assessment tool.

**Assessment Criteria.** Prioritization of areas for mitigation consideration is an integral step to risk assessments conducted within other effective mitigation programs. For the Room for the River assessment, scoring was performed at the parcel level using 14 assessment criteria in addition to the hazard scoring. For additional information on the assessment criteria, refer to Appendix C.

**Results.** The risk assessment combined hazard and asset data with a number of criteria that were vetted with county staff to automate the identification of high-risk areas and to steer appropriate mitigation strategies. Results are presented for 3 particular mitigation strategies at this time, including scoring for property acquisition (separated as ‘vacant’ parcels and ‘improved’ parcels), structure elevation, and structure relocation. Further information about the risk assessment tool, including a tool User Guide, can be found in Appendix D.

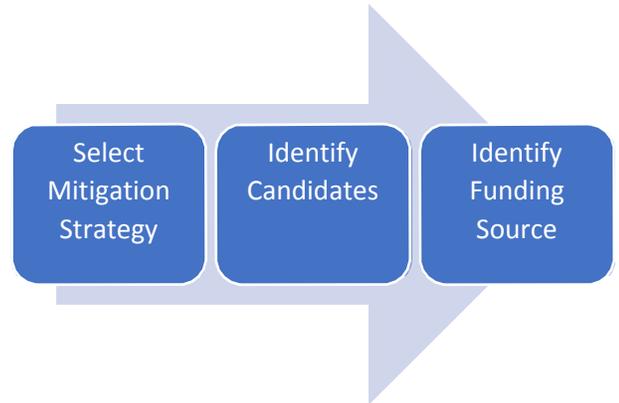
**Limitations.** Assessments such as this are sometimes limited by the amount and quality of data used as input, and can be further restricted by the selected criteria chosen for the assessment. In addition to regular maintenance to the tool itself to incorporate regularly updated hazard and asset datasets, future enhancements to data inputs, criteria, and the tool itself can produce more robust results.





## Mitigation Strategies.

Mitigation Strategies are another potential Program Driver. They can dictate the areas of expertise necessary to staff the program, the way program staff communicate, and the way projects are funded. The following strategies are those selected as a best-fit for the objectives and goals of a mitigation program focused specifically on floods, heavy rain events, and interrelated hazards. Hazards such as flooding, erosion, landslides, and debris flows pose significant risks individually and the threat increases exponentially when multiple hazards are present. This section looks at considerations to make for each strategy, pros and cons for each strategy, and specific community examples. Factors that affect each strategy are also discussed.



### Strategy 1: Minor and infrastructure-related flood mitigation projects

There will seemingly always be a focus on large-scale efforts to mitigate hazards and increasing community resiliency, but significant opportunities exist to connect with property owners, renters, and business owners on a different level so they understand some of the smaller steps they can take to reduce their exposure to hazards and build on personal resilience and preparedness. Similar to the Resilient Together Home Preparedness Assessment pilot program that was offered following the 2013 Flood Event, a Room for the River mitigation program should not overlook small steps that can be taken when the risk level calls for it. Projects such as the following could be eligible for reimbursement through various funding sources:

Flood vent installation	Septic retrofits
Sump pump inspection/repair	Smart landscaping/green infrastructure
Check valve/Backflow preventer installation	Debris/junk removal
Slope stabilization	Bank stabilization/stream restoration

Similarly, scheduled county improvements, including maintenance projects for existing infrastructure as well as capital improvement projects, can be planned and designed to incorporate mitigation measures.

*Table 5. Pros and Cons of Planning Improvements and Incorporating Mitigation Measures*

<b>Pros</b>	Retains building stock
	Educates property owners and enables them to understand their risk and address it
	Provides relief for nuisance flooding and some level of protection from larger events
	Qualifies homeowners for certain rebate programs
	Encourages mitigation components in public projects
<b>Cons</b>	Lower cost of implementation
	Requires commitment by homeowner to act
	Sometimes offer only minimal protection



**Strategy 2: Structure Elevation/Relocation/Mitigation Reconstruction**

There are properties and structures in Boulder County that would be good candidates for either elevation, relocation, or mitigation reconstruction. Unlike property acquisitions, project costs for elevation, relocation, or mitigation reconstruction must be paid up-front. Like property acquisitions, however, these methods come with their own set of considerations. They can be very dependent on hazard type and hazard characteristics, such as depth and velocity of flooding, flood duration, and susceptibility to other hazards like landslide or debris flows.

Avg home elevation cost/sq ft:  
**\$100**  
 Source: Citylab

*Table 6. Considerations Related to Structure Elevation, Relocation, and Mitigation Reconstruction*

Elevation Considerations	Relocation Considerations	Mitigation Reconstruction Considerations
Does the hazard support this strategy?	Does sufficient space exist outside of hazardous areas?	Does the hazard support this strategy?
Does the building support the strategy (size, shape, construction)?	Does the building support the strategy (size, shape, construction)?	Does current zoning support this strategy?
What's the required amount of elevation?	Is there a suitable route between the existing and new site?	
Are there qualified home elevation contractors in the area?	Are there qualified relocation contractors in the area?	
Are there historical, cultural, or environmental considerations?	Does the proposed site have proper access/utility connection availability?	
	What will happen to the abandoned site?	
	Are there historical, cultural, or environmental considerations?	

Boulder’s local development requirements will also come into play, so additional considerations and constraints given the language in the Boulder County Land Use Code and other county policy documents will certainly exist. As mentioned earlier, Boulder County operates using a ‘freeboard’ requirement for first floor elevations for structures located in the county’s Floodplain Overlay District. This technique alone accounted for nearly \$342M in losses avoided in Boulder County during the 2013 Flood Event. Elevation projects might also be impacted by height restrictions and other requirements within the land use code.

Losses avoided in 2013 as a result of county's freeboard requirements:  
**\$342M**

All of the methods within this strategy would require building occupants to relocate during project execution. Structures will be uninhabitable from project onset when utilities are disconnected until the county issues a Certificate of Occupancy following construction. Further, significant planning, design, review, and permitting is necessary for all structure mitigation methods.



*Table 7. Pros and Cons of Considering Structure Elevation, Relocation, and Mitigation Reconstruction*

<b>Pros</b>	Retains housing stock
	Reduces number of nonconforming buildings
	Reduces NFIP flood insurance policy costs
	Keeps property on tax rolls
	Promotes neighborhood/community cohesiveness
	Relocation- reduces flood damage potential/rescue and relief efforts
<b>Cons</b>	High cost and technical considerations
	Temporarily displaces residents
	Elevation- Makes building access more difficult (added expenses for ADA compliance)
	Elevation- Does not directly reduce burden to rescue/relief efforts
	Elevation- Does not eliminate potential for flood damage (to building, septic, access, etc.)
Increases potential for conflict with building height restrictions, wind loading allowances	

Strategy 3: Deed Restrictions/Conservation Easement

The use of these methods as a hazard mitigation strategy involves securing limitations on use and development that are attached to a piece of private property. Easements typically involve portions of property that are donated or sold, and the protection of these pieces of property are legally protected and perpetuated through property title. They can be guided and managed by land trusts or the community. Deed restrictions are similar in their outcome in that they act to somehow limit or direct use and development, but could be applied to the entire property and are perpetuated in the property deed. These methods are significantly more applicable for the following scenarios:

- 1) A property is undeveloped, has undeveloped areas in hazardous areas, or has removed accessory structures from hazardous areas; or
- 2) Another mitigation strategy has already been applied, such as structure relocation or mitigation reconstruction, and this strategy is being applied as a part of site restoration.

*Table 8. Pros and Cons of Using Deed Restrictions/Conservation Easement*

<b>Pros</b>	Allows preservation of land in the river corridors without the need to acquire entire properties or further regulate them
	Provides income tax and estate tax benefits for landowners
	Low technical requirements. Mainly an administrative exercise.
<b>Cons</b>	Requires increased coordination between community staff, land trust staff, realtors, and attorneys
	May require funding to provide compensation for property restrictions



Strategy 4: Property Acquisition.

Acquiring at-risk properties is often the most effective way for communities to achieve their hazard mitigation and comprehensive planning goals. More specifically, it provides a means to remove existing risk and ensure long-term preservation and hazard/risk reduction by removing any development potential. While its effectiveness is apparent, implementation of this strategy can prove to be difficult. It requires support from the local government, support and participation from the community, and the funding necessary to not only purchase property, but also manage and execute a number of tasks related to the project like performing site assessments, demolition, site restoration, and long-term property management. Still, these projects will typically always demonstrate a positive cost-benefit over time.

Avg Boulder County  
home price/sq ft:

\$320

Source:  
Zillow

In Boulder County, development in a number of extremely high-risk areas points to property acquisition as a practical strategy; in other words, there may be no other suitable location on the property to which a structure could be moved. Following the 2013 flood event, approximately 80 property owners expressed interest in selling their property to the county (ultimately, 47 were acquired). Repeat events and the potential for damage and loss of life from other hazards, paired with efforts to increase the understanding of risk throughout the county, could compel additional property owners to come forward once a permanent program is established. Other communities have executed successful flood-specific property acquisition programs following repeat flood events, and some have maintained long-term voluntary programs.

*Table 9. Communities Engaged in Property Acquisition*

Community/Organization Name	Population (2015 or 2016 est)	Household Income (2011)	Median Home Value/Sale Price	Number of acquisitions	Program Type
<b>Austin, MN</b>	24,720	33,750	86,500	240	Both
<b>Boulder, CO</b>	108,090	60,569	1.07M	20	Long-term
<b>Boulder County, CO</b>	319,372	67,403	659,275	40	Post-event
<b>Charlotte-Mecklenburg County, NC</b>	1,054,835	56,883	212,000	400	Long-term
<b>Clyde, NC</b>	1,223	35,708	155,300	45	Post-event
<b>East Grand Forks, MN</b>	8,601	55,590	205,000	507	Post-event
<b>Harris County, TX</b>	4,589,928	56,629	183,300	960	Long-term
<b>Jefferson County, WI</b>	83,686	52,813	183,000	115	Long-term
<b>King County, WA</b>	2,117,000	73,035	450,000	DNA	Long-term
<b>Kinston, NC</b>	22,000	28,608	87,300	1,000	Post-event
<b>Montevideo, MN</b>	5,383	26,025	92,266	131	Post-event
<b>Moorhead, MN</b>	38,065	49,514	183,000	264	Post-event
<b>Pierce County, WI</b>	41,019	64,364	200,500	62	Post-event
<b>Pequannock, NJ</b>	15,000	72,729	378,100	87	Post-event
<b>Rocky Mount, NC</b>	60,000	36,724	75,900	446	Post-event
<b>Sayreville, NJ</b>	42,704	82,172	301,900	180	Post-event
<b>Snohomish County, WA</b>	772,501	67,394	421,000	DNA	Long-term
<b>Wayne, NJ</b>	55,000	104,825	435,200	133	Post-event



The differences between communities that acquire property following a flood disaster (reactionary) and those that have developed a long-term strategy for property acquisitions (long-term), for the most part, comes down to 1) funding; and 2) capacity. The reactionary programs have relied on the funds that are made available following presidential disaster declarations. Long-term programs have come to rely on other funding sources, which will be discussed in the Funding Strategies section of this plan. Similarly, communities with long-term programs have the resources to commit to offering this strategy at any point in time, regardless of the timing of a flood event.

*Table 10. Pros and Cons of Property Acquisition*

<b>Pros</b>	Promotes natural resource/habitat preservation and protection
	Provides recreational, educational, and environmental opportunities (natural and beneficial functions)
	Steers development away from high-hazard areas
	Removes existing risk (buildings/people) from hazard areas (reduces damage/cleanup)
	Reduces rescue/relief efforts and the need to evacuate
	Adds to community open space inventory
<b>Cons</b>	High cost
	Reduces housing stock
	May disrupt neighborhood/community cohesiveness
	Removes land from tax base
	Requires increased coordination between community staff, property owners, and other necessary professionals such as appraisers, titling companies, and contractors
	Requires long-term property management/maintenance

Long-term management of acquired property, whether through property acquisition or conservation easements, might require additional considerations for cost and resources. In Boulder County, the practice for management of acquired parcels and easements has been a responsibility of the Parks & Open Space Department. Extensive considerations around certain factors might require additional review and planning processes to be considered for mitigation projects involving acquisitions and easements. Potential factors for consideration by the program development team for long-term property management include:

- Proposed/allowable uses: Recreational, educational, natural & beneficial functions, wetlands accounting for county projects, habitat connectivity, water quality, etc. This can also be dictated by grant requirements.
- Planning & Management
- Maintenance
- Security
- Outreach
- Neighborhood concerns

Strategy 5: Integrating river-related hazard mitigation with existing plans and policies. This can range from aligning the Room for the River program within the county’s Hazard Mitigation Plan, to continued evolution and enhancement of site development/improvement standards and requirements. In Boulder County, the Land Use Code already contains many hazard-specific development requirements for new site development as well as improvements to existing, already-developed sites. For example, certain types of improvements in regulatory floodway areas are prohibited, and Boulder County already operates using a Flood Protection Elevation, or a specified ‘freeboard’ above the 100-year Base Flood Elevation required for first floor elevations. The Boulder



County Comprehensive Plan and the Boulder County Hazard Mitigation Plan also outline a number of concepts and goals that both support and validate the focus of a Room for the River program.

*Table 11. Boulder County Plan Goals*

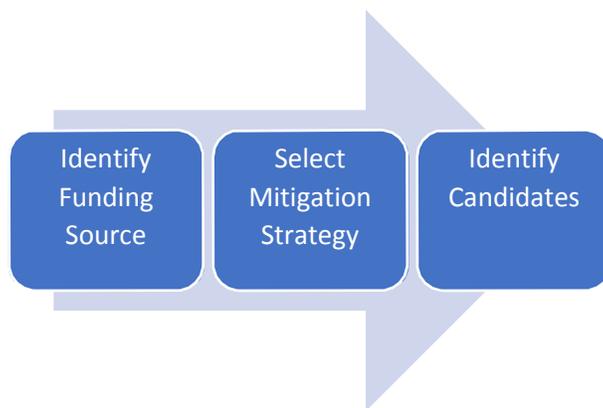
<b>Boulder County Natural Hazard Mitigation Plan</b>	
<b>Goal 1-</b>	Reduce the loss of life and personal injuries from hazard events
<b>Goal 2-</b>	Reduce impacts of hazard events on property, critical facilities/infrastructure, and the environment
<b>Goal 3-</b>	Strengthen intergovernmental coordination, communication, and capabilities in regard to mitigating hazard impacts
<b>Goal 4-</b>	Improve public awareness regarding hazard vulnerability and mitigation
<b>Boulder County Comprehensive Plan</b>	
<b>Natural Hazards Goal L.1-</b>	Inappropriate development in natural hazard areas should be reduced as much as possible or eliminated in order to minimize potential harm to life, health, and property
<b>Natural Hazards Goal L.2-</b>	Efforts to mitigate existing areas of risk to the impacts of natural hazards and disasters should be made to minimize the potential for harm to life, health, and property
Other residual goals for Environmental Management (B.1-B.8), Parks and Open Space (C.1-C.5), Transportation (G.1-G.6), Public Involvement (H.1), Government Relations (I.1), Cultural Resources (K.1-K.2), and Agricultural Resources (M.1)	

*Table 12. Pros and Cons of Integrating River-Related Hazard Mitigation with Existing Plans and Policies*

<b>Pros</b>	Pushes mitigation planning and execution to project proponents (property owners, etc.)
	County experience with plan/policy/code updates and an established feedback loop
	Can incorporate future land use considerations
	Low cost
<b>Cons</b>	Requires interdepartmental staff coordination
	Requires coordination with other local organizations such as water/ditch companies, Oil and Gas, etc.

### Funding Strategies

A third potential Program Driver considers how the program and projects are funded. Funding amounts, types, and availability can dictate the necessary resources to consider as well as the mitigation strategies that are most feasible from a funding standpoint. Funding has proven for many other communities to be a moving target- meaning they have not been able to consistently rely on one single funding source from program development and initiation through program execution. It's also necessary to consider funding for both staffing/program management and executing mitigation projects. For this reason, it's suggested that the



program be more malleable in the way it secures funding, to provide for flexibility in both staffing and projects, and also to ensure the continued operation of the program. Choosing one funding type may limit the eligibility of projects or the actual number of projects that could be executed in any given year, but would allow for streamlining of processes related to project funding and execution such as grant applications or project design



documents. The best approach may be the one that first plans and develops the best mitigation project for a given area, then seeks out a funding source that fits- much more like a Mitigation Strategy-driven program. Certain projects may fall within a particular funding category, while others may fit another category, and it’s worthwhile to maintain flexibility. A growing number of communities have overcome financial barriers with funding strategies that are sustainable and effective. Some of the most common strategies are outlined below.

Strategy 1- Grants

Grants provide an opportunity for communities to compete for money to fund various activities under local programs like Room for the River. Competition is an important factor to consider with grant funding. Grant funding has historically been reliable from certain sources, but it is difficult to predict their continued existence, and the competitive nature of the grants can make them less reliable, especially when considering grant funding to fund staff positions. Comprehensive lists and tools to select grant funding sources exist, but they are essentially a written history of potential funding instead of a reliable resource for identifying and sequencing funding during program execution, as funding amounts, grant availability, and grant entities change frequently. Nevertheless, it’s still worthwhile to compile existing sources of grant funding and maintain the list as the program matures.

There are efficiencies that can be realized when tapping into grant funding on a continued basis for program and project execution. Programs can be designed to front-load information gathering that is common across multiple grant sources after mitigation candidates identified and onboarded, making the grant application and fulfillment process more efficient.

Grant sources are broken down into 2 categories: 1) FEMA grants, and 2) other grants.

**FEMA Grants.** One of the most well-known sources of funding for hazard mitigation planning and projects is the FEMA Hazard Mitigation Assistance, or HMA, programs. Funding through these programs has been historically reliable, and many communities have used these grants following a disaster to springboard into a full-fledged and long-term mitigation program. FEMA offers three distinct HMA funding programs:

*Table 13. FEMA Hazard Mitigation Assistance (HMA) Programs*

Grant Program	Purpose
<b>Hazard Mitigation Grant Program (HMGP)</b>	funding to significantly reduce or eliminate future risk to lives and property from natural hazards
<b>Pre-Disaster Mitigation (PDM) Program</b>	building disaster-resistant communities by funding mitigation projects
<b>Flood Mitigation Assistance (FMA) Program</b>	funding to help reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insured under the NFIP.

All three of these programs are administered in Colorado by the *Colorado Division of Homeland Security & Emergency Management (DHSEM)*, Mitigation and Recovery Section. Officially, each of these



programs can vary from year to year based on congressional budget appropriations, eligibility requirements, and other factors, but they are generally easier to anticipate on an annual basis than non-HMA grant opportunities. They are applicable for most types of mitigation projects, including planning and management, and all carry with them some level of funding match/ cost share requirements, as indicated by the table below.

*Table 14. FEMA Hazard Mitigation Assistance Programs*

Program	Disaster Declaration Required?	Cost Share (Fed/Non-Fed)	Acquisition	Elevation/Relocation/Reconst.	Other Mitigation Activities	Hazard Mitigation Planning
<b>HMGP</b>	Yes	75/25	X	X	X	X
<b>PDM</b>	No	75/25	X	X	X	X
<b>FMA</b>	No	75/25	X	X	X	X

Cost share percentages under FMA can drop to 90/10 for FEMA-designated Repetitive Loss properties, and properties designated as Severe Repetitive Loss properties are covered at 100%. Although Boulder County currently only has five Repetitive Loss properties and no Severe Repetitive Loss properties, future claims, even from minor events, could trigger additional properties to carry this designation. It is recommended that, through the Room for the River program, the county monitor and update claims information being used under the program (for example, within the Risk Assessment Tool), as additional claims on certain properties could open additional funding options.



*Repetitive Loss Properties.*

It's typical for funding match/cost sharing under these FEMA programs to be the responsibility of those who would be benefiting from the mitigation project, like homeowners, businesses, or local communities. Match/cost share can also accumulate from more than one source, meaning that if a FEMA grant pays 75% of a project's cost, the match funds could be something like this:

**Source 1(12.5%) + Source 2(7.5%) + Source 3(5%) = 25% Total Matching Funds**

Potential matching funds that meet FEMA requirements include:

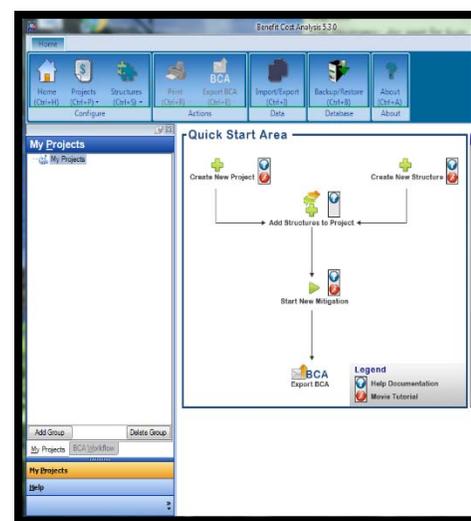
*Table 15. Potential Matching Funds for FEMA Grant Programs*

Match Type	Description/Source	Considerations
<b>Cash</b>	Property owners, state/local government, other entities. This includes community general funds/funding raised through fees and taxes	Ready to use. Flexible. Can be a burden to property owners. Can be hard to gain approval for local funding source.
<b>Resources</b>	Professional Services, labor, or materials from individuals, businesses, or community	Can be quantified using existing staff. Requires extensive documentation. Must be used for an eligible project line item not Usually eligible for pre-award activities.
<b>HUD CDBG Funds</b>	Once allocated, these grant funds lose their federal identity.	Still taps federal assistance. May need HUD approval for this approach. Competitive.
<b>Increased Cost of Compliance (ICC) Funds</b>	Property owners may be eligible for up to \$30K from the NFIP	NFIP Insurance coverage required. Funding allocation can be expeditious. Property Owner must obtain through their policy. Only for Substantial Damage or Repetitive Loss properties. Applicable for demo, relocation, and elevation.
<b>Other Sources</b>	Non-federal or other grants	Timing can be difficult. Need \$ in hand.

The application process and timelines will typically drive the process for mitigation projects funded through HMA programs. While the county should be considering cost and cost-benefit for all of the mitigation projects it pursues, projects funded through the HMA programs require that a Benefit-Cost Analysis, or BCA, be conducted using the FEMA Benefit Cost Analysis Tool (currently at Version 5.3) to ensure that the project will have an acceptable cost-benefit ratio. Two considerations with respect to FEMA grants and BCA is that the BCA is waived for projects that are:

- A) determined to be in the 10-year floodplain; or
- B) Below a certain cost ceiling

While Boulder County does not currently have a mapped 10-year floodplain hazard area to use for these types of determinations, the data exists to have this hazard produced for use during the program. The cost ceiling, while helpful to many community programs that rely on FEMA HMA grant programs, may prove challenging Boulder County given the housing market and home prices compared to the typical cost ceiling. The current cost ceiling hovers around \$300K, while home prices in Boulder County average above \$500K.



*Start Screen of FEMA's Benefit Cost Analysis Tool, v5.3*



HMA grant options will also require assessments for environmental historical considerations, to comply with federal laws pertaining to Environmental Planning and Historic Preservation.

Factors that must be considered and that are reviewed with a grant application include:

- Historic Structures
- Impacts on unique populations
- Contamination
- Air Quality
- Wetlands
- Endangered Species
- Hazardous Materials

**Other Grants.** Other grant opportunities can be somewhat less predictable than FEMA funding and are significantly more difficult to track. As previously mentioned, many existing tools that list potential grant sources can be beneficial, but would prove difficult to use on their own to plan and schedule program activities and projects with constantly fluctuating grant schedules, amounts, and availability. Application requirements can vary widely, but other grant funding can provide additional opportunities for:

- Funding projects that may not be eligible for HMA grants
- Match funds to apply to HMA grants

The following table provides a sample of grants that have been made available for mitigation projects in previous years, including the types of projects they were intended to fund. Each of the grants listed may have included specific eligibility requirements such as providing certain levels of natural resource protection or implementing an income-based prioritization scheme, and had a specific dollar cap.

*Table 16.- Sample Grants/Grant Programs and Eligibility Requirements*

Title	Agency	Post-Disaster Required?	Planning/Admin/Training Eligible	Acquisition Eligible	Elevation-Eligible	Relocation-Eligible	Other Mitigation Eligible	Maintenance Activities Eligible
<b>CDBG-DR</b>	DOLA	Y						
<b>Home Investment Partnership Program</b>	DOLA			X	X			
<b>Housing Devt Grant Funds</b>	DOLA			X	X			
<b>CO Conservation Trust Fund</b>	DOLA			X			X	X
<b>Homeland Security Grant Program</b>	CO DHSEM			X	X	X		
<b>Emergency Mgmt Performance Grant</b>	CO DHSEM		X					
<b>Disaster Emergency Fund</b>	CO DHSEM	Y	X					
<b>Land &amp; Water Conservation Fund</b>	CO Parks & Wildlife		X	X				X
<b>Great Outdoors Colorado</b>	Great Outdoors CO							X



Title	Agency	Post-Disaster Required?	Planning/Admin/Training Eligible	Acquisition Eligible	Elevation-Eligible	Relocation-Eligible	Other Mitigation Eligible	Maintenance Activities Eligible
<b>SBA Loan</b>	US SBA	Y			X			
<b>Sustainable Comms Planning Grants</b>	HUD		X					
<b>Community Challenge Grants</b>	HUD		X					
<b>Sustainability Training Grants</b>	Enterprise Partners, LLC		X					
<b>EPA CARE</b>	EPA		X					
<b>CAP Section 208</b>	USACE						X	X
<b>CAP Section 205</b>	USACE					X	X	
<b>Cooperative Watershed Management Program</b>	BOR		X					
<b>5-star/Urban Waters Rest. Grants</b>	Fish/Wildlife Foundation						X	X
<b>Rural Housing Repair &amp; Rehab Loans</b>	Rural Development				X		X	
<b>Conservation Innovation Grants</b>	NRCS					X	X	X
<b>Conservation Acquisition</b>	The Conservation Fund			X				
<b>Laura Jane Musser Fund</b>	Laura Jane Musser Fund							X
<b>Gates Family Foundation</b>	Gates Family Foundation							X

Strategy 2- Local Funding

Programs similar to Room for the River have established sources of local funding, which provides them with control, flexibility, and quick access to funds. A local funding source can expand the ability for the county to execute projects on a much shorter timeline than those that follow the grant process, or can provide a source of funds for grants that may require cost share. Building a local funding source also might reduce the necessity to achieve a specified benefit-cost threshold, which could lead to executing a project that might not otherwise be possible through grant funding. Examples of communities that are either partially or completely funding a property acquisition or other flood mitigation program are shown in the table below.

**National Association of Counties- Advice from County Leaders:**  
 Establish a continuous stream of local funding for regular mitigation and resilience activities. The backbone of resilience is resilient funding. As counties cannot rely on State and federal money, it is beneficial to establish dedicated funding if and when possible.

Source: [www.naco.org](http://www.naco.org)



Table 17. Communities That Fund Mitigation Programs

Community	Population	Number of Acquisitions	Funding Type	Funding Description
Boulder, CO	108,090	20	Stormwater Utility Fee	Parcel size
King County, WA	2,117,000	Data Not Avail.	Property Levy	\$0.129 per \$1,000 assessed value
Charlotte-Mecklenburg County, NC	1,054,835	400	Stormwater Utility Fee	Impervious acreage per parcel
Austin, MN	24,720	240	Sales Tax	\$0.05 sales tax on goods & services
Tulsa, OK	403,090	Data Not Avail.	Stormwater Utility Fee	Impervious acreage per parcel
San Francisco Bay 9-County Area	7.4M	Data Not Avail.	Parcel Tax	Generates \$25M Annually

Local funding can provide communities with unique opportunities for project execution. Within the framework of an acquisition program, a local funding source can provide:

- 1) Opportunities to serve as local match dollars to meet HMA grant match requirements
- 2) Opportunities to monitor and bid within the open real estate market

Local funding broadens the potential for creative funding strategies, or strategies that may eliminate the need for the county to acquire funding. Certain creative funding strategies have been successfully implemented in other programs and may be a good fit for mitigation projects and property owners in Boulder County. Some of these options are shown below:

Loans from non-profit organizations	Non-profit partnerships for maintenance
Auction acquired structures	Public-private partnerships
Municipal bonds	Plan review & permitting fees
Property levies	Sensitive area development charges/impact fees
Parcel taxes	Utility or use fees
Goods & Services taxes	Stormwater management fees
Real estate transaction taxes	

### Staffing & Capabilities

All effective planning and mitigation programs require a certain level of capacity to run smoothly. Communities must ensure that the proper technical, administrative, financial, and other capabilities are at their disposal at any point within the program. Staffing is fundamentally a part of the program's existence; there is, however, a need to consider how Program Drivers can impact staffing as well as the capabilities necessary for program execution. Questions to consider while developing the Room for the River program include:

- What department(s) will run the program?
- Who are the relevant subject matter experts in Boulder County?



- Is there a need for consultant expertise?
- Will the program require full-time, dedicated staff?
- How will the program impact overall staff workloads?
- What priority will the program take compared to existing staff responsibilities?
- Should predictability of program activity/volume of work be a factor in selecting the program approach (e.g., to avoid over-burdening staff)?

The ability of a community to implement a successful mitigation strategy depends, in part, on available resources, including people and staff, and the capabilities of staff assigned to the program. Program staff should have the ability to obtain, use, and understand hazard and risk data, to navigate the many steps and processes of implementing mitigation strategies, to set achievable program goals, and to communicate with stakeholders about the program. When it comes to running the program, it's important to consider these factors and determine how to structure staff within the program. While not necessary for success, many flood-related mitigation programs in other communities tend to be run by the department or group responsible for floodplain management and floodplain development.

*Table 18. Communities That Fund Mitigation Programs*

Community	Managing Department/Entity
Boulder, CO	Boulder Public Works Department
Charlotte-Mecklenburg County, NC	Charlotte-Mecklenburg County Stormwater Services
Harris County, TX	Harris County Flood Control District
King County, WA	King County River & Floodplain Management Section
Lake County, IL	Lake County Stormwater Management Commission
Morehead, MN	Morehead Planning Department/City Engineer's Office
Snohomish County, WA	Snohomish Co Public Works- Surface Water Mgmt Div
Tulsa, OK	Tulsa Engineering Services Department- Flood Control

While it's unclear how different departments and staff in these communities support one another to run their mitigation program, it is clear, given the breadth of required capabilities, that interdepartmental management, coordination, and execution tasks will exist. The county can consider the following factors, as well as others, when determining internal structure for program staffing:

- Previous mitigation program experience
- Code compliance/permitting experience
- Experience with real estate transactions
- Experience managing construction projects
- Experience with long-term property management
- Understanding of hazards and risk throughout the county
- Outreach capabilities
- General capacity to run a mitigation program
- Ability to coordinate across departments



In 2017, the State of Colorado rolled out a tracking mechanism to assess capabilities of communities as they relate to hazard mitigation. Communities are expected to include an assessment of capabilities in their hazard mitigation plans that are in-line with the State’s directive. These staffing and capability elements are specific to multi-hazard mitigation plans, but can be useful in assessing capabilities that crosswalk into establishment of a mitigation program like Room for the River.

Planning and Regulatory	Yes/No	Administrative and Technical	Yes/No
Building Codes		Emergency Manager	
Building Codes Year		Floodplain Administrator	
BCEGS Rating		Community Planning:	
Capital Improvements Program (CIP) or Plan		- Planner/Engineer (Land Devel)	
Community Rating System (CRS)		- Planner/Engineer/Scientist (Natural Hazards)	
Community Wildfire Protection Plan (CWPP)		- Engineer/Professional (Construction)	
Comprehensive, Master, or General Plan		- Resiliency Planner	
Economic Development Plan		- Transportation Planner	
Elevation Certificates		Full-Time Building Official	
Erosion/Sediment Control Program		GIS Specialist and Capability	
Floodplain Management Plan		Grant Manager, Writer, or Specialist	
Flood Insurance Study		Warning Systems/Services:	
Growth Management Ordinance		- General	
Hazard-Specific Ordinance or Plan (Floodplain, Steep Slope, Wildfire)		- Flood	
NFIP		- Wildfire	
Site Plan Review Requirements		- Tornado	
Stormwater Program, Plan or Ordinance		- Geological Hazards	
Zoning Ordinance			

State of Colorado Hazard Mitigation Plan Capabilities Tracker for Local Communities, 2017

Using the state’s tracking mechanism as a guide, paired with the possible staffing and capabilities required for typical hazard mitigation programs and specific mitigation strategies, the Tables below present a breakdown of potential Boulder County staffing and capabilities to consider during Room for the River program development. Responsibilities of staff as well as each capability should be scrutinized to determine the level of potential involvement possible for county staff, and whether certain capabilities could be procured from outside consultants and contractors.

Table 19. Staffing Requirements by Mitigation Strategy

Mitigation Strategy	Staffing																		
	Program Manager	Resiliency Staff	Program Coordinator	Floodplain Mgmt staff	Transportation Planner	Transportation-Maintenance Staff	Land Use Planner	Development Review	Building Division	POS Planner	Other POS Staff	Assessor's Office	Grants Specialist	GIS Staff	Real Estate Land Officer	Attorney	Paralegal	Public Health	Housing & Human Services
Strategy 1- Minor/Other Mitigation Measures- GR	X	X	X	X	X	X		X					X						
Strategy 2- Elevation/Relocation/Mitigation Reconstruction- GR	X	X	X	X	X		X	X	X		X	X	X	X				X	X
Strategy 3- Deed Restrictions/conservation easements/setback- GR	X	X	X	X			X	X		X	X	X	X	X	X	X	X	X	
Strategy 4- Property Acquisition- GR	X	X	X	X			X			X	X	X	X	X	X	X	X	X	X
Strategy 5- code/policies- GR	X	X	X	X			X		X		X		X			X			

Table 20. Capability Requirements by Mitigation Strategy

Mitigation Strategy	Capabilities															
	Program Administrative Tasks	Outreach/Stakeholder Engagement	Site Assessment	Flood Hazards	Geologic Hazards	Fluvial Hazards	Geomorphology	Civil Engineering	Structural Engineering	Building Architecture & Design	Surveying	Construction	Construction Mgmt	Demolition/Deconstruction	OWTs/Utilities	Historic Review
Strategy 1- Minor/Other Mitigation Measures- GR	X	X		X	X	X	X	X	X			X	X		X	
Strategy 2- Elevation/Relocation/Mitigation Reconstruction- GR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Strategy 3- Deed Restrictions/conservation easements/setback- GR	X	X	X	X						X				X	X	X
Strategy 4- Property Acquisition- GR	X	X	X	X						X				X	X	X
Strategy 5- code/policies- GR	X	X		X	X	X	X								X	

Mitigation Strategy	Capabilities															
	Environmental Review	Landscape Architecture	Forestry	Plant Ecology	Endangered Species	Trails	Stormwater Quality	Stream Restoration	Revegetation	Forestry	Agricultural Resources	Plant Ecology	Wildlife Biology	Real Estate Transactions	GIS	Appraisals
Strategy 2- Elevation/Relocation/Mitigation Reconstruction- GR	X				X		X	X								
Strategy 3- Deed Restrictions/conservation easements/setback- GR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Strategy 4- Property Acquisition- GR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Strategy 5- code/policies- GR																



## Outreach

Two distinct outreach approaches are necessary to consider for the Room for the River program: general program outreach, and strategy-specific or targeted outreach.

**General Program Outreach.** A dedicated effort is necessary to create and maintain program visibility and program awareness. Achieving visibility and awareness begins with establishing program objectives around which messaging can be tailored. For the most part, Room for the River is intended to be a mitigation program that advertises *voluntary* participation. It's important to consider the actual *perceived voluntariness* of a program that, in effect, may relocate families, disrupt social connectivity, and target areas where flood insurance requirements are in place. A focus on clear and careful messaging is required in order to build trust with county stakeholders and increase the social capital that exists between county officials and county inhabitants.

**Targeted Outreach.** The program's approach to targeted outreach should aim to simplify the process for selecting effective, efficient, and appropriate methods that can reach the intended stakeholders. It should consider the level of engagement necessary as well as and the selected mitigation strategy(ies).

Appendix E outlines an outreach strategy for the program. It includes an outreach matrix that outlines strengths and limitations of certain outreach methods, and can be filtered based on:

- Intended stakeholder group
- Strengths/limitations of the engagement tool
- Purpose or Level of engagement (To build awareness, gauge interest, socialize action, etc)
- Mitigation Strategy

The matrix is designed as a guide for Boulder County to use in development of specific outreach products to accomplish targeted outreach based on the filters above.

**Other Outreach Considerations.** There are a number of existing programs and platforms that Room for the River could consider partnering with to foster understanding of risk to natural hazards, outline shared resiliency and hazard mitigation goals, and promote participation in the program. Potential partnerships include:

- Resilient Together/Resilient Boulder
- BoCo Strong
- Wildfire Partners
- Watershed Coalitions
- Colorado Department of Local Affairs- Resiliency & Recovery Office
- State declarations: Public Lands Day, Flood Safety & Wildfire Awareness Week

**Unique Solutions.** Similarly, other communities are using unique and/or innovative solutions for reaching stakeholders. Thinking about characteristics such as social or cultural background, level of technological expertise, and history in working with Boulder County can lead to engagement practices such as:



- Program Workshops (for Personal Resilience, Communication, Strategizing)
- Apps like *Bang the Table* (clients include Boulder, Fort Collins, Louisville & Aspen)
- Radio and Podcast interviews/segments

**Incentivizing Participation.** Mitigation incentives can support communities in their quest to achieve political backing and community support for mitigation strategies that may, on the face, seem like targeting or government-centric strategies. When investigating incentives, communities must broadly evaluate available resources that could be incentivized and determine which incentives would be valued in a community. Types of incentives for program participation and mitigation strategy selection that Boulder County could consider include:

- Relocation benefits
- Transferrable development credits
- Tax credits/disincentives
- Reduced insurance premiums (through rating or the Community Rating System)
- Demonstrating appraised value ROI

### Program Implementation

A necessary precursor to executing the program is reviewing and understanding how program implementation will be affected by considerations under all other program elements. To determine how a Room for the River program could be implemented, the mitigation and funding strategies discussed above must be compared using factors that the county must consider determining the ideal framework for successfully executing the program. In tabular form, each of the factors listed below will be rated based on a scoring system of Green (Low), Yellow (Medium), and Red (High). Each factor and the scoring for mitigation strategies/funding sources is explained/justified in individual tables. A summary table is provided at the end of the section. The Program Implementation factors analyzed are:

- *Cost.* Is the project achievable given the anticipated costs?
- *Cost-effectiveness.* Will the benefit of the project, over time, outweigh the initial project cost?
- *Impacts on environmental and cultural resources.* Is the project addressing environmental concerns like habitat? Are there endangered species present? How will a project change the social characteristics of a neighborhood?
- *Startup time.* How long would it take to be ready to implement a chosen mitigation project?
- *Lag time.* How long would it take to get funding in place to execute the program/specific projects?
- *Time to realize benefit.* How much time must pass before the county can see the benefits that come following a completed project, or before the benefit-cost ratio exceeds 1.0?
- *Technical feasibility.* Are there constraints with the project site or structure that would make a project difficult to execute?
- *Staffing requirements.* What level of staffing is necessary for program implementation, technical support, and administration to successfully execute a program based on different mitigation and funding strategies?
- *Property owner engagement.* What is the frequency/type of outreach that's necessary with property owners to get them in the program and execute a project?



- *Community Support Potential.* Do county inhabitants share some of the same goals of the mitigation program? Do they understand the benefits of hazard mitigation?
- *Reliance on risk assessment.* How much of an impact could a risk assessment have on particular strategies?
- *Mitigation project management.* What are the necessary requirements for project oversight?
- *Alignment with program objectives.* Does the project promote community resilience to natural hazards and strengthen the county's ability to respond to and recover from future hazardous events? Does the project actually reduce risk/vulnerability?



**Cost and Cost Effectiveness.** Project cost and cost effectiveness are important considerations, as those factors are likely to affect how robust a program can truly be, and how many projects can be executed over the life of the program or from year to year. Is the project achievable given the anticipated costs? Will the benefit of the project, over time, outweigh the initial project costs?

*Table 21. Cost and Cost Effectiveness*

Mitigation Strategy by Funding type	Cost	Cost Effectiveness	Comments
<b>(GR = Grant Funded; CO = County Funded)</b>			
Strategy 1- Minor/Other Mitigation Measures- GR	L-M	L-M	These are small projects focused on personal resilience at home, and projects focused on public infrastructure improvements. Property owners may see a reduction in flood damages after implementing methods and best practices of this strategy.
Strategy 1- Minor/Other Mitigation Measures- CO			
Strategy 2- Elevation/Relocation/Mitigation Reconstruction- GR	M	L-M-H	costly; more structural skillsets (engineers/surveyors). Still generally cheaper than acquisition. Elevation projects help reduce the potential for flood losses; do not eliminate loss potential entirely. Larger floods can damage structure that has been properly elevated.
Strategy 2- Elevation/Relocation/Mitigation Reconstruction- CO			
Strategy 3- Deed Restrictions/conservation easements- GR	L-M-H	M-H	Some restrictions like easements and deed restrictions require payment. can boost cost effectiveness if removal of structures also occurs. Easements cost-free at times, but may require payment to property owner to restrict land use/development on their property (as compensation)
Strategy 3- Deed Restrictions/conservation easements- CO			
Strategy 4- Property Acquisition- GR	H	M-H	Boulder County's median home price is \$583,325. The national average is \$188,900. Property acquisition can be an expensive endeavor in Boulder County, but provides the biggest assurances of reducing long-term risk.
Strategy 4- Property Acquisition- CO			
Strategy 5- code/policies- GR	L	M	Costs are generally lower as less resources, time, and energy are needed to employ this strategy. Difficult to estimate cost-effectiveness due to the focus on future development.
Strategy 5- code/policies- CO			



**Timeframes.** These include startup time, lag time, and the time it actually takes for the project benefit to be realized. Startup time looks at how long it would take to be ready to implement a chosen mitigation project. Lag time looks at how long it would take to get funding in place to execute the program and specific mitigation projects.

Table 22. Timeframes

Mitigation Strategy	Startup Time	Lag Time	Time to Realize Benefit	Comments
<b>(GR = Grant Funded; CO = County Funded)</b>				
Strategy 1- Minor/Other Mitigation Measures- GR	L-M	M-H	L-M	Timeframes for Minor projects and county improvements can vary depending on the project. Smaller projects will have lower startup times, especially for grant funding that focuses on personal resilience. Benefits will range depending on the target hazard magnitude for the mitigation project. Grant application/award increases lag.
Strategy 1- Minor/Other Mitigation Measures- CO	M-H	L-M	L-M	Building support for local funding takes time. Projects can be accomplished within annual CIP/maintenance budgets or owners fund projects themselves.
Strategy 2- Elevation/Relocation/Mitigation Reconstruction- GR	M-H	H	M-H	different project types and requirements can complicate startup. Grant Application/Award increases lag. Benefits realized over longer periods as structures can still be at some risk.
Strategy 2- Elevation/Relocation/Mitigation Reconstruction- CO	H	L-M	M-H	building support for/enacting program with local funding source takes time. Once implemented, funding available immediately. Benefits realized over longer periods as structures can still be at some risk.
Strategy 3- Deed Restrictions/conservation easements- GR	M	M	L-M-H	More complicated to formulate with multiple interests involved. Execution relies on grant application/award. Benefits realized over a range of timeframes. Grants will take longer to realize benefits.
Strategy 3- Deed Restrictions/conservation easements- CO	M-H	L-M	L-M-H	building support for/enacting program with local funding source takes time. Once implemented, funding available immediately. Benefits realized over a range of timeframes, but potentially faster than grant funded projects.
Strategy 4- Property Acquisition- GR	M	H	M	County's experience with FEMA grants and program guidance reduces startup. Grant Application/Award increases lag. Benefits realized over shorter periods as much or all of the risk has been mitigated.
Strategy 4- Property Acquisition- CO	M-H	L-M	L-M	building support for/enacting program with local funding source takes time. Once implemented, funding available immediately. Benefits realized over shorter periods as much or all of the risk has been mitigated. Typically faster than grants.
Strategy 5- code/policies- GR	L	M	M	County experience with plan/policy updates reduces startup. Execution relies on grant app/award.
Strategy 5- code/policies- CO	L	L	M	County experience with plan and policy updates reduces startup time. Local funding gets the process started more quickly.



**Technical Feasibility.** Which strategy or funding type might present challenges that are technical in nature? Are there specific conditions on the site that must be uniquely dealt with?

*Table 23. Technical Feasibility*

Mitigation Strategy	Tech Feasibility (measured as Technical Difficulty)	Comments
<b>(GR = Grant Funded; CO = County Funded)</b>		
Strategy 1- Minor/Other Mitigation Measures- GR	L-M-H	dependent on selected mitigation measure. Landscaping and maintenance are more feasible, while installing new service equipment or performing slope stabilization may be less feasible. County infrastructure projects can be complex due to hazards and geography.
Strategy 1- Minor/Other Mitigation Measures- CO		
Strategy 2- Elevation/Relocation/Mitigation Reconstruction- GR	H	Building quality, foundation type, proper building site(s), wind loading, height restrictions, and other factors make this strategy complex from a technical perspective. There is an overall increase in the capabilities required to implement.
Strategy 2- Elevation/Relocation/Mitigation Reconstruction- CO		
Strategy 3- Deed Restrictions/conservation easements- GR	L-M-H	Deed restrictions are easier, and mainly administrative. Easements require extensive expertise to implement correctly to meet federal/state law. Some demo/restoration may be required.
Strategy 3- Deed Restrictions/conservation easements- CO		
Strategy 4- Property Acquisition- GR	M-H	Other than certain grant application requirements, the transaction is usually straight-forward, but certain sales can get complicated. Demo/site restoration can involve complex scenarios for hazardous materials abatement, endangered species protection measures, etc. Long-term planning and management requires specific open space and natural resource capabilities.
Strategy 4- Property Acquisition- CO		
Strategy 5- code/policies- GR	L	Updates simply require the expertise to draft policy language and follow established review and approval procedures
Strategy 5- code/policies- CO		



**Staffing.** Each strategy and funding source comes with its own staffing and capability requirements. Here’s a look at the different levels of staffing that might be necessary, based on the program framework.

*Table 24. Staffing*

Mitigation Strategy	Implementation	Staffing Tech	Admin	Comments
<b>(GR = Grant Funded; CO = County Funded)</b>				
Strategy 1- Minor/Other Mitigation Measures- GR	L	M	L	Grants available for this type of work will have less-strict qualification requirements. Certain methods will require technical staff.
Strategy 1- Minor/Other Mitigation Measures- CO	M	M	L	local funding implementation is higher effort, but amount of funding needed for minor projects is small relative to other strategies. Technical staffing is
Strategy 2- Elevation/Relocation/Mitigation Reconstruction- GR	M	H	H	Requires applications; BCA; hist/env review; Structural Eng; Hazard SMEs; Project scoping/design; contractor procurement; construction mgmt
Strategy 2- Elevation/Relocation/Mitigation Reconstruction- CO	H	H	M	Implementation staffing is high in order to establish local funding source. Technical staffing needed to facilitate structural improvements.
Strategy 3- Deed Restrictions/conservation easements- GR	M-H	M-H	M-H	deed restrictions can be straightforward. Conservation easements require increased staffing for potential complexities. Legal support required.
Strategy 3- Deed Restrictions/conservation easements- CO	M-H	M-H	M-H	Implementation staffing is high in order to establish local funding source. Legal support required.
Strategy 4- Property Acquisition- GR	M-H	M-H	M-H	Requires applications; BCA; hist/env review; appraisal; real estate transactions; contractor procurement; demo/site restoration. Legal support required.
Strategy 4- Property Acquisition- CO	M-H	M-H	M-H	staffing high to establish local funding source. Burden slightly lower overall without grant requirements/grant management, but can still be a heavy load. Legal support required.
Strategy 5- code/policies- GR	M	L	M	less-strict grant qualification requirements (typically planning-type grants). SMEs required but burden low.
Strategy 5- code/policies- CO	M	L	M	implementation is higher effort, but options exist to perform plan/policy updates with regular staff time.



**Property Owner Engagement and Potential for Community Support.** How much and how often will a particular strategy necessitate communicating with, visiting, or otherwise engaging property owners or their representatives? Will one strategy fare better than another with respect to support from the community?

*Table 25. Property Owner Engagement and Potential for Community Support*

Mitigation Strategy	PO Engagement	Support Potential	Comments
<b>(GR = Grant Funded; CO = County Funded)</b>			
Strategy 1- Minor/Other Mitigation Measures- GR	L	L	Homeowners more likely to take small steps to reduce their risk. Getting them on-board can be combined with existing county procedures. Smaller project costs mean smaller funding supply needed. Support for development of a local funding source is challenging. Opportunities exist through CIP program, etc.
Strategy 1- Minor/Other Mitigation Measures- CO			
Strategy 2- Elevation/Relocation/Mitigation Reconstruction- GR	M-H	M-H	engagement ranges dependent on funding and project type, but typically increased owner involvement is necessary. It can be difficult to convince people that these strategies are worth it.
Strategy 2- Elevation/Relocation/Mitigation Reconstruction- CO			
Strategy 3- Deed Restrictions/conservation easements- GR	M	M	Increased owner involvement to determine easement boundaries, deed language, etc. Transactions possible. Communicating this strategy can be difficult, leading to support shortfalls.
Strategy 3- Deed Restrictions/conservation easements- CO			
Strategy 4- Property Acquisition- GR	H	M	Site assessments, data collection, the transactional sense of this strategy increase engagement. Support can be mixed and is affected by the overall program messaging.
Strategy 4- Property Acquisition- CO			
Strategy 5- code/policies- GR	M	M	Generally takes the form of a typical public outreach process and does not target specific individuals. Support is directly related to the amount new regulatory burden.
Strategy 5- code/policies- CO			



**Reliance on a Risk Assessment.** This table considers how much of an impact a risk assessment could have on a particular strategy.

*Table 26. Reliance on a Risk Assessment*

Mitigation Strategy	Reliability on Risk Assessment	Comments
<b>(GR = Grant Funded; CO = County Funded)</b>		
Strategy 1- Minor/Other Mitigation Measures- GR	M	A Risk Assessment can be relied on to identify necessary infrastructure improvements or locate areas of minor/shallow flooding hazards where certain minor methods could work. The Risk Assessment for Room for the River currently does not include these criteria, but it is possible.
Strategy 1- Minor/Other Mitigation Measures- CO		
Strategy 2- Elevation/Relocation/Mitigation Reconstruction- GR	H	Risk Assessments, including the tool created for Room for the River, are excellent at identifying and prioritizing properties or areas to target for elevation, relocation, and/or mitigation reconstruction using selection criteria
Strategy 2- Elevation/Relocation/Mitigation Reconstruction- CO		
Strategy 3- Deed Restrictions/conservation easements- GR	L-M	If the assessment is constructed accordingly, candidate areas for easements can also be identified, but this strategy will rely more heavily on engagement with land owners
Strategy 3- Deed Restrictions/conservation easements- CO		
Strategy 4- Property Acquisition- GR	H	Similar to Strategy 2, Risk Assessments can easily identify and prioritize properties or areas to target for acquisition using selection criteria
Strategy 4- Property Acquisition- CO		
Strategy 5- code/policies- GR	L-M	Certain results from a risk assessment will drive policies, but overall these policies are governed by the type/severity of hazards and county goals
Strategy 5- code/policies- CO		



**Alignment with Program Objectives.** Does the project promote community resilience to natural hazards and strengthen the county’s ability to respond to and recover from future hazardous events? Does the project actually reduce risk/vulnerability? *[This table to be completed by Boulder County when Program Objectives are finalized]*

*Table 27. Alignment with Program Objectives*

Mitigation Strategy	Ability to meet mitigation objectives			
	Obj 1	Obj 2	Obj 3	Obj 4
<b>(GR = Grant Funded; CO = County Funded)</b>				
Strategy 1- Minor/Other Mitigation Measures- GR	L-M	M	TBD	TBD
Strategy 1- Minor/Other Mitigation Measures- CO	L-M	M		
Strategy 2- Elevation/Relocation/Mitigation Reconstruction- GR	H	M		
Strategy 2- Elevation/Relocation/Mitigation Reconstruction- CO	H	M		
Strategy 3- Deed Restrictions/conservation easements- GR	M	L		
Strategy 3- Deed Restrictions/conservation easements- CO	M	L		
Strategy 4- Property Acquisition- GR	H	M		
Strategy 4- Property Acquisition- CO	H	M		
Strategy 5- code/policies- GR	L	H		
Strategy 5- code/policies- CO		H		

## Rollup up of program implementation factors

The factors discussed throughout this section are presented in summary form below. Staff can use this summary table to gain an understanding of how the different strategies and funding types might impact the county’s ability to employ certain strategies and can help build a case for general program structure. The major takeaway from these factors is that while programs that focus on or offer acquisition and structural methods of mitigation are more difficult to establish and run, they are the best options for meeting program objectives and reducing flood losses over time.

Table 28. Strategies and Considerations

Mitigation Strategy	Ability to meet mitigation objectives				Cost	Cost Effectiveness	Startup Time	Lag Time	Time to Realize Benefit
	Obj 1	Obj 2	Obj 3	Obj 4					
<b>(GR = Grant-funded; CO = County-funded)</b>									
Strategy 1- Minor/Other Mitigation Measures- GR			TBD	TBD	L-M	L-M	L-M	M-H	L-M
Strategy 1- Minor/Other Mitigation Measures- CO	L-M	M					M-H	L-M	L-M
Strategy 2- Elevation/Relocation/Mitigation Reconstruction- GR					M	L-M-H	M-H	H	M-H
Strategy 2- Elevation/Relocation/Mitigation Reconstruction- CO	H	M					H	L-M	M-H
Strategy 3- Deed Restrictions/conservation easements- GR					L-M-H	M-H	M	M	L-M-H
Strategy 3- Deed Restrictions/conservation easements- CO	M	L					M-H	L-M	L-M-H
Strategy 4- Property Acquisition- GR					H	M-H	M	H	M
Strategy 4- Property Acquisition- CO	H	M					M-H	L-M	L-M
Strategy 5- code/policies- GR					L	M	L	M	M
Strategy 5- code/policies- CO	L	H					L	L	M
Mitigation Strategy	Technical Feasibility (Measured as Technical Difficulty)	Staffing			Property Owner Engagement	Community Support Potential	Reliability on Risk Assessment	Mitigation Project Mgmt	
		Implementation	Technical	Administrative					
<b>(GR = Grant-funded; CO = County-funded)</b>									
Strategy 1- Minor/Other Mitigation Measures- GR		L	M	L					
Strategy 1- Minor/Other Mitigation Measures- CO	L-M-H	M	M	L	L	L	M	L-M	
Strategy 2- Elevation/Relocation/Mitigation Reconstruction- GR	H	M	H	H	M-H	M-H	H	H	
Strategy 2- Elevation/Relocation/Mitigation Reconstruction- CO		H	H	M					
Strategy 3- Deed Restrictions/conservation easements- GR		M-H	M-H	M-H	M	M	L-M	L-M	
Strategy 3- Deed Restrictions/conservation easements- CO	L-M-H	M-H	M-H	M-H					
Strategy 4- Property Acquisition- GR		M-H	M-H	M-H	H	M	H	M	
Strategy 4- Property Acquisition- CO	M-H	M-H	M-H	M-H					
Strategy 5- code/policies- GR		M	L	M	M	M	L-M	L	
Strategy 5- code/policies- CO	L	M	L	M					



## Moving Forward

A number of examples, options, and comparisons of differing approaches for each of the program elements included in this plan have been presented in anticipation of a formal approval process through the Board of County Commissioners for program implementation. Between finalization of this plan and a mature river-related hazard mitigation program, there are necessary actions that should be tackled immediately, actions that are focused during the first three years following program buy-in from County officials, and planning-related actions that look to the long-term health and endurance of the program.

### Immediate Next Steps

**Determine a Program Development Team.** All the following steps necessitate collaboration from select staff to plan, meet, discuss, and make decisions. Establishing the specific staff that will be involved in kicking off the program, and possibly developing something of a Program Charter, is a good first step.

**Collectively agree on program objectives.** This plan begins to present concepts on program objectives like protecting life & property, removing/reducing existing risk, and building capacity to prepare for future disasters. Unlike specific measurable goals, program objectives are able to explain what the county wants to achieve, or strive to achieve, with the advent of this program.

**Evaluate Program Options.** As previously mentioned, the information presented in this plan is meant to guide Boulder County in its decision-making process as it looks to determine how the program will be staffed, funded, and administered. Staff should begin evaluating the options presented in this plan, including how best to structure the program and how implementation factors have been scored.

**Determine a path for public input.** The consensus during plan development was that informing the public on the county's efforts to study the feasibility of this type of program and consider what a potential program might look like is necessary, as is getting their feedback. To-date, a website has been created for providing public update on the planning process, but a more formalized public feedback loop should be established.

**Determine a path to BOCC and formulate a recommendation for their consideration.** Boulder County's docket and public hearing process for BOCC to review, comment on, and approve policy, regulation, and departmental initiatives sets the stage for programs such as Room for the River to get off the ground. There could be multiple trips to Planning Commission and BOCC during program development and implementation.

### 3-year Action Plan

The 3-year Action Plan will be an essential component of a recommendation to BOCC to move forward with establishing the program, as it will lay out specific tasks where staff will be focusing efforts as the county moves towards kicking off the program. Year 1 of this action plan assumes BOCC approval to move forward with implementation, begins following such approval, and should be updated to reflect any changes based on decisions of the program development team and/or feedback from BOCC. Larger efforts are necessary in Year 1 to determine staffing and capabilities to build the necessary framework for accepting program participants, and getting the word out. See below for a detailed breakdown of implementation in years 1-3.

#### Year 1

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**Finalize program structure.** At this point, public feedback and direction from PC/BOCC has likely resulted in preferred structure for the program. This step involves determining final staffing and capability needs; determining which mitigation strategies will be offered/supported by the program; and determining a funding strategy to pursue (grant-focused, local funding, other).



**Build capacity.** This step involves more specific steps like updating staff position descriptions to include program roles and responsibilities; training staff; filling staffing and capability gaps through new hires; identifying on-call contract needs; identifying external program ambassadors; identifying state/federal/other stakeholders and establishing these relationships.

## Year 2

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**Develop measurable program goals.** Using the SMART approach- Specific, Measurable, Attainable, Relevant, Time-Oriented, goals can be developed that will allow public, county officials, and staff to look at program success over time and help to track and identify areas where updates to the program itself may be necessary. Examples include number of lives saved, acres of land protected, and amount of losses avoided.

**Roll out program.** The program could be at a point in Year 2 where the county is ready to officially roll it out. A large component of program rollout involves general program outreach and assumes that staffing and processes are in-place to handle the first potential program participants.

## Year 3

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**Generate Interest.** Acquiring program participants means that the investments made to establish the program and promote actionable mitigation measures is paying off. Using methods and practices from the outreach strategy paired with a good program platform, which should be tailored during program development, the county can reach the pool of county inhabitants and/or landowners that might be inclined to volunteer to participate. This step should include following through on outreach partnerships, disseminating program information; and updating department procedures to include crosswalks with the program.

**Review/Update Risk Assessment.** By this point, county staff should have a good handle on how well the Risk Assessment Tool is meeting the needs of the program. Determining ways to update and improve the assessment to better-suit the program, its objectives, and county stakeholders will create a more focused and efficient program.

## Long-Term Planning

Over the life of the program, the county will need to be able to measure program success against previously-established goals, and revise as-needed to reflect the evolution of the program. A losses-avoided study can look at program impacts and help determine the program success relative to the benefit-cost of mitigation projects that are executed during the program. Program evaluation as well as program maintenance that is informed by evaluation outcomes should be performed at pre-determined milestones to ensure program stability, to refocus any tangential tasks happening within the program, to adjust the program's structure, and to determine if the program should have an endpoint.



## References/Resources

### General Resources

*Central City Disaster Resiliency & Recovery Master Plan.* Central City, CO. June 2017.

*Draft National Mitigation Investment Strategy.* Department of Homeland Security- Mitigation Framework Leadership Group. January 11, 2018.

*Do Local Plans Drive Community Action? A Planning Effectiveness Literature Review.* Federal Emergency Management Agency & Resilience Action Partners. No Date.

*Flood Hazard Mitigation Plan for Colorado.* Colorado Water Conservation Board and the Colorado Department of Local Affairs-Division of Emergency Management. September 2010.

*Floodplain Management Plan- County of San Diego, California.* Federal Emergency Management Agency, Region IX. August 2007.

*FY2015 Flood Risk Assessment and Risk Reduction Plan Implementation (Charlotte-Mecklenburg County, NC).* Charlotte-Mecklenburg Storm Water Services. May 2014.

*Hazard Mitigation & Resiliency Toolkit.* Federal Emergency Management Agency, Region IV. No Date.

*Integrating Disaster Data into Hazard Mitigation Planning: A State and Local Mitigation Planning How-to Guide.* Federal Emergency Management Agency. February, 2015.

*Local Mitigation Planning Handbook.* Federal Emergency Management Agency, March 2013.

Long, Brock W. Memo for All FEMA Employees. *Administrator's Annual Planning Guidance.* Federal Emergency Management Agency. December 22, 2017.

*Managing Disasters at the County Level: A Focus on Flooding.* National Association of Counties, February 2017.

*Mountain Resilience Plan- Phase 1 of a new Comprehensive Plan (Larimer County, CO).* Larimer County Community Development. November 2017.

*Natural Hazard Mitigation Saves: 2017 Interim Report.* National Institute of Building Sciences. December 2017.

*Opportunities to Enhance the Nation's Resilience to Climate Change.* U.S. Government-Council on Climate Preparedness and Resilience. October 2016.

*Planning For Hazards: Land Use Solutions for Colorado.* Colorado Department of Local Affairs. March 2016.

*Reducing Losses Through Higher Regulatory Standards: 2013 Colorado Floods Case Study.* Federal Emergency Management Agency. March 30, 2015.

*Reducing Losses Through Higher Regulatory Standards: Best Practices and Cost-Effective Strategies Report.* Federal Emergency Management Agency. March 30, 2015.

Urahn, Susan. *Before the Flood: The Value of Mitigation.* Pew Charitable Trusts. March 22, 2017.

### Mitigation Strategies

*Buyouts and Home Elevation Fact Sheet.* Texas Department of Public Safety and Emergency Management. March 22, 2015.



De Vries, D.H., & Fraser, J.C. *Citizens Rights and Voluntary Decision Making in Post-Disaster U.S. Floodplain Buyout Mitigation Programs*. International Journal of Mass Emergencies and Disasters, March 2012.

*Decreasing the Impact of Wild Fires on Communities: Developing a Rebate Program to Replace Roofs with Fire-Safe Materials*. Federal Emergency Management Agency. No Date.

*Developing Pre-Disaster Resilience Based on Public and Private Incentivization*. National Institute of Building Sciences-Multihazard Mitigation Council & Council on Finance, Insurance, and Real Estate. October 29, 2015.

*Economic Incentives to Encourage Homeowner Mitigation Action: Developing a Rebate Program for Residential Tornado Safe Rooms*. Federal Emergency Management Agency. No Date.

*Elevating Structures to Reduce Flood Damages: Guidelines for Property Owners*. King County Flood Control District. No Date.

*Floodplain Buyouts: An Action Guide for Local Governments on How to Maximize Community Benefits, Habitat Connectivity, and Resilience*. University of North Carolina-Chapel Hill Institute for the Environment & the Environmental Law Institute. April 2017.

*Floodplain Buyout Case Studies: Austin, MN; East Grand Forks, MN; Montevideo, MN; Morehead, MN; Clyde, NC; Kinston, NC; Rocky Mount, NC; Pequannock, NJ; Sayreville, NJ; Wayne, NJ; Jefferson County, WI; Kenosha, WI; Pierce County, WI*. University of North Carolina-Chapel Hill Institute for the Environment. Various Dates.

*From Property Buyouts to a Local Park- a Work in Progress (Northfield, VT)*. U.S. Environmental Protection Agency, November 2015.

*Frequently Asked Questions- Superstorm Sandy Blue Acres Buyout Program*. New Jersey Department of Environmental Protection. September 16, 2015.

*Handbook for Floodplain Acquisition and Elevation Projects*. Florida Department of Community Affairs, January 2001.

Kopits, E., McConnell, V., & Walls M. *A Market Approach to Land Preservation*. Spring 2003.

*Losses avoided due to Home Acquisitions in Austin, MN: Analysis of 163 Acquisitions on the Cedar River*. Federal Emergency Management Agency, Region V. March 2001.

*Mitigation Incentives Summary*. Resilience Action Partners. September 2015.

*Mitigation Success Stories In the United States, Edition III*. Association of State Floodplain Managers, December, 2000.

*Mitigation Success Stories in the United States, Edition IV*. Association of State Floodplain Managers, January 2002.

*On the Move: A Minnesota City Creatively Battles Repetitive Flooding (Mower County, MN)*. Federal Emergency Management Agency, March 2011.

*Strategic Partnerships and Floodplain Buyouts: An Opportunity for Wetland Restoration*. University of North Carolina-Chapel Hill Institute for the Environment & the Environmental Law Institute. No Date.

*Voluntary Floodplain Home Elevation Program- Guidelines For Property Owners. (Snohomish County, WA)*. Snohomish County Public Works- Surface Water Management. March 2016.

*Voluntary Home Buyout Program- Guidelines for Property Owners (Snohomish County, WA)*. Snohomish County Public Works- Surface Water Management. March 2016.

## Funding Strategies

*BCA Reference Guide*. FEMA, 2009.



*Certified Grants Management Specialist Examination- Candidate Handbook*. National Grants Management Association. October 2012.

*Comprehensive Housing Market Analysis- Boulder, Colorado*. U.S. Department of Housing & Urban Development, January 1, 2017.

*Hazard Mitigation Assistance Guidance*. FEMA, February 27, 2015.

*Hazard Mitigation Assistance Cost Share Guide- For Applicants, Subapplicants, and FMA*. May 2016.

Lightbody, Laura. *Vulnerable Communities are Using Innovative Financing to Prepare for Natural Disasters*. Pew Charitable Trusts. November 30, 2016.

*Lessons from the Storm: Case Studies on Economic Recovery and Resilience (East Central Vermont)*. National Association of Development Organizations (NADO) Research Foundation, Winter 2015.

*Managing Wet Weather With Green Infrastructure- Municipal Handbook- Funding Options*. USEPA, September 2008.

*Managing Wet Weather with Green Infrastructure- Municipal Handbook- Incentive Mechanisms*. USEPA, September 2009.

*Mitigation Funding- A Resource for Funding Mitigation Projects*. FEMA, 2014.

*Recovery Resources Funding Database*. Federal Emergency Management Agency, September 8, 2017.

*Small Flood Damage Reduction Projects (Section 205)*. U.S. Army Corps of Engineers- Walla Walla District. March 2014.

Wright, Roy E. Memo for Regional Administrators, Regions I-X. *Cost Effectiveness Determinations for Acquisitions and Elevations in Special Flood Hazard Areas*. Federal Emergency Management Agency, August 15, 2013.

### **Other Resources & Links**

Best Practices in Mitigation Planning- [www.mitigationguide.org](http://www.mitigationguide.org)

Georgetown Climate Center- [www.georgetownclimate.org](http://www.georgetownclimate.org)

Great Outdoors Colorado- [www.goco.org](http://www.goco.org)

Herman, Marc. *Rain Check: Flood after Flood, Taxpayers Still Subsidize People Living in Harm's Way*. Mother Jones Magazine, March/April 1998.

Naturally Resilient Communities- [www.nrcsolutions.org](http://www.nrcsolutions.org)

Pew Charitable Trusts- Flood-Prepared Communities. <http://www.pewtrusts.org/en/projects/flood-prepared-communities>.

Werley, Jensen. *Australian Software Helping Colorado Governments Engage with Citizens*. BizWest. June 30, 2017.

Cities of Service- <https://medium.com/@CitiesOfService/in-boulder-fresh-perspectives-are-helping-local-government-engage-citizens-to-boost-resilience-bff8f52f0171>

# Summary of 2013-2017 Buyout Program and Lessons Learned

*Prepared for Creating Room for the River project team*

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- I. Program Synopsis**
- II. Program Development and Funding Sources**
- III. Program Processes**
- IV. Program Management and Operations**
- V. Lessons Learned**
- VI. Future program ideas**

## **I. Program Synopsis**

The Boulder County Flood Recovery Buyout Program was established shortly after the flood event of September 2013. The program served as a hazard mitigation tool, and it provided an option for property owners for whom rebuilding after the flood wasn't an option. Boulder County used funding from the FEMA Hazard Mitigation program (HMGP) and HUD Community Development Block Grants for Disaster Recovery (CDBG-DR) program to purchase properties impacted by the September 2013 flooding. Property owners who owned the property at the time of the event were offered the pre-disaster market value of the property (for buyouts) or current fair market value (for acquisitions<sup>1</sup>) as determined by two independent and state-licensed appraisers. This was a voluntary program; Boulder County did not compel any property owners to participate nor did the county purchase property through eminent domain proceedings. Once the properties were purchased, the improvements were removed and the land was returned to its natural state. The property will remain in public ownership unless an alternative public use is identified that could be accommodated in a safe manner for future users of the site. Such alternative uses could include recreational areas, community gathering spaces, or public infrastructure such as road or bridge project needs<sup>2</sup>.

## **II. Program Development and Funding Sources**

As early as October 2013, Boulder County engaged in discussions with the state recovery office about how to establish a buyout program for badly damaged properties to provide an additional option beyond the other flood recovery programs being established. Boulder County competitively selected a consultant, Leidos, Inc, to help set up the program and manage the initial client intake, applications, and other eligibility documentation required of participants. By mid-2014, 80 property owners signed Notices of Intent indicating their interest in pursuing the buyout program. Using FEMA's benefit-cost calculator, Leidos performed a cost-benefit analysis for each property to determine an overall estimated budget for properties that indicated interest early on after the flood.

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<sup>1</sup> Buyout: purchase of property at pre-flood value (for primary residences); Acquisition: purchase of property at post-flood value (for second homes).

<sup>2</sup> Regulations on long-term use and management of the properties vary by funding source. HMGP-funded properties have much stricter rules governing post-acquisition use and allowable activities. Generally speaking, acquired properties are to remain free of development in perpetuity.



The first group of properties was assigned to the FEMA HMGP program before it was determined that additional funding would be made available for the buyout program through the HUD Community Development Block Grant for Disaster Recovery (CDBG-DR) program. The CDBG-DR program provided a local match to augment the purchase of HMGP buyout properties, as well as opened funding to properties that were either deemed ineligible for the HMGP program or applied after the application window had closed. Due to a host of reasons, including a 2016 FEMA decision prohibiting acquisition of properties with any mineral rights attached, several properties on the initial HMGP buyout list were moved to the CDBG-DR funding source. Nineteen properties were purchased through the HMGP and local match program. Six properties were purchased under the first round of CDBG-DR funding, and an additional 22 properties were purchased with the second round of CDBG-DR funding. CDBG-DR round 2 funding essentially extended the application period for property owners who had initially expected to repair damages sustained in the flood, but realized that repairs would be too costly, time-intensive or otherwise burdensome, and opted to enroll in the buyout program.

The program coordination approach was somewhat slow to develop. Delays in establishing the list of properties, confirming the overall budgets, and determining program eligibility and participation rules, as well as procuring contractors necessary to complete elements of the program pushed the timeline of the program well beyond initial expectations. Additional program requirements such as application materials, residency and income documentation, and environmental assessments of buyout candidate properties were also added after more information was received from the respective funding sources, and each additional step caused further delays in arriving at the actual property acquisition. The first buyout was completed in April of 2015. The last of the 47 acquisitions was completed in May 2017. The demolition portion of the program was also relatively slow to develop, with the first demolition underway in the summer of 2016, and the last expected to be completed by mid-December 2017.

To streamline the approach to managing the second round of the CDBG-DR side of the program, the Boulder County Collaborative formed in the summer of 2015. The aim of this initiative was to facilitate sharing of knowledge between the entities involved in flood recovery including the Town of Lyons and the City of Longmont. The City of Longmont essentially took on the mantle of approving Boulder County buyouts on behalf of the state of Colorado Department of Local Affairs. County staff worked directly with City of Longmont Staff to submit and approve application documents, complete duplication of benefits analysis, and eventually complete the request for reimbursement process by which Boulder County is reimbursed for funds expended on acquisitions, acquisition-related costs such as appraisals, demolition and revegetation.

#### Program description by funding source:

**HMGP:** The FEMA HMGP provides funding for long-term hazard mitigation measures in communities impacted by disaster. The program aims to reduce or eliminate loss of life and property due to natural disasters as well as providing property owners with an opportunity to recoup a large part of their investment in property that has lost some, if not most, of its value due to damage. Before the HUD funding became available, the HGMP program was prepared to cover 75 percent of the cost of acquisition, with the remainder coming out of homeowners' pockets. CDBG-DR funding covered the match and allowed HMGP buyouts to be purchased at 100 percent of the appraised value, with no out-of-pocket expense incurred by homeowners.

**CDBG-DR:** The Federal Housing and Urban Development (HUD) program is funded through CDBG-DR dollars. The program is open to all flood-affected homeowners for both primary residences and second homes, as well as those located outside the floodplain but in Disaster Risk Reduction Areas. CDBG-DR dollars also funded the local match portion of HMGP buyouts.



*Boulder County:* Boulder County Transportation department funds were used to purchase two properties needed to complete the re-construction of a public bridge. One of the properties will be eligible for reimbursement under the HMGP buyout program, but the other will not.

### Program Eligibility and National Objectives

*Program eligibility* was initially limited to any primary or secondary residences and properties within the 100-year floodplain. However, due to the substantial damage sustained by properties outside the floodplain, Boulder County advocated that additional properties affected by flood-related hazards be made eligible for the CDBG-DR program, which carried less stringent regulations regarding program eligibility. Areas susceptible to flooding, landslide, rock falls, wildfire, or other documented hazards are considered Disaster Risk Reduction Areas (DRRA) under the CDBG-DR program. Several CDBG-DR buyout properties were acquired after a “DRRA” determination was made. The policy decision came as a result of a site visit and field trip by government representatives including Congressman Jared Polis in November 2015. Because they are located in known hazardous areas, properties in DRRAs should not be rehabilitated, re-inhabited or redeveloped for the safety of residents, visitors and the surrounding community. In Boulder County, a significant amount of housing is located outside of the floodplain but in areas at high risk of flood, landslide, mudslide or erosion.

National Objective CDBG-DR funds from the U.S. Department of Housing and Urban Development (HUD) must meet a National Objective. The National Objective met through Boulder County’s Buyout and Acquisition Program will be classified, for each project individually, as serving Low- to-Moderate-Income (LMI) households or meeting an Urgent Need. In all cases the purchase of the property serves the community by removing hazardous structures from harm’s way.

LMI includes applicants with a household income at or below 80% area median income (AMI), and was determined on a household rather than area basis. Boulder County verified income of property owners by collecting federal tax information (IRS 1040) to demonstrate whether they qualify as an LMI household. To demonstrate that LMI households meet the LMI National Objective, Boulder County documented that LMI households were re-housed following the buyout, as verified by a lease agreement, HUD-1 form, or signed affidavit from the property owner regarding their new residence.

Urgent Need is defined in the Colorado CDBG-DR Action Plan for Disaster Recovery as, “meeting other community development needs having a particular urgency because existing conditions pose a serious and immediate threat to the health or welfare of the community, and other financial resources are not available to meet such needs.” There is a public need that exists to prevent redevelopment in hazardous locations. Homes in hazardous locations are a threat to homeowners, emergency responders, and everyone who lives downstream or downhill from that home. There is also a need to help homeowners recover financially in order to move to a safer location. All households in the Boulder County Buyout and Acquisition Program that were not LMI will be counted as Urgent Need.

Buyout and acquisition are a Public Infrastructure activity and the purpose of the program is risk reduction. Therefore, household income was not a determinant for eligibility for the program. Boulder County did, however, collect demographic and income data from property owners to demonstrate that the CDBG-DR requirement to serve a majority of LMI households has been satisfied across all CDBG-DR activities. Although most program participants did not qualify as LMI, Boulder County used an approach known as the global match whereby a certain percentage of money spent on HMGP program acquisitions was used to purchase LMI properties, thus meeting the CDBG-DR requirements for funds spent serving LMI households.

### III. Program Processes



With help from Leidos and guidance from federal and state agencies, as well as extensive internal discussion and program development, Boulder County established a process framework for the buyout program. New elements were added as they received additional guidance. Overall program guidelines are based on the respective grant agreements with each funding source.

### Recruitment and eligibility determination of participants

Information about the program was presented and disseminated through letters to owners of destroyed or significantly damaged property, phone and walk-in inquiries at the Flood Rebuilding and Permit Information Center, community meetings, quarterly resource guide, website, newspaper articles, and communication with municipal partners in Boulder County. Application materials were developed with assistance and guidance from FEMA and CDBG-DR staff. Applicants submitted a significant amount of information including income documentation, residency and identification documents, HMGP and CDBG-DR program application forms, a form acknowledging voluntary participation in the program, and a duplication of benefits form and affidavit stating any other assistance received following the disaster. In addition to household paperwork, Boulder County managed several processes to establish valuation of the property and establish eligibility of the property itself for acquisition. While homeowners themselves were all considered eligible, some property-specific issues such as the historic significance of properties, property liens, and ownership documentation created hurdles toward completing the acquisition.

### Communications with Funding Agencies

Program staff kept in constant communication with the two main state agencies administering the grants from federal funding agencies. For HMGP buyouts, staff worked closely with consultants to the State Department of Homeland Security and Emergency Management (DHSEM) to determine eligibility, document and analyze duplication of benefits to arrive at final purchase offer, and manage documentation and reimbursement for program expenses. Staff also submitted any FEMA requests to DHSEM, who then communicated directly with FEMA regional or national staff. For CDBG-DR buyouts, staff worked through the Boulder County Collaborative, which was established to help Boulder County and municipalities within the county (i.e., Town of Lyons, Town of Jamestown, and City of Longmont) manage their respective buyout programs. Staff coordinated application document review with consultants from Hagerty, Inc and local staff working for the City of Longmont.

### Timeline of a buyout

1. Intake and application – Property owners completed the Boulder County HMGP and/or CDBG-DR Buyout and Acquisition application. The application process included a Duplication of Benefits review. The LMI review and verification process was administered by Boulder County Department of Housing and Human Services CDBG-DR staff. Application materials included the following: application, residency documentation, income verification (for determination of LMI or Urgent Need households), voluntary participation agreement, declaration of all flood recovery funds received, documentation of insurance and insurance claims).
2. Prioritization – If needed, Land Use staff was prepared to calculate a prioritization score for each specific property, utilizing the prioritization criteria defined in the program guidelines document. The purpose of the prioritization process was to purchase those properties most damaged, threatened, or hazardous, should funds be insufficient to purchase all eligible applicants' properties. Prioritization schedules were established but never employed because enough funding was available to complete all acquisitions.
3. Duplication of Benefits (DOB) review – For buyout applicants, staff conducted an analysis as outlined in the Boulder County Collaborative Duplication of Benefits policy document. Duplication of Benefits includes any benefits received for the specific purpose of post-flood repairs. If the property owner received



proceeds for FEMA Individual Assistance (IA) for repair and temporary housing assistance and wanted to claim temporary living credits, the proceeds for repair and temporary living needed to be included in the duplication calculation. Any assistance received was initially subtracted from the buyout offer price, but receipts for repairs and temporary rental were credited back towards offer price up to initial appraised value.

4. Phase I Environmental Site Assessment – This consisted of a preliminary review of each property that assessed any potential environmental issues on the property such as hazardous materials, environmental clean-up liens, land use limitations, etcetera that may affect eligibility for buyout or acquisition.
5. Environmental and Historical Assessment – CDBG-DR properties were required to complete this process which involved obtaining approval from the State of Colorado Historic Preservation Office. The assessment looked at any historic significance on buyout properties, and where present, required mitigation such as historic signage.
6. Appraisals – Initial valuations/offer prices were based on the average of two independent appraisals.
7. Offer – For both buyouts and acquisitions the offer price is based on the appraised value minus any net duplication of benefits.
8. Title work – This work was carried out by Land Title Guarantee Company, the vendor hired through a competitive procurement process. The process involved preparation of title commitment, and buyers and sellers’ settlement statements; mitigating any outstanding issues with title including outstanding taxes, liens; and dealing with any easements associated with property. County Attorney staff (paralegal) was involved in drafting documents including the deed transfer with deed restrictions (i.e. property must be maintained as open space in perpetuity).
9. Purchase of the property – Closing took place at the title company office – in our case at the Land Title Guarantee Company office. The Seller and Buyer are both present to sign all required paperwork. Afterwards, forms are notarized and where necessary are sent to the county clerk and recorder to be recorded.

### Post-acquisition Demolition, Re-vegetation, and long-term property management

Federal regulations require buyout and acquisition properties to be deed-restricted and remain undeveloped in the future. In the majority of cases, all improvements and structures were removed, and properties will remain undeveloped in perpetuity<sup>3</sup>. Depending on the location, natural features, and adjacency to existing publicly held lands, these properties (or portions of properties) may be used for recreational or open space purposes. In limited circumstances, portions of property may be utilized for other public benefits such as road or bridge improvements, flood control or mitigation, or for community meeting places, provided these improvements could be made in a way that does not endanger users of the facilities or public or private resources nearby. Boulder County will document that properties were returned to their natural state and maintain use compatible with the rules of the HMGP and CDBG-DR programs under which they were funded. In addition to demolition of structures, demolition staff also coordinated the de-commissioning of any wells, septic tanks, and electrical and gas service to buyout properties.

Prior to demolition, each property is secured against any unauthorized access. Boulder County Building Services Staff went to each property and erected construction fences, boarded up doors and windows, and posted No Trespassing signs to deter unauthorized access onto acquired properties. In some cases, County staff hired a contractor to complete a survey of a buyout property to confirm property boundaries and to resolve any border disputes with neighboring properties. All structures and improvements on buyout properties were tested for hazardous materials including lead, asbestos, etc. If hazardous materials were found, abatement was required as

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<sup>3</sup> In rare cases some improvements such as retaining walls were left in place to stabilize unstable hillsides.



part of demolition process. Following testing, all structures and improvements were removed and brought to waste management facilities. Where possible, materials were salvaged for re-use in coordination with Habitat for Humanity and staff from the Parks and Open Space (POS) Department. The timeline for demolition from start of process to completion of re-vegetation was approximately 3 months. The process generally occurred as follows:

Day 1-33: Project Launch: Hazardous materials testing notice to proceed issued to hazardous materials testing contractor; county staff property site visits; county staff submit requests to utility providers to de-commission electric, gas, and other services; POS staff draft reclamation scope of work.

Day 34-45: Task Order: Task order for demolition released for bidding to by the demolition firms contracted through the grant program. Bids are received, scored according to a rubric, and awarded to the winning contractor. The contractor then establishes a timeline and work plan for completing the work, which varies based on the number and size of structures and other improvements, presence or absence of hazardous materials, and ease of access to the property (i.e. if a temporary access has to be installed).

Day 46-55: Contractor work planning: county staff review work plan submitted by contractor and issue the notice to proceed; the contractor submits requests permits for demolition for approval by relevant agencies (Boulder County, CO Public Health, CDOT, etc.).

Day 56-70: Demolition and abatement work: Generally takes 2-3 weeks; materials are removed from the site leaving bare soil where improvements used to sit; Field oversight manager provided regular progress reports (Boulder county staff also managed field oversight of demolition at several properties).

Day 71-90: Project closeout: Boulder County withholds payment for services rendered until all closeout documents, including pictures, waste manifests, section 3 compliance reports, daily progress reports, and other pertinent documents are received.

Following demolition, all disturbed areas were re-vegetated using native plant and grass species. The revegetation process was more involved and complex for Boulder County than for other parts of the country that have offered buyout programs, as our county has unique challenges related to the mountain environment, such as steep slope, dry climate and extreme weather, as well as seasonal issues with planting native grasses. County staff also encountered issues with accessing properties to complete reclamation projects, with several properties requiring installation of a temporary access to allow demolition equipment and staff to cross streams and creeks to complete projects. Re-vegetated areas are monitored regularly to ensure vegetation takes hold and stays healthy to avoid growth of weeds as much as possible.

Boulder County anticipates retaining ownership of most properties purchased through the program. The entity that owns the buyout and acquisition properties must ensure compliance with the program-mandated use restrictions in perpetuity, to prevent redevelopment in locations with known natural hazards. It's not clear what level of demand there will be for other entities to purchase the properties from the county. Some private property owners have expressed interest in the program-purchased properties. Those purchased with CDBG-DR funds can be sold to private parties subject to deed restriction. Properties acquired with HMGP funds cannot be sold to private parties, but can be leased for purposes compatible with open space uses.

Depending on the circumstances, the county may agree to transfer buyout properties through a maintenance or other agreement, to local municipalities (e.g. Town of Lyons) or neighboring property owners. This would ease the long-term burden of ownership and maintenance for the county, and would maintain the county's spirit of collaboration and public service, serving those entities that step forward and demonstrate interest and willingness to adhere to program requirements. If Boulder County decides to pursue this option, the county and the entity assuming maintenance or ownership of the property will take on the responsibility of fully complying with all



CDBG-DR or FEMA HMGP rules and regulations. The properties will be deed restricted which will prohibit new development, with rare exceptions as described below.

The HMGP and CDBG-DR programs impose restrictions on future use and upon the transfer of properties purchased with the grant funds of each. Boulder County will not dispose of a property where funding source requirements dictate that the county must own the property<sup>4</sup>. The county may require additional use restrictions, beyond what the funding source requires. For example, the county prohibits disturbance of riparian areas, may require restoration of native vegetation, and may lease a property for a shorter term than the funding source allows. Parks and Open Space, in its sole discretion, determines which requirements will benefit Boulder County for a specific property.

## IV. Program Management and Operations

### Staffing

Initial program development and overall project management was carried out by Land Use Department staff. Boulder County decided early on that the program would be managed by the Land Use Department. One Land Use staff member was the main program manager, but received support from others in the department when developing the program. Support for the program came from a variety of other county departments and staff members as detailed below:

Land Use Department: Program operations were mainly driven by staff in the Land Use Department from the beginning. This involved coordination with other county departments as Boulder County established the various flood recovery programs serving individual households (home access, home rehabilitation, etc.). As the program evolved, staff from additional departments were included to assist with or manage various phases of the program.

The Long Range Planning manager took on the bulk of the duties from time of flood until the end of 2015. This staff person then shifted out of her position as Long Range Planning Manager and instead focused fully on the Buyout program through mid-2016. At that point a staffing transition took place. A new staff person took over management of acquisition activity and an additional full-time staff position was created to manage property clearance and revegetation. Support for the re-vegetation portion of the project was provided by a plant ecologist in the Parks and Open Space Department. Additional project oversight was provided by the project sponsor, the Long Range Planning Manager, and a Property Clearance program manager in the transportation department.

Land Use Department staff developed buyout program guidelines and policies with input from other county staff. Internal discussions over issues like prioritization revealed differences in staff opinion about which factors should be prioritized when, if necessary, decisions had to be made about which properties should be acquired. The prioritization criteria were established but were never employed in making eligibility decisions because adequate funding was available to acquire all the properties that remained in the program. The prioritization schedule can be found in the Program Guidelines document.

*Key staff:* Land Use staff instrumental in initial program set-up and ongoing program guidance included the Director, Chief Planner, and Long Range Planning Manager. Continuing support for permitting and other work was

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<sup>4</sup> Properties acquired with CDBG-DR funding cannot be disposed of until more than five years after acquisition and must have perpetual deed restrictions allowing only uses compatible with open space, recreation or wetlands management. Properties acquired with FEMA/HMGP funding cannot ever be sold, but may be leased, as long as the uses are compatible with open space purposes and the lease is clearly subject to the use restrictions. Restrictions include but are not limited to no structures, no paving, no fencing and no uses that obstruct the floodplain.



also provided by the Building Division. For example, the Building Division issued building permits for demolitions, as well as a blanket permit issued for de-construction which waived the usual recycling requirements on deconstruction projects that occur within the county.

Boulder County Commissioners' Office: The Commissioners' Office provided guidance on federal and state policies and their impact on the buyout program, as well as valuable insight across a range of issues, and general support and coordination with other flood recovery efforts underway in the county.

*Key staff*: Policy Analyst (Flood Recovery), Flood Recovery Manager

County Attorney's Office – Before acquisition could be completed, County Attorney Office staff coordinated closely with the Land Title Guarantee Company to work out the mechanics of the property transfer, including the addition of program restrictions in the warranty deed. County Attorney staff also helped work out any legal issues related to acquired properties such as ownership and personal representative issues, liens on properties, easement issues, etc. Staff from the Boulder County Attorney's office were also involved in drafting and monitoring contracts with vendors hired to complete various stages of the buyout and demolition process.

*Key staff*: Assistant County Attorneys – Two assistant county attorneys were assigned to work on flood recovery-related projects. These staff members also helped navigate the complex regulatory issues related to the buyout program, and also worked on development and review of all contracts related to the program.

Paralegal – Once the county gained understanding of the scale of legal issues the project would entail, a paralegal was assigned to help manage documents leading up to acquisition of the properties.

Finance Division – Finance staff was instrumental in ensuring acquisitions remained within the allocated budget for the programs. Finance staff also processed all transactions related to acquisitions, from processing the wire transfer for purchase of the property to requesting reimbursement for acquisition- and demolition-related expenses from the federal funding entities. Finance staff also assisted with procurement of any vendors involved in the program. Vendors were procured through RFP or SOQ processes.

Building Services Division – This department secured properties (boarding up, erecting No Trespassing signs and construction fences) following acquisition to minimize potential issues such as squatters taking residence in abandoned homes prior to demolition.

Transportation Department – This department managed the property clearance portion of the program.

*Key Staff*: Property Clearance Manager and Demolition oversight manager. Additional program support was provided by County Engineers and Department Director. Several buyout properties will be managed by the Transportation Department for use in right-of-ways, bridge and road construction projects, and other scenarios.

Parks and Open Space Department – This department manages the post-demolition re-vegetation of buyout properties, and will ultimately be responsible for managing a majority of program properties.

*Key Staff*: Plant Ecologist. The plant ecologist assessed the needs of and developed specifications for the revegetation of each property, including the proper mix of seeds. This staff-member also coordinated management of weeds on buyout properties.

Real Estate Division: This department will also be responsible for long term property management. Two staff members in the POS Real Estate division have been tasked with managing the transfer of properties to POS management following completion of property reclamation.



Parks and Open Space Rangers: These staff-members also helped keep an eye on properties following acquisition by responding to any trespassing issues.

#### Vendors and Contractors

To remain in compliance with program regulations, Boulder County carried out several procurement processes for vendors that were instrumental in completing the program. Each procurement took considerable time, as it involved drafting the RFP, soliciting bids, evaluating responses, making offers to vendors, and finally completing the work. Procurements were required for virtually every step of the program including:

*Program development* - Leidos created application paperwork and guided applicants through the process.

*Appraisal services* – Each property required two appraisals, and the initial offer price was the average of the two appraised values. Three appraisal companies were hired through competitive bidding processes.

*Environmental Site Assessments* – Environmental engineers determined whether any environmental issues existed on buyout properties that could either prevent eligibility for acquisition (e.g. oil and gas rights tied to properties made several properties ineligible for acquisition under the HMGP program), or require mitigation efforts by the county (for example presence of any hazardous materials, mine tailings, etc.). Three companies were hired through a competitive bidding process.

*Title Work* – The Title Company and county attorneys coordinated on the preparation of closing documents, and mitigation of any liens or issues preventing completion of acquisition. One company was hired through a competitive bidding process.

*Hazardous materials testing and abatement* – each structure was tested for hazardous materials such as lead and asbestos. Where these materials were present, abatement was required to mitigate issues related to hazardous materials. One vendor was hired through a competitive bidding process to manage this process on all the demolition projects.

*Demolition* – These contractors managed demolition and removal of materials from buyout properties, followed by re-vegetation of any disturbed areas. Six contractors were hired through a competitive bidding process.

*Field oversight of hazardous materials abatement and demolition* – This contractor was hired to manage field oversight of demolition and hazardous materials abatement activities. The contractor provided daily updates and final summaries related to all demolition projects.

## V. Lessons Learned

### Staffing

Over the course of the program, Boulder County realized additional staff were needed to complete all the requirements and address the many complex steps involved in administering the program. In the early days of the program, a lot of staff were involved in setting priorities and establishing the program, but the scale of the project was too much for one person (the initial buyout project manager) to manage in addition to her usual duties as Long Range Planning Manager. Program staffing was difficult to plan for and manage, as the needs and scale of the program was hard to predict. In addition, the program's management roles demand a wide range of skills and experience, and an ability to take on an incredible amount of responsibility (i.e., managing a complex 35-million-dollar program and being the primary face of the county with banks, distressed homeowners, funders and numerous vendors). The county was lucky to have dedicated, solutions-oriented staff working on the program, but



would have benefited from having staff who could have come into the program with greater relevant experience and knowledge of the county.

Boulder County Land Use ultimately appointed a dedicated staff member to manage contracts related to buyouts. The staff member coordinated review and routing for signature of vendor contracts. Initially the high volume of procurement activity associated with the program was not fully anticipated or planned for from a staffing perspective

The program faced several challenges as no one at the county had managed a flood buyout program before, and many staff needed to incorporate elements of this program into their already full workloads. The cross-departmental and collaborative nature of the program has been a great asset. However, there was not a dedicated, experienced staff lead associated with the program from start to finish who had the capacity and knowledge to tie all the pieces of the program together, navigate the complexities of funding requirements and participant needs, and manage communication challenges. Having a dedicated program manager overseeing all aspects of the program (i.e., both acquisition and demolition) may have been beneficial to improve communications and efficiency. Additionally, although county staff from departments such as the County Attorney's office and Finance Departments were extremely helpful in supporting the program, staff were often stretched too thin and did not always have adequate time or resources to dedicate to time-sensitive issues such as contracting, policy development and negotiation, and tracking of the myriad invoices incurred through program operations.

There was staff turnover in key positions during an intense period of program activity. The new staff did an excellent job of quick learning and problem solving, but key institutional knowledge was difficult to transfer efficiently to new staff. Staff had to prioritize dealing with program emergencies (e.g., addressing participant financial crises and potential foreclosures, as well as unanticipated needs related to property securement, and vendor procurement) and therefore had limited time to devote to internal communications, an essential element in a collaborative program.

In addition, the state had minimal experience in managing flood recovery, so many program elements that could have been solved more quickly tended to drag on as details were fleshed out, applicability of federal guidelines were debated and program paperwork was established as the program evolved. Additionally, staff report that more and earlier guidance from the federal agencies would have been useful and saved substantial time.

Furthermore, staff-members involved in historic preservation have expressed interest in having additional input over any programs involving acquisition or especially demolition. The buyout program included two structures that were deemed to have historic significance. As part of the historic review process, Boulder County signed a memorandum of understanding with the State Historic Preservation Office to "mitigate" the adverse effect of removing these historic structures, which will be accomplished by erecting historical markers. While the rules of the program dictated that all structures be removed from buyout properties, historic preservation staff would nonetheless like to see additional steps taken to preserve historic structures in the future.

#### Demolition and Re-vegetation:

The county also realized in early 2016 that the demolition portion of the program would be much more onerous than initially anticipated. For example, the HMGP demolitions needed to be completed within 90 days of acquisition. That deadline was not achieved for several of the HMGP properties due to a host of factors ranging from delays in hiring demolition program contractors, development of demolition program requirements and processes, and issues related to establishing a brand new program with minimal guidance from funding agencies. The county secured an extension from FEMA due to the unique challenges faced by the Boulder County program including but not limited to lack of or unstable access to properties, weather-related challenges, and the stability



of homes and retaining walls. In retrospect, it would have been beneficial to have appointed a manager for the demolition portion of the program much earlier in the buyout process.

Additional lessons learned from the property clearance portion of the program include:

- A lengthy set of permits were required to complete each demolition, including: Floodplain Development Permit (issued by Boulder County Floodplain Manager); Boulder County Building Permit (issued by Boulder County Land Use staff, for deconstruction of buildings); Solid Waste Management Plan regulated by Boulder County; State of Colorado Department of Public Health and Environment abatement and demolition permit (for demolitions where asbestos is present); Colorado Department of Transportation traffic management permit if lane closures are required).
- De-commissioning of electric utility can take anywhere from 2-4 months, and gas up to 8 months. The ideal approach is to have the previous owner initiate the de-commissioning process prior to the closing of the acquisition because they will know which utilities are in place on the property.

### Timeframes:

The timelines for program completion were unrealistic; buyouts took much longer than expected, and demolitions were much more complex and time consuming than initially anticipated (e.g. hazardous materials testing, utility de-commissioning all had longer wait times than initially anticipated). Other unexpected issues like access to properties to complete demolition work, seasonality of re-vegetation, and general delays in working within the confines of federal grants all contributed to a much longer timeframe than expected. County staff also encountered numerous obstacles related to policy and program operations that affected the timeline for program completion.

Any policy issues that arose generally had to be discussed or sent to State or FEMA staff, which often took several weeks or months to receive a response. Other unanticipated property-specific issues arose and took considerable time to figure out included dealing with mineral rights on properties, historic issues related to older structures, and coordination with road repair and creek restoration projects adjacent to buyout properties. Another issue that prolonged the timeline for several applicants was the length of time it took for one of the appraisers to complete their work. Boulder County also encountered difficulties in meeting the requirements for historic and environmental review of properties as established by the State of Colorado. Midway through the program the State Historic Preservation Office began requiring a historic review of each CDBG-DR buyout candidate property. This required Boulder County to hire additional vendors, which was further complicated by miscommunication between the county and the Boulder County Collaborative about timeline and completion of the historic reviews. Additionally, staffing changes within the team of the Boulder County Collaborative in some cases delayed the completion of acquisitions and approval of vendor procurements and requests for reimbursement documents as policy changes or other crucial information were not always communicated adequately.

### County internal Communications

Several staff members raised concerns that program updates weren't shared frequently or broadly enough. Once the management of the program was established, updates about buyout completion or other relevant information was not always disseminated to broader county internal audiences. Regular updates were established in mid-2016, and a few "all hands on deck" meetings involving many stakeholders from Land Use to POS to Commissioner's office were held during 2016 and 2017.

### External Communications

Some staff members expressed concern about the level of awareness of the program within communities. Concerns raised included: too much time between public meetings, lack of sufficient messaging around buyout



program eligibility and program developments. Solutions to these issues include more outreach, and more presence at public meetings in communities. However, some of the concerns were regarding knowing what parcels were involved in the program and for confidentiality purposes that information was not released, generally. More general outreach, and explanation of the need to keep that information confidential may have helped.

#### Securing property:

The system worked well after initial hurdles were overcome, but would have ideally been established prior to the first acquisition. Boulder County enacted the policy of securing buyout properties after acquisition as a preventative measure to ensure public safety. The policy came about after several calls were received from neighbors of buyout properties complaining of trespassing on buyout properties.

#### Documentation of the Program for management and audit preparedness

The current program staff has made a great effort to prepare memos to file to document problems encountered, along with solutions. This documentation is necessary to support future potential audit requests, but it can also serve as a reference as any new long-term program is developed. A summary of key issues associated with each property is available in the zipped file management document.

## VI. Future Program Ideas and issues to consider in setting up an ongoing acquisition program

Prime geographic areas that were hit hard by flood (and fire) and may be good candidates for expansion of acquisitions: Fourmile Canyon (including Salina Junction, Gold Run, Fourmile Canyon Drive neighborhoods); James Canyon and Left Hand Canyon (from above Jamestown all the way to intersection of Left Hand Canyon Drive and Highway 36); North St. Vrain Creek Watershed – northwest of Lyons all the way to Longmont); South St. Vrain Creek Watershed (west of Lyons to town of Lyons including Raymond Riverside neighborhood on State Highway 7). Properties in these areas would be prime candidates for a future buyout program due primarily to their location within the newly expanded regulatory floodplain, or in the case of Fourmile Canyon area – proximity to repeat disasters including the flood and Fourmile Fire of 2010. Several homeowners in these areas showed interest in the buyout program seemingly as a last resort, but withdrew for reasons ranging from access to other flood recovery funds such as the Home Access Program or Home Rehabilitation Program to discontent over the appraised value of their property to a general desire to remain in their home regardless of future risk.

As the non-disaster, ongoing program is developed it should include elements that reflect these lessons learned. That will facilitate knowledge transfer, and future program implementation if and when the next disaster hits and emergency funds become available.

#### Funding sources and constraints

While FEMA and HUD funds were available in a disaster-recovery capacity, it is unclear whether either of these agencies will provide funds in a non-disaster capacity. Funds from state coffers, other federal sources such as NRCS, or perhaps a county sales tax fund akin to that managed by the city of Boulder may be potential sources to explore to support a Room for the River-type program in the future.

POS will most likely be the manager of any future acquired properties. However, POS may not be best suited to handle the nuances of program outreach. A combination of departments and staff established in the buyout program may serve well in the future, provided the appropriate amount of time and resources are dedicated to the project.



## Appendix B. National Mitigation Investment Strategy Outcomes and Recommendations

Outcome/Recommendation
<b>Outcome 1- Coordination of risk mitigation and management improves between and among the public, private, and non-profit sectors</b>
<b>Recommendation 1.1-</b> Public, private, and non-profit sector entities should, in a coordinated manner, develop and use a shared understanding of mitigation-related terms.
<b>Recommendation 1.2-</b> Public, private, and non-profit sector entities should, in a coordinated manner, develop and use common sets of metrics and indices for identifying and evaluating mitigation measures and overall resilience
<b>Recommendation 1.3-</b> Public sector entities at the federal and SLTT levels should adopt, to the extent possible, complementary timelines, criteria, and streamlined application processes for different types of mitigation, preparedness, and recovery funds
<b>Recommendation 1.4-</b> Federal departments and agencies should promote mitigation and resilience planning and coordination across sectors to build a more complete view of risk and resilience that includes socio-economic, health, and environmental factors
<b>Recommendation 1.5-</b> Public, private, and non-profit sector entities should improve coordination between mitigation and other preparedness mission areas to allow community-based adaptations to strengthen all aspects of affected communities and mitigate future natural disasters during the recovery period
<b>Recommendation 1.6-</b> Public sector entities should ensure that continuous improvement processes are put into place and that they incorporate mitigation strengths, innovations, and areas for improvement
<b>Outcome 2- The private and non-profit sectors increase their investments in and innovations related to resilience and mitigation</b>
<b>Recommendation 2.1-</b> Federal departments and agencies, and SLTTs, should remove barriers for, and otherwise support development of, financial products that reduce natural hazard risks and/or the costs of recovering from natural disasters
<b>Recommendation 2.2-</b> Public, private, and non-profit sector entities should encourage investments in developing and deploying new and improved tools and technologies related to mitigation
<b>Recommendation 2.3-</b> Public, private, and non-profit sector entities (in public-private partnerships, where feasible) should identify, evaluate, pilot, and promote non-traditional models for financing mitigation activities that promote leading practices and provide additional benefits to the funding resources
<b>Recommendation 2.4-</b> Public and private sector entities should coordinate to increase insurance coverage by individuals, businesses, and communities for natural hazard risk
<b>Outcome 3- State/Local governments increasingly empowered to lead risk reduction activities and share responsibility and accountability with the federal government</b>
<b>Recommendation 3.1-</b> Public, private, and non-profit sector entities should coordinate to identify community-based mitigation and resilience training needs in order to develop and deliver more targeted training for communities and/or regions



<p><b>Recommendation 3.2-</b> Public sector entities should create consumer assistance or other similar programs to incentivize mitigation</p>
<p><b>Recommendation 3.3-</b> Public, private and non-profit sector entities should align financial incentives and cost sharing for mitigation projects</p>
<p><b>Outcome 4- Public, private, and non-profit sector entities develop and share more of the data and tools needed to make risk-informed mitigation investments</b></p>
<p><b>Recommendation 4.1-</b> Federal departments and agencies should enhance the availability and usability of federal risk and resilience data</p>
<p><b>Recommendation 4.2-</b> Public, private, and non-profit sector entities should bolster existing efforts to disseminate leading practices, including an inventory of programs and case studies demonstrating the value of, and “business case” for, mitigation investments</p>
<p><b>Outcome 5- Public, private, and non-profit sector entities improve risk communication, leading to more risk-informed mitigation investments by individuals and communities</b></p>
<p><b>Recommendation 5.1-</b> Public, private, and non-profit sector entities should encourage the development and adoption of evaluative criteria and measurement tools that help communities evaluate, assess, and improve their economic, environmental, and social performance, becoming healthier, stronger, and more resilient</p>
<p><b>Recommendation 5.2-</b> Public, private, and non-profit sector entities should target more (and better) mitigation education and outreach to meet access and functional needs</p>
<p><b>Recommendation 5.3-</b> Public, private, and non-profit sector entities should apply evidence and best practices from the science of risk communication in order to enhance community and individual mitigation efforts</p>
<p><b>Outcome 6- The built environment- whether grey or nature-based infrastructure, and including lifeline infrastructure, buildings, and homes- becomes more resilient and promotes community resilience</b></p>
<p><b>Recommendation 6.1-</b> Federal departments and agencies should ensure up-to-date building standards are used by their programs and could incentivize SLTTs receiving federal aid for building projects to adopt and enforce, at a minimum, the most current version of model building codes</p>
<p><b>Recommendation 6.2-</b> Public sector entities should encourage nature-based solutions for mitigation and resilient infrastructure investments</p>
<p><b>Recommendation 6.3-</b> Public sector entities should focus more on rebuilding better as well as rebuilding quickly following damage caused by natural disasters</p>
<p><b>Recommendation 6.4-</b> The public and private sectors should encourage local and regional investment that enhances the security and resilience of infrastructure by supporting resilient design standards, and the planning and implementation of cross-jurisdictional and cross-sector capital improvement and other plans that address multiple and evolving human, technological, and natural threats and hazards</p>



## Appendix C. Room for The River Tool – Criteria and Results

The Room for the River Toolset was developed in order to assist Boulder County formulate the mitigation and outreach strategies outlined in the Room for the River Plan. This tool is a GIS-based toolbox that processes input datasets based on criteria reviewed and established during the Room for the River program planning process, and will help county staff zero-in on areas of mitigation interest and potential mitigation strategies.

All parcels in the County are scored by the tool based on the criteria developed as part of this project. The parcels receive an acquisition score, an elevation score, and a relocation score.

The acquisition score is developed by scoring all parcels in the county by the criteria listed in the table below. Separate criteria were developed for vacant land parcels and improved parcels. The parcels are then intersected with comprehensive hazard assessment of the county. The hazard assessment is based on nine hazard datasets listed in the table below. The combination of the parcel score (vacant land or improved) with the hazard score represents the total acquisition score for each parcel.

The elevation score and relocation score are developed separately from the acquisition score. The criteria listed in the table below were used to develop elevation and relocation scores. Elevation and relocation scores were only developed for improved parcels.

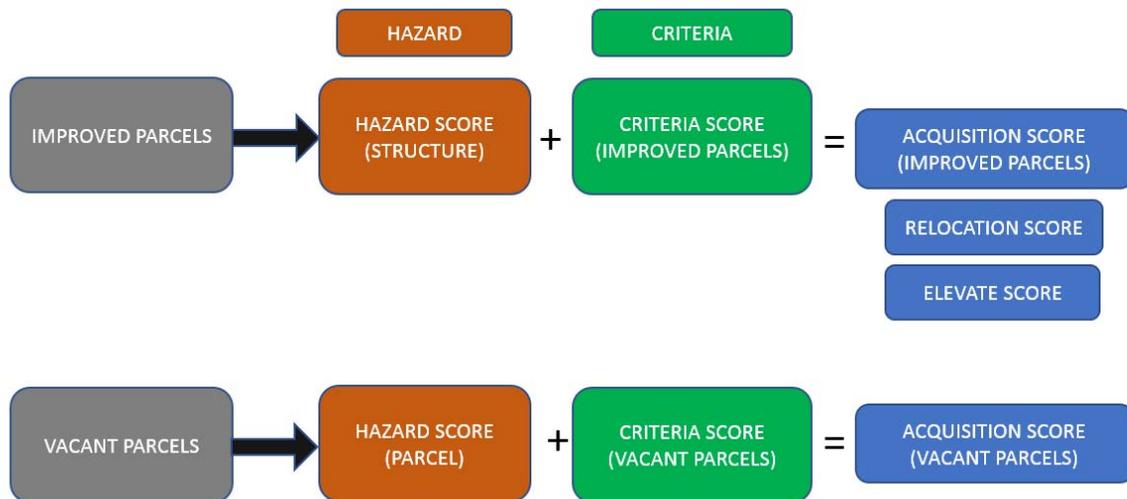




Table C.1: Acquisition Criteria

Vacant Land Criteria		
Criteria	Scoring	Statistics
Parcel Size	Square Feet <10,000 = 25	4,773 properties
	Acres .25-1 = 50	7,547 properties
	Acres 1-10 = 75	10,415 properties
	Acres >10 = 100	4,127 properties
Buildable Lots	1 = 0	24,777 properties
	1-4 = 50	1,589 properties
	>4 = 100	496 properties
Public Lands Connectivity (Federal, State, Local, Private, ROWs,)	Adjacent to BoCo Open Space = 100	693 properties
	1 property removed from any public lands = 50	28 properties
	>1 property removed from any public lands = 0	26,141 properties
Wetlands & Riparian Corridors	In wetland OR Riparian Area = 100	10,225 properties
	Not in wetland OR Riparian Area = 0	16,637 properties
Critical Wildlife Habitat and Migration Corridors	In critical habitat area = 100	4,045 properties
	Not in critical habitat area = 0	28,817 properties
Improved Land Criteria		
Criteria	Scoring	Statistics
Structure Occupancy type	Residential = 100	18,656 properties
	Commercial = 75	163 properties
	Agricultural = 25	953 properties
Number of Bedrooms	5+ = 100	6,189 properties
	3-4 = 75	8,367 properties
	2 = 50	3,377 properties
	1-25	1,432 properties
Number of Units	30+ = 100	2 properties
	15-30 = 75	1 property
	5-15 = 50	10 properties
	2-4 = 25	25 properties
	0-1 = 0	26,800 properties
Building Actual Value	Bldg Actual Value < \$100k = 25	7,926 properties
	Bldg Actual Value \$100k to \$300k = 50	7,385 properties
	Bldg Actual Value \$300k to \$500k = 75	6,830 properties
	Bldg Actual Value \$> \$500k = 100	4,717 properties
Total Building Area	Improvements > 4,000 sq. ft. = 100	4,812 properties
	Improvements 2,000-4,000 sq. ft. = 50	8,857 properties
	Improvements < 2,000 sq. ft. = 25	5,012 properties
Building Age	Structure(s) >40 years old = 100	5,998 properties
	Structure(s) 20-40 years old = 50	9,550 properties
	Structure(s) <20 years old = 0	11,314 properties
Total # of NFIP Claims	3+ = 100	8 properties
	2 = 50	20 properties
	0-1 = 0	26,833 properties
NFIP Claims Total \$	No claim = 0	26,664 properties
	total claims <\$1K = 25	7 properties
	total claims \$1K-\$5K = 50	28 properties
	total claims > \$5K = 100	163 properties
Hazards Used in the Hazard Assessment		
Flood, Debris Flow, Fluvial Hazard Zones, Landslide Susceptibility, Rockfall, Steeply Dipping Bedrock, Flood Depth Grids, Flood Velocity Grids, and Wildfire Threat		



*Table C.2: Elevation Criteria*

Criteria	Scoring	Statistics
Exclude all structure(s) outside of all hazard areas except flood and fire	NA	NA
Exclude structure(s) outside of Floodway	Structures touching 0.2% SFHA = 50	244 properties
	Structures touching 1% SFHA (NON FW) = 100	1,212 properties

*Table C.3: Relocation Criteria*

Criteria	Scoring	Statistics
Exclude all parcels with < 1 acre (43,560 sq. feet) outside of hazard areas (except wildfire)	NA	NA
From remaining parcels, score hazard type impacting structure(s)	Floodway = 100	106 properties
	Floodplain = 75	360 properties
	Other Hazard = 25	1,528 properties
	None = 0	24,868 properties



## Appendix D. Room for The River Tools - Guidance Document

### I. Background

The Room for The River Toolset is used to develop a prioritized list of potential acquisition properties and a list of properties with structures on them that have the potential to be mitigated through acquisition, elevation, or relocation. The toolset also produces several project specific datasets for Boulder County’s Room for The River Project.

The toolset pulls information from a pre-loaded **RoomForTheRiver.gdb**, and they run in a linear fashion. There is a set of Set-Up tools and a set of Prioritization tools that run in sequential order, set-up tools first, and prioritization tools last. This document walks the user through the process of running each tool, in the order they are intended to be run, and then through each of the data requirements and variables for each tool. The **RoomForTheRiver.gdb** and the tools are built around Boulder County GIS data and as such they are specific to Boulder County. They will not run using data for a different county. Lastly, the scoring and prioritization functionality in the tools is framed around the current Boulder County parcel data and assessor tables. For that reason, the tool and data requirements must be strictly adhered to for the system to function properly. The **Tool and Data Requirements Section** at the end of this document contains a complete list of requirements that are data, layer, or tool specific. Failure to adhere to these requirements will likely result in the loss of functionality of the tools delivered for this project.

The Room for The River DB and Tools require ArcGIS 10.4.1 or later and the Spatial Analyst and 3D Analyst Extensions.

### Contents

Background

RoomForTheRiver.gdb Geodatabase

ArcGIS Toolbox:

Set-Up Tools

Prioritization Tools

Order of Tool Operation

Step by Step Guide to Running the Room for The River Tools:

Phase I – Set-Up Tools

Tool 1 - ConvertDepthGridsToScoringGrids

Tool 2 - ConvertVelocityGridsToScoringGrids

Tool 3 – CreateHazardScoringGrid

Tool 4 - CreateStreamlineFloodHazards

Phase II – Prioritization Tools

Tool – 01BuildScoringLayers

Tool - 02BuyoutPrioritizationTool

Tool - 03ElevateRelocateTool



## Tool and Data Requirements Section

### Requirements Matrix

#### Spatial Data Requirements

CULT1\_SubDivAndPlattedAreas:

HAZ1\_FloodHazard:

HAZ2\_DebrisFlow:

HAZ3\_FluvialHazardZone:

HAZ4\_LandslideSusceptibility:

HAZ5\_RockfallHazard:

HAZ6\_SteeplyDippingBedrock:

HAZ7\_HUC12WildfireThreat:

RES1\_CountyOpenSpace:

RES3\_RiparianAreas:

RES3\_Wetlands:

Municipalities:

Structures:

#### Parcels and Assessors Table Requirements

Parcels:

\_Account\_Parcels:

\_Buildings:

\_Values:

\_Owner\_Address:

#### Other Data Requirements

Field Descriptions

Scoring\_Parcels



## II. RoomForTheRiver.gdb Geodatabase

The Room for The River Toolset is built to run and perform using the supplied **RoomForTheRiver.gdb**. The database comes pre-loaded with all the layers required by the various tools. These layers can be updated at any time if the updates adhere to the guidance provided in the **Tool and Data Requirements Section**. The database also acts as an output directory for several tools.

## III. ArcGIS Toolbox

The Room for The River Toolbox (**Toolbox.tbx**) is comprised of set-up tools, prioritization tools, and submodels. The submodels are background components and will never need to be run individually. Only the set-up tools and prioritization tools will need to be ran by the user. However, there will be one python script that will need to be sourced once the toolbox is situated in its working location. See the step by step guide section for instructions.

### Set-Up Tools

- **ConvertDepthGridsToScoringGrids**: This tool converts the pre-loaded flood hazard depth grid [**FldDepth**] into a scoring grid [**FldDepthSc**] used within the tool processes.
- **ConvertVelocityGridsToScoringGrids**: This tool converts the pre-loaded flood velocity depth grid [**FldVeloc**] into a scoring grid [**FldVelocSc**] used within the tool processes.
- **CreateHazardScoringGrid**: This tool develops a scoring grid representative of all the hazards throughout the County. It uses several input Feature Classes within the RoomForTheRiver.gdb to develop the [**Hazard**] grid. This tool is unique in that it allows the user to apply a scoring weight to the hazards relative to each other. For example, if the user wishes to weight the flood hazards higher than any other hazard, this tool allows them to do just that.
- **CreateStreamlineFloodHazards**: This tool develops a buffer of a stream line network to use as additional floodplain hazard information where existing regulated floodplain data is incomplete. The tool results can be added to the **HAZ1\_FloodHazard** Feature Class as a supplement to existing regulated data.

### Prioritization Tools

- **01BuildScoringLayers**: This is the first of the prioritization tools and its intent is to develop and set up the main scoring layers for the remaining prioritization tools. This tool also narrows down the scoring layers by eliminating those that are within municipalities, those with multiple assessor's accounts ("strap" id) associated with them, and those without an assessors account id. The results from this tool are stored in the root of the **RoomForTheRiver.gdb**.
- **02BuyoutPrioritizationTool**: This tool produces a prioritized list of acquisition properties that meet the criteria to be acquired. The results are stored within several fields in the **Scoring\_Parcels** layer. Results are returned for Acquisition Structures and Acquisition Properties.
- **03ElevateRelocateTool**: This tool builds on the results of the 02BuyoutPrioritizationTool and returns a prioritized list of structures that meet the criteria to be Elevated and/or Relocated. Results are returned within the Scoring\_Parcels layer AND within two structure footprint layers **STR\_ELEVATE** and **STR\_RELOCATE**.

### Order of Tool Operation

1. Run the **Convert Depth Grids** and the **Convert Velocity Grids** tools first.
  - a. Requires an existing FldDepth and/or FldVeloc grid.
2. Run the **CreateHazardScoringGrid** tool.
  - a. Requires a FldDepth and FldVeloc grid and all HAZ layers.
3. Run the **CreateStreamlineFloodHazards** tool (when supplemental flood hazards are needed in areas without adequate floodplain coverage).

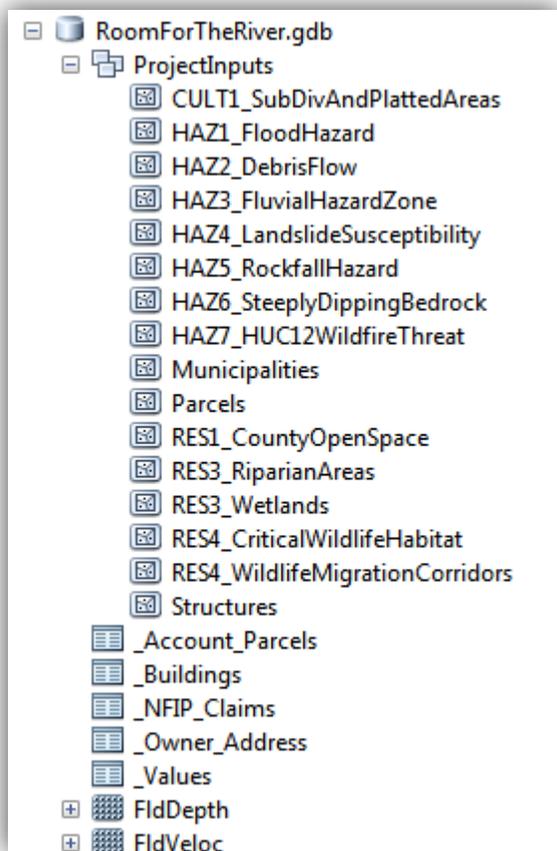


- a. Requires a re-run of the **CreateHazardScoringGrid** tool after the results are added to the Flood Hazard layer.
4. Run the **01BuildScoringLayers** tool.
  - a. Requires Structure layer and all Parcel fabric layers and assessor's tables.
5. Run the **02BuyoutPrioritizationTool**.
  - a. Requires completion of the **01BuildScoringLayers** tool, completed **Hazards** grid, and all **RoomForTheRiver.gdb** layers.
6. Run the **03ElevateRelocateTool**.
  - a. Requires completion of the **02BuyoutPrioritizationTool**, completed **Scoring\_Parcel**s, **Scoring\_Structures**, and all HAZ layers (except wildfire).

## IV. Step by Step Guide to Running the Room for The River Tools

### System Set-Up:

- The **RoomForTheRiver.gdb** and **Toolbox** can be placed on a local hard drive (best performance) or in a folder on a network. The tools have not been tested in SDE.
- Before executing any tools for the first time, the user must source a python script that's being called in the tools.
  - In ArcCatalog, expand the Toolbox and Right Click on the **Concatenate Row Values** script tool and open the Properties. Under the Source tab, browse to the **ConcatenateUniqueValues.py** provided as part of the Deliverables, and click OK.
- Always maintain a clean/fresh version of the **RoomForTheRiver.gdb**. Simply make a copy of the original prior to executing the tools.
- Execute the Room for The River Tools from within ArcCatalog. Navigate to the Room for The River Toolbox.tbx in the Table of Contents, and double click the tools to open them.



#### Parcel Fabric Layer and Assessor Tables:

- Parcels
- \_Account\_Parcels
- \_Buildings
- \_Owner\_Address
- \_Values

#### Boulder County Layers

- Municipalities
- Structures

#### Hazard Layers

- HAZ1\_ through HAZ7\_
- FldDepth Grid
- FldVeloc Grid

#### Improved Land Acquisition Layers

- CULT1\_SubDivAndPlattedAreas

### Phase I – Set-Up Tools

The Phase I Set-Up Tools must be run in advance of any of the Prioritization Tools. The Prioritization Tools will not function unless the Set-Up tools have been ran, because the Set-Up Tools produce essential layers for the Prioritization Tools.

However, once the Set-Up tools have been run once, they do not need to be ran again unless data within the **Required Base Layers** has been modified. For Example, if the user has new flood hazard data available, and they



wish to update the HAZ1\_FloodHazard Feature Class, they would need to follow the guidelines for updating that layer in the **Tool and Data Requirements Section** at the end of this document, then re-run the Set-Up tools.

Run the Set-Up Tools:

**Tool 1 - ConvertDepthGridsToScoringGrids**

1. In ArcCatalog Table of Contents, double click the **ConvertDepthGridsToScoringGrids** tool.

This tool converts the existing FldDepth Grid in the database to a scoring grid used by the Prioritization Tools.

2. Navigate to the **RoomForTheRiver.gdb** and select the **FldDepth** Grid as your input.
3. Then select the **RoomForTheRiver.gdb** geodatabase as your output workspace.
4. Click OK, and the tool will produce a **FldDepthSc** Grid in the root of the **RoomForTheRiver.gdb** geodatabase.

**Tool 2 - ConvertVelocityGridsToScoringGrids**

1. Same steps as the **ConvertDepthGridsToScoringGrids** tool.

**Tool 3 – CreateHazardScoringGrid**

1. In ArcCatalog Table of Contents, double click the **CreateHazardScoringGrid** tool.

This tool produces a Hazard Grid using all the Hazard Feature Classes (**HAZ1** through **HAZ7**) and the **FldDepthSc** and **FldVelocSc** Grids.

2. For the first variable, select the **RoomForTheRiver.gdb**.
3. Enter the hazard weights for the remaining variables.

These weight variables allow the user to modify the weights associated with each individual hazard. The weights are all relative to each other. The default weights are all set to 1 which means each hazard is equal relative to each other. For stronger weighting enter values greater than 1. For weaker weightings, enter values less than 1 (but greater than 0).

EXAMPLE: If you want the **Flood Hazard** to have the strongest influence relative to other hazards, enter a 1.5 or a 2 which would mean it would be 2X the influence relative to the other hazards.

EXAMPLE 2: If you want the **Wildfire Hazard** to have less influence over the overall hazard score for any given area, you would want to enter 0.75 for the weight OR 0.25, 0.5 etc., which would mean it would 0.75X times the weight of all other hazards.

4. Click OK, and the tool will produce a **Hazards** Grid in the root of the **RoomForTheRiver.gdb** geodatabase.

**Tool 4 - CreateStreamlineFloodHazards**

1. In ArcCatalog Table of Contents, double click the **CreateStreamlineFloodHazards** tool.

This tool is used to produce supplemental Flood Hazard data to include in the HAZ1\_FloodHazard Feature Class. It should be used to pull in flood hazard data in areas where the HAZ1 layer does not show a



hazard. Many small stream networks are not studies and flood hazard data may not be available and this tool create data that can be supplemented in those areas.

2. Enter the stream line layer that you wish to use as supplemental flood hazard data.
3. Enter the HAZ1 layer or the latest complete flood hazard dataset you have available.
4. Select an output workspace for the tool to create the resulting shapefile.
5. Finally enter a buffer distance to use as a supplemental flood hazard area. The default is 25 feet, which produces a 50ft wide flood hazard for the supplemental areas.
6. Click OK to run the tool.
7. Navigate to your output workspace and you'll see the **StreamlineFloodHazards.shp**
8. Update the HAZ1\_FloodHazard layer with the results from this tool (**don't forget to re-run the CreateHazardScoringGrid tool now that you have additional Flood Hazard data in the HAZ1 layer!**)



## Phase II – Prioritization Tools

The Phase II toolset is used to first establish the scoring layers and then to score them according to their acquisition, elevate, and relocate potential. Prior to running these tools, ensure you have all the necessary inputs available after running the Set-Up tools.

### Run the Prioritization Tools

#### **Tool – 01BuildScoringLayers**

1. In ArcCatalog Table of Contents, double click the **01BuildScoringLayers** tool.

This tool produces a **Scoring\_Parcels** layer and a **Scoring\_Structures** layer, along with a back-up (unscored) copy of both.

2. Enter your **RoomForTheRiver.gdb** as your first variable, and enter the layers for the remaining variables.

All should come directly from your **RoomForTheRiver.gdb**. These include the Parcel data and Structure data and three Assessor Tables. All of which have several requirements that must be met prior to running this tool. Go to the Required Base Layers section of this document to ensure those data requirements have been met.

3. Click OK, the tool produces scoring layers in the root of the **RoomForTheRiver.gdb**.

#### **Tool - 02BuyoutPrioritizationTool**

SPECIAL NOTE: If you have already run this tool and want to run it again, delete OR tag the existing Scoring\_Parcels layer and Scoring\_Structures layers with a version id, then simply rename the “\_Orig” versions so they do not contain the “\_Orig” parts of their names. These two files are available specifically for this purpose.

1. In ArcCatalog Table of Contents, double click the **02BuyoutPrioritizationTool** tool.

This is the main prioritization tool that produces a prioritized list of potential acquisition properties and properties with acquisition structures.

2. Enter the **RoomForTheRiver.gdb** for the first variable, and enter the name of the output Excel file that will be produced.
3. Click OK, the tool scores the **Scoring\_Parcels** layer then exports it into Excel to the location you select.

#### **Tool - 03ElevateRelocateTool**

1. In ArcCatalog Table of Contents, double click the **03ElevateRelocateTool** tool.

This is the main structure prioritization tool that scores each structure according to its potential for elevation and/or relocation, then applies their score to their Scoring\_Parcels feature. For Parcels with multiple structures, the parcel receives the highest structure score on the parcel.

2. Enter the **RoomForTheRiver.gdb** for the first variable.
3. Then select an output workspace that the tool can use to store interim layers and tool outputs.



This Scratch Workspace will not have any outputs once the tool finished but it's a required workspace for the tool to operate.

4. Click OK, the tool scores the **Scoring\_Parcels** layer with the results of the structure relocate and elevate potential, and it also produces a structure layer for both, **STR\_ELEVATE** and **STR\_RELOATE**.

NOTE: The **STR\_ELEVATE** and **STR\_RELOCATE** layers may have more than one structure on any given parcel. The **Scoring\_Parcels** layer will receive the highest scoring structure score when this is the case.

Additionally, there are data limitations associated with the Parcel fabric used in these tools. There are several properties in the Parcels layer that have multiple records for them in the **Parcels** layer that also end up in the **Scoring\_Parcels** layer, meaning, there are multiple parcels on top of one another that have different parcel numbers. Therefore, when the structure information is transferred to the **Scoring\_Parcels** layer, only one of those parcels receives the structure score. Further clean-up of the Boulder County Parcel fabric is needed to eliminate this from occurring within the Room for The River prioritization results.



## V. Tool and Data Requirements Section

To understand the data and tool requirements, it's necessary to understand how the **RoomForTheRiver.gdb** layers and tables are utilized in the tools. The HAZ layers are all pre-attributed in the HAZ Feature Classes with a value in their **[Value]** fields as to how much of a hazard influence they represent. For example, the Flood hazard values are lower for the 0.2% flood chance areas than they are for the 1% chance areas. The same concept applies to the other HAZ layers. These **[Value]**s need to be produced properly in each HAZ layer that's updated/re-loaded.

Similarly, the Parcel fabric and Assessor tables used in the design of these tools comes from the Boulder County website. To properly reload or update the Parcel fabric and Assessors tables, the data must come from the same source because the tools are designed around the specific field names and in some cases specific attribute combinations within this source data.

The requirements listed in this section will provide the user with instructions on how to properly re-load or update the HAZ layers, the parcel fabric layers and tables and all other layers in the pre-loaded **RoomForTheRiver.gdb**.

### Requirements Matrix

The following matrix depicts the requirements associated with updating individual layers in the RoomForTheRiver.gdb, in terms of which tools will need to be re-run.

		ROOM FOR THE RIVER TOOLS TO RE-RUN						
		ConvertDepthGridsToScoringGrids	ConvertVelocityGridsToScoringGrids	CreateHazardsScoringGrid	CreateStreamlineFloodHazards	01BuildScoringLayers	02BuyoutPrioritizationTool	03ElevateRelocateTool
ROOM FOR THE RIVER - LAYER MODIFICATION	HAZ1_FloodHazard	✓*	✓*	✓	✓		✓	✓
	HAZ1_FloodHazard**			✓**	✓**			
	HAZ2_DebrisFlow			✓			✓	✓
	HAZ3_FluvialHazardZone			✓			✓	✓
	HAZ4_LandslideSusceptibility			✓			✓	✓
	HAZ5_RockfallHazard			✓			✓	✓
	HAZ6_SteeplyDippingBedrock			✓			✓	✓
	HAZ7_HUC12WildfireThreat			✓			✓	
	RES1_CountyOpenSpace						✓	
	RES3_RiparianAreas						✓	
	RES3_Wetlands						✓	
	RES4_CriticalWildlifeHabitat						✓	
	RES4_WildlifeMigrationCorridors						✓	
	Municipalities					✓	✓	✓
	Structures					✓	✓	✓
	Parcels					✓	✓	✓
	_Account_Parcels					✓	✓	✓
	_Buildings					✓	✓	
	_Values					✓	✓	
	_Owner_Address						✓	
	_NFIP_Claims						✓	
FldDepth	✓		✓			✓	✓	
FldVeloc		✓	✓			✓	✓	

\*This tool should be re-run if the feature layer modifications are accompanied with FldDepth or FldVeloc grid modifications.

\*\*Flood Hazard modifications made as a result of new data from the CreateStreamlineFloodHazards tool. These Flood Hazard modifications require a re-run of the CreateHazardScoringGrid tool.



## Spatial Data Requirements

### **CULT1\_SubDivAndPlattedAreas:**

To reload data into this layer, the user need only ensure that they are loading a spatial layer that represents unique cultural areas throughout the county that represent areas of Community Cohesiveness.

### **HAZ1\_FloodHazard:**

To reload flood hazard data into this layer, the user must load and fully attribute data containing the basic FEMA Flood Hazard schema.

Required Fields and attributes:

- FLD\_ZONE
  - A
  - AE
  - AH
  - AO
  - X
- ZONE\_SUBTY
  - FLOODWAY
  - 0.2 PCT ANNUAL CHANCE FLOOD HAZARD
- Value
  - 1 = 1% Flood Hazard Zones (A, AE, AO, or AH)
  - 0.5 = 0.2% Flood Hazard Zones (X - 0.2 PCT ANNUAL CHANCE FLOOD HAZARD)

### **HAZ2\_DebrisFlow:**

To reload data into this layer, the user need only ensure that they are loading a spatial layer that represents debris flow areas. Required Fields and attributes:

- Value – all features must be attributed with a value of 1

### **HAZ3\_FluvialHazardZone:**

To reload data into this layer, the user need only ensure that they are loading a spatial layer that represents fluvial hazard zones. Required Fields and attributes:

- Value
  - all main fluvial hazard zones should be attributed with a value of 1
  - all secondary fluvial hazard zones should be given a value of 0.5

### **HAZ4\_LandslideSusceptibility:**

To reload data into this layer, the user need only ensure that they are loading a spatial layer that represents landslide susceptibility areas, and that all areas smaller than 450 square feet should be removed out of the dataset. Required Fields and attributes:

- Value – all features must be attributed with a value of 1

### **HAZ5\_RockfallHazard:**

To reload data into this layer, the user need only ensure that they are loading a spatial layer that represents rockfall hazard areas. Required Fields and attributes:

- Value – all features must be attributed with a value of 1



### **HAZ6\_SteeplyDippingBedrock:**

To reload data into this layer, the user need only ensure that they are loading a spatial layer that represents steeply dipping bedrock areas. Required Fields and attributes:

- Value – all features must be attributed with a value of 1

### **HAZ7\_HUC12WildfireThreat:**

To reload data into this layer, the user need only ensure that they are loading a spatial layer that represents the wildfire hazard areas. The data currently in this layer is broken down to the HUC 12 extents, with a summary of their threat level (High, Medium, and Low). Required Fields and attributes:

- Threat
  - High
  - Medium
  - Low
- Value
  - High = 1
  - Medium = 0.666
  - Low = 0.333

### **RES1\_CountyOpenSpace:**

To reload data into this layer, the user need only ensure that they are loading a spatial layer that represents County Open Space areas.

### **RES3\_RiparianAreas:**

To reload data into this layer, the user need only ensure that they are loading a spatial layer that represents Riparian Areas.

### **RES3\_Wetlands:**

To reload data into this layer, the user need only ensure that they are loading a spatial layer that represents Wetland areas.

### **RES4\_CriticalWildlifeHabitat:**

To reload data into this layer, the user need only ensure that they are loading a spatial layer that represents Critical Wildlife areas.

### **RES4\_WildlifeMigrationCorridors:**

To reload data into this layer, the user need only ensure that they are loading a spatial layer that represents Wildlife Migration Corridor areas.

### **Municipalities:**

To reload data into this layer, the user need only ensure that they are loading a spatial layer that represents non-county municipality areas. Areas within this layer are NOT ANALYZED by the tools.

### **Structures:**

To reload data into this layer, the user need only ensure that they are loading a spatial layer that represents current existing structures in the county (NOTE: the pre-loaded structures do not include those attributed as “demolished”). Required Fields and attributes:



- Bldg\_ID – must contain a unique building ID.
- SqFt – must have the sqft of the structure calculated.
- ParcelNo and STRUCT\_HAZ are required fields and they can be empty.

### Parcels and Assessors Table Requirements

The parcel data and assessor’s tabular data that’s been pre-loaded into the **RoomForTheRiver.gdb** geodatabase have been modified to meet a few standards before they can be used effectively within the Room for The River Tools. Those same modifications must be made to any new parcel data or assessor data when its re-loaded into the **RoomForTheRiver.gdb** layers. *(Failure to reload data that meets the standards and requirements laid out in this section will likely result in the loss of functionality of the tools delivered for this project).*

The Parcel data contains a PARCEL\_NO field that’s linked to an Account\_Parcels assessors table. The Account\_Parcels assessor table contains a “strap” id (aka account number) that links to the rest of the assessor’s tables.

NOTE 1: This “strap” id needs to be cleaned up when the new tables are loaded into the **RoomForTheRiver.gdb** table layers. The user must ensure there are no extra “space” characters in any of the [strap] fields when loading data into each of the layers below. The “space” characters are not visible when loading the data. To ensure there are no space characters in any strap id within any layer in the **RoomForTheRiver.gdb**, open each of them in GIS and remove all extra spaces. It is critical that the strap id contains no extra spaces for the tools to perform effectively.

NOTE 2: When updating any part of the parcel fabric in the **RoomForTheRiver.gdb** database, the user must reload every one of the layers (Parcels, \_Account\_Parcels, \_Buildings, \_Values, and \_Owner\_Address).

### Parcels:

To reload data into this layer, the user must ensure they are loading the [Boulder County “Parcels”](#) layer containing a PARCEL\_NO field. Required Fields and attributes:

- PARCEL\_NO

### Account\_Parcels:

To reload data into this table, the user must ensure they are loading the [Boulder County Assessors](#) “Account\_Parcels” table, which includes a **ParcelNo** field (which links to the parcels), and a “strap” ID (aka account number, that links to the rest of the assessors tables).

When loading new **Account\_Parcels** table records, the user must ensure the following required fields receive the correct information from the new assessors table:

- Strap – (ensure this field contains no extra “space” characters)
- ParcelNo

### Buildings:

To reload data into this table, the user must ensure they are loading the [Boulder County Assessors](#) “Buildings” table, which includes a “strap” ID, which can be linked to the Parcels via the Account\_Parcels table.

The Assessors Buildings table also contains many additional fields, several of which are used within the tools and included in the **RoomForTheRiver.gdb Buildings** table layer.

When loading new **Buildings** table records, the user must ensure the following required fields receive the correct information from the new assessors table:

- Strap – (ensure this field contains no extra “space” characters)



- bldgClass
- builtYear
- EffectiveYear
- nbrBedRoom
- UnitCount
- Stories

#### **\_Values:**

To reload data into this table, the user must ensure they are loading the [Boulder County Assessors](#) “Values” table, which includes a “strap” ID, which can be linked to the Parcels via the Account\_Parcels table.

The Assessors Values table also contains many additional fields, several of which are used within the tools and included in the **RoomForTheRiver.gdb \_Values** table layer.

When loading new **\_Values** table records, the user must ensure the following required fields receive the correct information from the new assessors table:

- Strap – (ensure this field contains no extra “space” characters)
- bldAcutalVal
- LandAcutalVal
- totalActualVal

#### **\_Owner\_Address:**

To reload data into this table, the user must ensure they are loading the [Boulder County Assessors](#) “Owner\_Address” table, which includes a “strap” ID, which can be linked to the Parcels via the Account\_Parcels table.

The Assessors Owner\_Address table also contains many additional fields, several of which are used within the tools and included in the **RoomForTheRiver.gdb \_Values** table layer.

When loading new **\_Owner\_Address** table records, the user must ensure the following required fields receive the correct information from the new assessors table:

- Strap – (ensure this field contains no extra “space” characters)
- owner\_name
- mail\_to
- mailingAddr1
- mailingAddr2
- mailingCity
- mailingState
- mailingZip
- mailingCountry

## **VI. Other Data Requirements**

#### **\_NFIP\_Claims:**

To reload data into this table, first start with the latest Historical Claims data. Using the address associated with each claim, begin tying the data to the addresses within the Boulder County Assessors “Owner\_Address” table. The “Owner\_Address” table contains a strap id. Once you have the Historical Claims data containing the \$Total



Paid and the Owner\_Address strap id, you can load the data into the **RoomForTheRiver.gdb\_NFIP\_Claims table**.

Required Fields and attributes:

- Strap – (ensure this field contains no extra “space” characters)
- SUM\_Total\_Paid

#### FldDepth:

To reload data for this grid, the user should replace this grid with a new grid representing Flood Depths, and the new grid once loaded **MUST** be named FldDepth, and it must be in NAD\_1983\_StatePlane\_Colorado\_North\_FIPS\_0501\_Feet with depths and horizontal units both in feet.

#### FldVeloc:

To reload data for this grid, the user should replace this grid with a new grid representing Flood Velocities, and the new grid once loaded **MUST** be named FldVeloc, and it must be in NAD\_1983\_StatePlane\_Colorado\_North\_FIPS\_0501\_Feet with velocities in feet/sec and horizontal units in feet.



## VII. Field Descriptions

### Scoring\_Parcel

Important Results Fields and their descriptions:

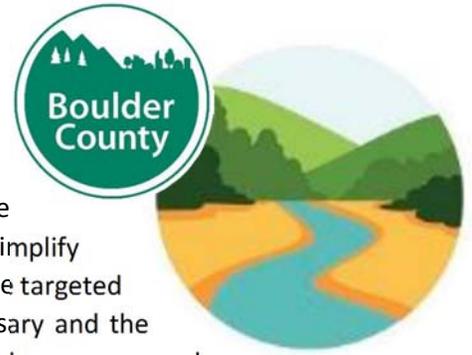
<b>PCL_HAZ</b>	PARCEL HAZARD ONLY SCORE	Maximum hazard value on the parcel from the hazard raster, normalized out of 100.
<b>STRUCT_HAZ</b>	STRUCTURE HAZARD ONLY SCORE	Maximum hazard value of all structures on the parcel, normalized out of 100.
<b>VACNT_SCORE</b>	VACANT LAND CRITERIA ONLY SCORE	Sum of the vacant land criteria scores, normalized out of 100.
<b>IMPRV_SCORE</b>	IMPROVED LAND CRITERIA ONLY SCORE	Sum of the improved land criteria scores, normalized out of 100.
<b>VACANT_BO</b>	ACQUISITION SCORE (DEVELOPMENT POTENTIAL ONLY)	Sum of the Vacant Land score and the Parcel Hazard score, normalized out of 100.
<b>IMPROVE_BO</b>	ACQUISITION SCORE	Sum of the Improved Land score and the Structure Hazard score, normalized out of 100.
<b>RELOCATE_SC</b>	RELOCATION SCORE	Tool 3 calculation
<b>ELEVATE_SC</b>	ELEVATE SCORE	Tool 3 calculation

## Appendix E. Outreach and Engagement Plan

### I. Engagement Methodology

#### Overview

The Room for the River (R4R) outreach program is designed to follow the program concepts of simplicity, visibility and design. This strategy aims to simplify the process for selecting effective and efficient outreach strategies that are targeted to the stakeholders you want to reach, the level of engagement necessary and the specific mitigation strategy identify. They also consider the county’s available resources and capacities for implementing an identified strategy.



#### Connection to Program Concepts

<b>Simplicity</b>	Direct line of communication Short response time Centralized program information One-click access to personnel/answers Integrated into parcel data systems
<b>Visibility</b>	Up to date status updates for enrolled properties available online
<b>Design</b>	Targeted to specific stakeholders, mitigation strategies, level of desired engagement Considers available staff capacity and resources Offers multiple options for engagement scenarios

#### Function

The Outreach and Engagement Strategies matrix is intended to provide guidance on effective strategies given program criteria. The matrix can be filtered based on:

- Target Stakeholder Group
- Strengths/limitations of the engagement tool
- Level of engagement (build awareness, gauge interest, socialize action, mitigation strategy planning)
- Mitigation Strategy specific tools

The engagement and outreach should be organized and tracked over time using the outreach log. This will monitor gaps in outreach, specific stakeholder needs, assist with consistency between staff/contractors and monitor the mutual defined mitigation goal and timeline as well as ongoing milestone updates.

## Room for the River Boulder County, Colorado

DRAFT: Outreach and Engagement Tools				Mitigation Strategy Specific Recommendations						
Description	Target Stakeholder Group	Strengths/ Limitations of Tools	Strategy Best used to: 1: Build Awareness 2: Gauge Interest 3: Socialize Action 4: Mitigation strategy planning	Strategy A	Strategy B	Strategy C	Strategy D	Strategy E	Strategy F	Strategy G
<b>Flyers:</b> Provide program overview to all eligible parcels.	All eligible parcels	Presence where your audience is Simple and easy, limited resources needed <b>Difficult to encourage follow up by viewer</b> <b>Lack of personal impact may mean less response</b> Easy to track where outreach has been completed	1							
<b>Utility Mailers:</b> Provide program overview to eligible parcels, and create a broader program awareness to all parcel in service area.	General/broad	low-time commitment for staff Minimal cost <b>Unable to track read rate</b> <b>Lack of personal impact may mean less response</b>	1							
<b>Online Engagement:</b> Nextdoor, Facebook, Twitter and websites to spread basic knowledge of program and provide program updates.	General/broad	Low-cost way to reach large audience Able to leverage existing accounts and platforms Connect to smaller neighborhood groups Quick link back to more information/response <b>Stakeholder groups may not have reliable Internet access/be frequent users</b> <b>Potential for online rumor mill/need to track conversation</b>	1, 2, 3							
<b>Variable Message Sign (VMS):</b> Use a VMS to post website and program information at key road junctures where owners of eligible parcels will see information.	Clustered eligible parcels	Very targeted to specific location Attention grabbing (potentially) inexpensive and low staff time Effective advertising for public event Difficult to measure view rate Not an easy connection for viewer to respond Reaching owners not in the area	1							
<b>Cold Call/Robo Call:</b> Call owners of eligible parcels to share program information.	Absent owners All eligible parcels	inexpensive ability to have a personal contact and quickly gauge interest <b>High demand on staff/time consuming</b> <b>Difficult to track down up to date contact information</b> <b>May be considered invasive by some</b>	2							
<b>MLS:</b> Include project eligibility in MLS information	Real Estate Professionals Property Seller/buyer	Education group focused on opportunity Easy to access information on known platform Reach sellers prior to point of sale <b>Concerns for property valuation</b> <b>Need to keep records up to date</b> <b>Cost? Staff time?</b>	1,3							
<b>Assessor Map/Data:</b> Include project eligibility in assessors map/data with link to project website	Real Estate Professionals Property Seller/buyer	Easy to access information on known platform Readily available to those not specifically looking for this opportunity <b>Concerns for property valuation</b> <b>Need to keep records up to date</b> <b>Cost? Staff time?</b>	1,3							
<b>Community Meeting:</b> Social gathering to discuss program and program benefits. Could be incorporated into a pancake breakfast, or other existing event, or a stand alone meeting.	Clustered eligible parcels	Ability to have in-depth conversations Target specific communities Conversations vs. one-way information <b>Time consuming for staff</b> <b>Limited attendance</b> <b>Difficult to encourage follow-up</b>	2,3							
<b>Survey:</b> Email survey to all eligible parcels to gather information on levels of interest and program awareness.	All eligible parcels	Inexpensive Reach a broad audience Gather program guiding information and adjust <b>Unable to control response rate/groups</b>	2,3							

## Room for the River Boulder County, Colorado

DRAFT: Outreach and Engagement Tools				Mitigation Strategy Specific Recommendations						
Description	Target Stakeholder Group	Strengths/ <span style="color: red;">Limitations</span> of Tools	Strategy Best used to: 1: Build Awareness 2: Gauge Interest 3: Socialize Action 4: Mitigation strategy planning	Strategy A	Strategy B	Strategy C	Strategy D	Strategy E	Strategy F	Strategy G
<b>Mitigation Strategy FAQ:</b> This product should be made widely available and answer the key questions for the proposed mitigation strategies. It is an informational piece that can be e-mailed, posted to website, shared on social media and brought to in-person interactions as a leave behind.	General/broad	Adds clarity to program/reduces rumor mill risk Place where your target audience is/plug into existing events Inexpensive, can develop with program Translatable to digital platforms <span style="color: red;">Difficult to encourage response from viewer</span>	1, 3							
<b>Real Estate Workshop:</b> 1 hour webinar on what the program is for area real estate.	Real Estate Professionals	May have high interest in tool for sellers (potentially) High level of understanding of sales, flooding, NFIP, SFHA Ability to share information with sellers <span style="color: red;">May not want to pursue due to timelines</span> Make a personal connection, connect to emotions	1							
<b>Storytelling:</b> Through images, video or narrative share the story of a successful voluntary mitigation. Include sentiments of the property owner and data on increase in valuation/decrease in insurance costs and reduced risk to the property owner(s) And/OR focus the stories on loss and the impacts of loss	All eligible parcels Repetitive loss parcels	Easy to distribute digitally Package comprehensive program understanding with stories <span style="color: red;">high-cost, one-time high staff time demand</span> <span style="color: red;">difficult to respond after viewing</span> <span style="color: red;">difficult to track viewers</span>	1,2							
<b>Mitigation Self-Assessment:</b> Provide a digital or mailed questionnaire for property owners to fill out and score. Their score would then tell them an initial look at potential mitigation strategies that may work for their property and encourage them to reach out for a full mitigation assessment. This scoring would mimic that of the database scoring, in a simplified fashion for property owners.	Interested, eligible parcel owners	Assists with educating property owners in a voluntary ways about their risk Encourages engagement with program Provides value to property owner in analysis <span style="color: red;">Barrier to initially filling out self-assessment/may get low response</span> <span style="color: red;">time consuming for staff to analysis/follow up</span>	1,2,3							
<b>Mitigation Assessment:</b> Potential Mitigation Strategies for parcel, estimated return on investment for home valuation and decrease in insurance costs. Estimated increase in protection to property. This assessment could be structured to include specific information that is of value to that property owner. Depending on demand and resources, this could be an noted as a first come first served, or application process and the value of the assessment could be shared with property owners (i.e. \$500 in technical evaluation of flood risk and potential mitigation strategies)	Interested, eligible parcel owners	Highly effective to building interest to act, providing property owner with education and strategies Builds a relationship with potential candidate Fact check for program on parcel condition <span style="color: red;">time-consuming/costly</span>	3							
<b>Mitigation Action Plan:</b> This would choose a preferred strategy for the property owner, set real expectations, reinforce the benefits and set a mutual goal between the project team and the property owner to pursue a specific strategy and complete by a desired date. Interim check-in dates would also be established.	Owners who are eligible, interested and have taken the initial program steps	Supports positive interactions through process Build partnership <span style="color: red;">time-consuming/costly</span> <span style="color: red;">Difficult to set reasonable expectations</span> <span style="color: red;">Very targeted/Very targeted</span>	3, 4							

Room for the River Boulder County, Colorado  
DRAFT Program Outreach and Engagement Strategy

Mitigation Strategy	Parcel ID	Owner Contact Information	Identified Outreach Strategy	Owner Level of Interest/Knowledge	Contact Log	Parcel Goal
Elevate Structure	xxxxx	Bob xxx-xxx-xxxx bob@bob.com	Utility flyer survey phone call Home Assessment	High level of interest, responded to survey and expressed interest during phone call.	His key issue is the price of insurance. If he can decrease this cost through mitigation he is open to it.	Elevate structure to remove from floodplain by 12/1/2020
Buyout - Right of First Refusal	xxxxx	Jane xxx-xxx-xxxx janes@jane.com	phone call Utility flyer	Owner of parcel is in another state, is interested in the program.		Complete right of first refusal agreement upon sale by 8/1/2018
Not yet determined	xxxxx	Sue xxx-xxx-xxxx sue@sue.com	survey phone call	This property owner responded to the survey, but is skeptical of timelines and not yet interested in pursuing.		Not yet determined.



## II. Program Messaging

### Overview

Messaging will help motivate participation, communicate the program clearly and connect to your target stakeholders



### Connection to Program Concepts

<b>Simplicity</b>	<p>Use terms that audience understand and build complexity with increased level of engagement</p> <p>Create concise messages that share the most critical components</p> <p>Clearly explain why this is valuable to the property owner</p>
<b>Visibility</b>	Share messages in multiple formats
<b>Design</b>	Focus on what is at stake for the property owner and include a call to action

### Initial messaging concepts

Translate key ideas into relatable statements that connect to emotions, or stakeholder values.

Key Concepts	Data	Message
How much time does disaster recovery take vs. Mitigation?	What can you do with that amount of time?	With the time it takes to rebuild you can eat xx meals with your family, go on a two-week vacation, chat with your friends for xx hours and read three new books
How much money do you recover in home value?	Include what % increase include what you can do with that money over the course of a year.	What the increase in value you could...
How much money to you save on insurance?	Keep your family and your investment safe.	With the money you save on insurance annually you could...
How much can you reduce your risk to a disaster?		???