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LARIMER COMMUNITY RESILIENCY FRAMEWORK

LARIMER COUNTY

Letter from the Steering Committee

Resiliency is a word that is tossed around rather loosely these days. It means different things to different people, and encompasses ideals that can apply in multiple sectors of any community. In the end, no matter which definition you use, resiliency means that you truly believe in the power of people and organizations to overcome the challenges that arise in more difficult times and to work together to change the future. Sometimes this is in the actions of first responders who work daily to keep people safe. Sometimes it is in the actions of governmental and non-governmental organizations working together to solve complex problems. More often than not, it is in the actions of each individual as they help their family, their neighbors, and their community.

We live in a beautiful county, but the sources of that beauty are also associated with inherent dangers and the potential for disasters. Our natural waterways provide for fishing and recreational opportunities, but when severe weather strikes, these waterways can become paths of destruction. Our extensive trail systems, the National Forest, and Rocky Mountain National Park all provide the very best that nature has to offer, and yet they also create a large amount of land with heavy fuel load for wildfires. These are the tradeoffs for living in a place so lovely.

We cannot remove all hazards from our environment, and disaster recovery can only take us so far. In a county that faces natural and human-caused threats every year, we must take an extra step to develop communities that are self-sufficient and when knocked down, will rise up, wipe the dust off, and come back swinging. This is the purpose of the Resiliency Framework.

A collaborative group of governmental, non-governmental, volunteer, and private sector partners worked together for over six months to develop resiliency strategies for the future of Larimer County and its communities. The vision of this Larimer Community Resiliency Framework (the Framework) is to create a connected, collaborative, and cooperative region that proactively works together to strengthen systems and to resolve complex issues. The Framework outlines the first steps in making this happen through a series of goals and actions.

The Framework is a living document, and will require ongoing support to keep up with our changing environment. Over time, we will complete actions and add new ones. The work on resiliency has not ended—this Framework is merely the beginning. The Larimer County Resiliency Steering Committee vows to sustain the momentum from the last six months and to guide the Framework from initial actions to long-term resiliency.

Acknowledgements

The Larimer Community Resiliency Framework was developed as a collaborative effort. The planning process included participation, insight, and support from a wide range of local, state, and federal government partners, as well as partners in the private and non-profit sectors. Special thanks go out to the following organizations for their support in making this planning process a successful step toward enhancing resiliency in Larimer County:

Big Thompson River Restoration Coalition

Coalition for the Poudre River Watershed

City of Fort Collins

City of Loveland

Colorado Department of Local Affairs

Colorado Resiliency and Recovery Office

Estes Valley Watershed Coalition

Larimer County Voluntary Organizations Active in Disasters

Larimer County Departments, Elected Officials, and Key Staff

Larimer County Long-Term Recovery Group

Larimer Community Resiliency Steering Committee (a full list of committee members is provided in Appendix A)

Little Thompson Watershed Coalition

Town of Estes Park

Funding for this planning process was administered through the Colorado Resiliency and Recovery Office. Ecology and Environment, Inc., and ISET-International provided contract plan development assistance. All photos have been used with the permission of project partners or are from the public domain.

Executive Summary

The Larimer Community Resiliency Framework (the Framework) represents the commitment of communities in Larimer County to a more resilient future. Developed with the collaboration of over 300 stakeholders representing government, non-profits, the private sector, and individuals, the Framework is driven by Larimer County communities' knowledge, priorities, and values. It identifies and analyzes shocks and stresses that may occur, and ultimately develops a holistic strategy and identifies concrete activities that communities in the county can implement to enhance resiliency. The Framework represents a call to action and seeks to empower all those with a stake in resiliency to participate in making it an ongoing community priority and reality.

What is Resiliency?

This Framework uses the definition of resiliency established by the Colorado Resiliency Working Group. Resiliency is *"…the ability of communities to rebound, positively adapt to, or thrive amidst changing conditions or challenges – including disasters and climate change – and maintain quality of life, healthy growth, durable systems, and conservation of resources for present and future generations."*

.Pursuant to the Colorado Resiliency Framework, resiliency can be expressed by the vitality of the following six sectors: Community; Economic; Health and Social; Housing; Infrastructure; and Watersheds and Natural Resources. These sectors provide a framework for looking at a wide range of community needs and activities and exploring the interconnections between systems and services.

Establishing a Baseline

Building more resilient communities in Larimer County requires an understanding of existing conditions in the six resiliency sectors. Chapter 2 of the Framework presents a snapshot of these conditions in Larimer County communities using metrics from various trusted sources. The following key strengths and challenges were identified in each sector:

Sector	*Key Strengths*	*Key Challenges*
Community	Coordinated planning Strong non-profit sector	Rapid population growth Unmet recovery needs
Economic	Low unemployment Education and research institutions	Net exporter of labor Flood zone remapping
Health and Social	Strong culture of volunteerism High educational attainment	Over-reliance on volunteerism Limited access in remote areas
Housing	Coordinated efforts to increase housing supply and alleviate costs	Rapid population growth Housing costs outpacing wage growth
Infrastructure	I-25 north-south connection Increasing public transit use	Lack of redundancy Aging facilities and equipment
Watersheds and Natural Resources	Strong watershed management Significant forest resources	Future flow depletions Wildland-Urban Interface development

Understanding Shocks and Stresses

Chapter 3 of the Framework presents the idea of shocks and stresses, and how they lead to community vulnerability. Shocks are events that can cause direct damage, injuries, and death. Examples of shocks include natural disasters, terrorism, and pandemics. The following have been identified as the most significant shocks that have impacted, or have the potential to impact, communities in Larimer County:

Significant Shocks	
Natural Hazards	**Human/Technological**
Wildfire	Terrorism and Acts of Mass Violence
Flooding and Dam Failure	Hazardous Materials Release
Severe Weather	Information Technology Failure
	Pandemic Disease Outbreak

Stresses, on the other hand, are underlying factors that exacerbate the impact of shocks and/or hinder a community's ability to recover from shocks. Examples of potential stresses include high unemployment, aging infrastructure, and poor access to critical services. The following have been identified as the most significant ongoing stresses impacting communities in Larimer County. Certain stresses directly reflect the key challenges identified in Chapter 2.

Significant Stresses
Aging and Inadequate Infrastructure
Lack of Available and Affordable Housing and Transportation
Increasing Homelessness
Aging Population
Recurring Drought
Economic Downturns

Defining a Vision and Goals

Having explored existing conditions and defined the major shocks and stresses that underlie resiliency efforts, Chapter 4 of the Framework presents the vision, goals and strategies that should drive immediate and longer-term action to enhance resiliency in Larimer County communities. After considering what resiliency should look like locally and regionally, the Larimer Community Resiliency Steering Committee crafted the following vision statement:

"A connected, collaborative, and cooperative region where:

- ***Cities, rural communities, and agriculture are valued and supported by long-range, regional, comprehensive planning.***
- ***There is a diverse range of housing and multi-modal transportation options.***
- ***Critical infrastructure has built-in redundancy.***
- ***County residents understand their risks, and communities and individuals are self-sufficient and take responsibility for their own and their collective preparedness.***
- ***The economy is diverse, vibrant, and sustainable with a trained, diverse workforce that fosters equitable access to the social services and education needed to maintain capacity, flexibility, and high quality of life.***
- ***The natural environment is valued, protected, and responsibly managed. Infrastructure is moved from/kept out of high risk areas."***

With the input of the broader stakeholder group, this vision statement was refined into the following set of goals.

Larimer Community Resiliency Goals

Goal 1: Implement regional, long-range, comprehensive planning.

Goal 2: Engage and educate county residents to foster awareness, preparedness, self-sufficiency, and a greater sense of community.

Goal 3: Develop and implement construction standards that increase energy and resource efficiency and reduce risk.

Goal 4: Increase the range of housing options and increase stock of affordable housing through traditional means as well as creative land use, building codes, and measures for innovative housing.

Goal 5: Develop and fund a regional, multi-modal transportation network.

Goal 6: Manage natural resources through watershed restoration and floodplain and land use planning.

Goal 7: Build public-private sector partnerships to support and achieve the community's vision and goals.

Defining Strategies

Informed by the resiliency vision and goals, the Larimer Community Resiliency Steering Committee developed strategies that address existing conditions and align with the six resiliency sectors. These strategies serve to define the objectives of resiliency projects.

In the planning process, to date, resiliency projects were identified through community consultation at broadly-attended charrettes and one formal public hearing. The list in this Framework (provided in Section 5, Tables 5.1 and 5.2) includes projects that have already been well defined and scoped, as well as ideas for future projects that were elicited for the first time during these events. Wherever possible, projects were prioritized based on the following criteria:

Prioritization Criteria	*Description*
Co-Benefits	Address problems across multiple sectors creating maximum benefit.
Innovation	Advance new approaches to encourage continual improvement.
High Risk and Vulnerability	Reduce risks to human well-being, infrastructure, and natural systems.
Adaptive Capacity	Consider future unknowns of changing climate, and economic and social conditions.
Economic Benefit-Cost	Make good financial investments that have the potential for economic benefit.
Harmonize with Existing Activity	Expand, enhance, or leverage work being conducted to build on existing efforts.
Social Equity	Provide solutions that consider the needs of vulnerable populations.
Long-Term and lasting Impact	Create long-term gains with solutions that are replicable and sustainable.
Technical Soundness	Identify solutions that reflect proven best practices in similar regional contexts.

Priority Projects

Using the criteria listed above, and taking into account project readiness, the following projects have been identified as priorities for immediate action:

Project	Resiliency Sector(s)	Project Description
Larimer Connects – Community Conversations	Community	Develop education modules and outreach programs throughout Larimer County to increase community knowledge of hazards, risks, and preparedness options.
Mobile Resource Van	Health and Social	A countywide partnership between public and private agencies to bring resources, information, and services to vulnerable communities, including medical and public health services, testing and information, mental health services, and emergency response and preparedness information.
Regional Affordable Housing and Transportation Assessment and Strategy	Housing, Infrastructure	Conduct a countywide assessment of housing needs and availability as the foundation of a countywide housing plan. Plan and implementation will build on existing affordable housing projects and develop a clear strategy for a broader mix of housing options.
Northern Colorado Community Connectivity Project	Economic, Infrastructure	Construct a robust and resilient corridor connecting Northern Colorado. In the initial phase, the three I-25 bridges at Little Thompson River, Big Thompson River, and Poudre River crossings would be replaced, stream improvements would be implemented, and greenways that connect the west and east sides of I-25 would be installed.
Resilient Natural and Built Infrastructure	Infrastructure, Watersheds and Natural Resources	Plan and implement projects that have a system-wide ecosystem benefit. To do this, develop new design criteria for low-impact development and green infrastructure in watersheds across the county.

Roadmap to Resiliency

Resiliency is an ongoing process. Community resiliency will not be achieved simply through the completion of projects proposed in this Framework. Continued action in the following areas will be critical for ensuring the ongoing success of the Framework.

Leadership and Collaboration. A variety of organizations are needed to sustain ongoing resiliency actions. Ongoing efforts should be made to identify new approaches toward coordination and governance.

Capacity Building. Building resiliency relies on an ongoing process of evaluating resources and generating new opportunities.

Ongoing Community Involvement. Ongoing success relies on active public engagement. Community members should stay informed, and new outreach methods should be developed.

The Larimer Community Resiliency Steering Committee is committed to spearheading efforts to improve community resiliency throughout 2016. These efforts will include broadening committee membership to represent all sectors and geographic areas of the county, continuing to develop a wider network of organizations that participate in resiliency conversations, and gaining the active support of local governments.

Over the next two to five years, the Larimer Community Resiliency Steering Committee aims to create a more perennial body dedicated to ongoing community engagement toward resiliency and to the continued mobilization of local governments and private organizations to implement future resiliency projects.

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Section 1
Introduction

Larimer County is known for its world-class outdoor recreation opportunities, a balance between thriving agriculture and growing urban communities, and Colorado State University. Like most counties in the Front Range of the Rocky Mountains, Larimer County encompasses both the mountains in the west and flat agricultural land in the east. Communities in the mountains tend to follow the canyons carved out by the main rivers and creeks, flowing on to the plains. These water courses provide resources for recreation, irrigation, and urban water needs. Unlike most Front Range counties, Larimer County has never had a large mining industry. Instead, ranching and agriculture, including cattle, hay, and sugar beets, have historically driven growth. Today, the county is considerably more diversified, with most people finding employment in government, hospitality and food industries, and retail. The government sector includes school districts and state-run colleges. Population growth in the county is running ahead of the state average, and is projected to grow faster than jobs.

In the past few years, the area has been subject to both severe fire and flood events, the two principal hazards in the Front Range. These hazards have been an issue since the settlement of the area in the 1860s. In fact, the original Camp Collins was flooded in 1864, just a few years after it was founded, and was then moved to a less flood-prone area. Early settlers worried about forest fires consuming local trees needed for fuel and construction.

Most recently, the High Park Fire burned for three weeks in June 2012. The fire burned over 87,200 acres, the vast majority of which was National Forest (49%) and private land (45%), with some damage on state land. The estimated cost of suppressing the fire was over $39 million[1], and insurance claims cost insurers approximately $97 million.[2] It was the largest and most destructive fire in the history of Larimer County, destroying 259 homes and cabins and disrupting the lives of hundreds of residents. Given the fire's location in the foothills, possible further consequences in subsequent seasons include flooding, debris flows, sediment transfer, and erosion. While this fire was being fought, a second smaller fire broke out in Woodland Heights, near Estes Park and the entrance to Rocky Mountain National Park, and destroyed over 20 additional homes.

The following year, Larimer County was hit by the September 2013 floods, which affected a large stretch of the Front Range. Within the county, 338 homes and 25 businesses suffered significant damage, and 47 homes and seven commercial buildings were destroyed. Severe damage to the roads running up the canyons isolated many mountain communities for extended periods of time, including Estes Park, Drake, Glen Haven, and Cedar Park. The damage along Big Thompson Creek reminded residents of the 1976 flash flood along that same creek which killed 144 people. Difficulty of access was particularly impactful and damaging to the economy, since the flood occurred during high tourist season. Economic impacts were exacerbated by the shutdown of the federal government in October 2013, cutting off use of Rocky Mountain National Park, one of the area's key tourist draws. Only intervention by the State of Colorado kept the park open.

The county continues to recover from these disasters, incurring ongoing costs to both residents and government agencies. There is awareness that Larimer County will continue to experience these and other shocks and stresses in the future, and the county is preparing for that future. Larimer County communities have developed this Resiliency Framework, hereafter referred to as "the Framework," in order to provide a dedicated process for resiliency, develop a shared resiliency vision and goals, define and catalyze resiliency priority projects, and complement resiliency planning efforts in neighboring communities and at the statewide level.

Section 1.1 Objectives and Guiding Principles

This Framework is meant to serve the community as both a snapshot of current thinking around resiliency, but also as a framework for future thought and action in the community. The Framework has been developed by a varied group of stakeholders and has been vetted through a public review process.

Objectives of the Framework. The Framework is organized to accomplish the following objectives:

- Establish a baseline for understanding resiliency in Larimer County communities.
- Review the shocks (e.g., fire, flood, terrorism) and stresses (e.g., drought, aging infrastructure) that combine to create vulnerabilities in Larimer County communities.
- Present a vision for resiliency in Larimer County communities that is supported by forward-looking goals, actionable strategies, and concrete ideas and projects for action.
- Provide a framework for ongoing implementation and action that allows communities and organizations in Larimer County to use this document as a springboard for building capacity, increasing community connectivity, and moving toward a more resilient community.

What the Framework is Not. It is important to understand what this Framework is not intended to do:

- This Framework is not a hazard mitigation plan. It is not intended to provide an exhaustive review of all the shocks and stresses that might impact the community, but instead is intended to broaden understanding of shocks and stresses and how they have impacts across many aspects of the community.
- This Framework is not a comprehensive checklist of actions. Rather, it is a presentation of the community's vision for a resilient Larimer County, a discussion of strategies and priority projects that serve this vision, and a framework under which local government, community and faith-based organizations, the private sector, and other partners can take collective and individual action to foster a culture of resiliency.

- This Framework is not a 'capital C' County document or plan. It is meant to provide guidance and resources for all governments, community partners, and interested organizations located in Larimer County. The Framework does use the word "county" and "Larimer County" at times to serve as a way to succinctly cover a wide range of partners, but nothing in this document should be construed as being the sole product or responsibility of the Larimer County government.

Guiding Principles

Enhance Connectivity. Community action should support connecting people to their community, jobs, services, and each other.

Build on Existing Action. A framework for future action should honor the work that has already been conducted to build community resiliency.

Engage the Whole Community. Resiliency planning should not only engage the whole community, but be reflective of the human, economic, and geographic diversity within the community.

Support the Most Vulnerable. All resiliency action should be viewed through the lens of how it supports those who may be disproportionately impacted by shocks and stresses in Larimer County.

Foster Action. This Framework should drive action and empower communities to push a cultural shift in thinking about resiliency through concerted and collaborative efforts.

Section 1.2 Vision Statement

Through the resiliency planning and engagement process, community stakeholders have made a long-term commitment to enhance resiliency to shocks and stresses in Larimer County. This commitment is best expressed in Larimer County's vision for resiliency:

"A connected, collaborative, and cooperative region where:

- ***Land use planning is long-range, regional, and comprehensive, and values cities, rural communities, and agriculture.***
- ***There is a diverse range of housing and multi-modal transportation options.***
- ***Critical infrastructure is designed to be affordable, adequate, and resilient.***
- ***County residents understand their risks, and individuals and their communities are self-sufficient and take responsibility for their own and their collective preparedness.***
- ***The economy is diverse, vibrant, and sustainable with a trained, diverse workforce.***
- ***There is equitable access to the social services, health care, and education needed to maintain capacity, flexibility, and high quality of life.***
- ***The natural environment is valued, protected, and responsibly managed so that there is availability of and access to natural resources. Infrastructure is moved from/kept out of high-risk, high-value areas."***

Section 1.3 What is Resiliency?

The Colorado Resiliency Working Group has defined resiliency as "…the ability of communities to rebound, positively adapt to, or thrive amidst changing conditions or challenges – including disasters and climate change – and maintain quality of life, healthy growth, durable systems, and conservation of resources for present and future generations."

While there are many competing definitions of resiliency, most incorporate a few important concepts that can inform efforts to build resilient communities. One is the concept of ***adaptability to change***: a resilient community is one that can thrive under changing conditions, whether those changes are rapid or more gradual. ***Diversity*** and ***redundancy*** can foster resiliency. For example, a community with a diverse economy may be better able to weather an economic shock, especially if that shock adversely affects one or several sectors more than others. The electrical grid, which efficiently and effectively builds in redundancy, can smoothly handle shift, changes and spikes in load.

Another concept important to resiliency is that of ***systems*** and ***feedback***. Resiliency acknowledges that economic, social, and environmental systems are tightly interconnected. For example, drought can lead to crop failure, thereby impacting the agricultural economy. Simultaneously, drought can exacerbate the conditions for wildfires, which threaten life, property, and ecological communities. These relationships and feedback processes are central to understanding what creates (or undermines) resiliency.

Finally, resiliency addresses vulnerability arising from both acute ***shocks*** and latent ***stresses***. ***A resilient community is one that thrives in good times and bad.*** Hence, resiliency planning necessarily addresses a broader array of issues than traditional hazard mitigation planning. For example, hazard mitigation may help reduce the flood exposure of a neighborhood while resiliency planning recognizes that disparate conditions in that neighborhood, whether due to poverty, illness, language barriers, or other underlying factors, create and exacerbate negative outcomes before, during, and after a hazard event occurs.

Resiliency planning in Larimer County communities is organized around six resiliency sectors as illustrated in Figure 1-1. The framework planning process utilized these sectors as a way to engage stakeholders and ensure a ***holistic approach*** to community resiliency, but also recognized that the sectors are interconnected, and a truly resilient community relies on systems that foster cross-sector collaboration and benefits.

Figure 1-1: Resiliency Sectors

Section 1.4 Resiliency Planning and Community Engagement in Larimer County

The development of this Framework was not an insular endeavor. The Framework development process capitalized on existing momentum around resiliency planning in Colorado, and made efforts to engage a wide spectrum of stakeholders in the community.

Section 1.4.1 Colorado Resiliency Framework

On June 1, 2015, the Governor adopted the Colorado Resiliency Framework, which was designed to cultivate and empower a culture of resiliency throughout the state of Colorado, and represents "the State's long-term commitment and investment into a resilient future." Since the release of the Framework, the Colorado Resiliency and Recovery Office has supported the development of local resiliency frameworks and plans in Larimer, Boulder, and El Paso counties. These pilot plans will serve as a springboard for resiliency planning throughout Colorado.

Colorado Resiliency Framework Goals

Risk. Reduce risk to Colorado communities.

Planning. Enhance resiliency planning capacity in Colorado communities.

Policy. Develop, align, and streamline policies to empower resiliency.

Culture. Create a culture that fosters resiliency, instilling an inherent sense of responsibility among all.

Investment. Ingrain resiliency into investments in Colorado.

Section 1.4.2 Local Steering Committee

The resiliency planning process for communities in Larimer County began with the creation of the Larimer Community Resiliency Steering Committee in August 2015. Facilitated by representatives from local emergency management agencies and the Larimer County's Long-Term Recovery Group, the committee consists of representatives from a wide variety of stakeholders from local, state, and federal governments, community-led coalitions, non-profit organizations, and private businesses.

The Larimer Community Resiliency Steering Committee has directed the planning process, including identifying and recommending interested stakeholders, defining the structure and expected outcomes of the resiliency charrettes, and engaging and mobilizing government agencies and community partners to participate. The Steering Committee is expected to maintain a leading role in putting the principles of the Framework into practice.

A full list of Steering Committee members is provided in Appendix A.

Section 1.4.3 Resiliency Charrettes

The planning process focused on two charrettes that were held in the community as a forum on resiliency. The two charrettes provided an opportunity for intensive work sessions that would be more inclusive and productive rather than an ongoing series of meetings.

Charrette #1

The first charrette in the planning process was held on August 25 and 26, 2015, and engaged 65 representatives of local, state, and federal governments and non-profit organizations around issues of community resiliency.

During the first day, the group reviewed other plans that exist or are in the process of being developed in order to place this Framework in a broader context. Then, using a variety of exercises and small group discussions, the group developed a broad vision for community resiliency, goals, and strategies for each of the six sectors identified in Figure 1-1. The outputs of this charrette included understanding what shocks and stresses the county faces, what a resilient Larimer County would look like, and what strategies are needed to get there.

A number of principles guided the charrette:

- All voices need an opportunity to be heard through a variety of means, including speaking, writing, graphic representation, small group work, and plenary presentations.
- Resiliency is more than any single disaster event, but instead looks at how a community can thrive in the face of a wide variety of shocks and stresses that often are not associated with disaster management.
- Participants produce more resilient thinking when they interact with people from different sectors, jurisdictions, and perspectives.
- This planning process is not meant to replace the many other planning processes that exist. Instead, it seeks to create a new, more integrated way of thinking and acting that makes all the other plans more effective.

On the second day of the charrette, the group was narrowed down to the Larimer Community Resiliency Steering Committee and its state and federal partners so they could dig deeper into individual projects that work toward this vision and goals. Participants put forward their ideas for projects that represent a new way of doing business, including regional and cross-sector benefits, integration of best thinking, and addressing key vulnerabilities. Working together, this group combined their ideas in a set of five feasible projects that could be developed further in future sessions. These projects are identified in **Section 4: Resiliency Strategies.**

Charrette #2

The second Charrette reconvened the same group of people to review the results of the first charrette and lay out a Resiliency Road Map for the county that would eventually appear in the Community Resiliency Framework. The group met in Loveland on October 15, 2015. For this charrette, there were 41 representatives of local, state, and federal governments, the private sector, public utilities, and non-profit organizations.

The objectives of the charrette were:

Objective 1: Review and validate shocks and stresses, vision, goals, and strategies from Charrette #1.

Objective 2: Engage stakeholders in bringing forward new ideas for community resiliency.

Objective 3: Assign ownership to identified resiliency projects.

Objective 4: Build a "Roadmap to Resiliency" that establishes the community's path forward.

The morning activities of Charrette #2 focused on reviewing and validating shocks and stresses, the Larimer County resiliency vision and goals, and the strategies to achieve the vision and goals. Participants worked in small groups, in plenary, and interacted with materials posted around the room to validate the Framework's content. Charrette participants also reviewed the list of project ideas developed in Charrette #1. In the afternoon, participants focused on identifying the potential roadblocks to and opportunities for building resiliency within the county, how to address the roadblocks and opportunities, and who should be assigned to make that happen. In developing the "Roadmap to Resiliency," the participants considered the following framing topics: leadership and collaboration, capacity building, and community engagement.

Charrette #2 validated content included in the first draft of the Framework, produced a refined list of project ideas, including the identification of project owners for short-term actionable projects, and defined the first steps in the "Roadmap to Resiliency," to transform resiliency strategies into realities.

Framework Review Session

Following substantial completion of the draft version of this Framework, the Steering Committee held a formal Framework Review Session on December 9, 2015. This half-day session engaged committee members directly with the proposed Framework content and format. The session's primary objective was to gather comments and feedback confirming that Framework content adequately reflected community input and considerations, or, as necessary, provide a forum for proposing specific corrections, updates, or changes to the Framework.

The primary feedback obtained through this session included:

- Review of the key strengths of Larimer County communities and the challenges they face in the six resilience sectors, including requests to modify, and in certain cases add, content.
- Review of the content of the priority and future project lists, including a specific request to list project owners, and to identify the resiliency strategies fulfilled by each project idea.
- Confirmation that the Larimer Community Resiliency Steering Committee would remain the driving force behind the Framework in 2016.
- Discussion of the means to ensure the Framework becomes an effective driver of actions taken by local organizations and governments.

Summaries of the charrettes and the Framework Review Session are provided in Appendix B.

Section 1.5 Context

This Framework seeks to leverage and enhance planning efforts that have already been completed in Larimer County. These include:

- **2016 Larimer County Hazard Mitigation Plan Update (December 2015)**. Identifies hazards, risks, and vulnerabilities across the county, and recommends the development of mitigation actions.
- **Unmet Needs and Community Fragility Study (December 2015)**. Identifies recovery unmet needs, identifies community unmet needs, and assesses community fragility. Many needs are not covered by current local, state, and federal programs. Since resiliency is a determining factor in community fragility, the study illustrates community diversity, the importance of social capital and community connectedness, and the problem of a "one-size-fits-all" approach.
- **Larimer County Comprehensive Emergency Management Plan (2015).** Provides a basis for emergency prevention/preparedness, mitigation, response and recovery for Larimer County government before, during and after emergencies.
- **Larimer County Strategic Plan Update (2013-2018)**. A three-phase process that lays out seven goals with 23 objectives for county government.
- **Fort Collins Climate Adaptation Planning (2014)**. Planning to increase resiliency to four main effects: (1) Temperature Extremes and Air Quality; (2) Storms, Flooding, Wildfire, and Water Quality; (3) Drought Impacts and Water Supply; (4) General Climate Change and Natural Systems.
- **Regional Economic Development Strategic Plan (June 2015)**. Identifies and prioritizes infrastructure and amenity components within the county's control that inhibit or enhance Economic Development success; develops a comprehensive Economic Development framework to support innovation and entrepreneurship, and influence the retention and creation of opportunities; and updates the Comprehensive Master Plan.
- **Larimer County Code (Fire, Land Use, Building) Updates (under development)**. As part of the County Strategic Plan, codes are being updated for new construction to mitigate hazards.
- **State Hazard Mitigation and Land Use Guide (under development)**. Being developed by the Colorado Department of Local Affairs as a guide for communities around the state.
  - **Colorado Resiliency Framework (2015).** The Colorado Resiliency Framework provides guiding principles around resiliency for the state of Colorado and defines the structure through which the State will support local agencies and community groups as they identify and implement local resiliency frameworks.

Section 2
Existing Conditions

Resiliency in Larimer County communities is directly impacted by social, economic, physical, and institutional factors that influence both how much a community can be impacted and how well it can recover. This section summarizes these conditions in each of the six sectors identified in the Colorado Resiliency Framework: Community, Economic, Health and Social, Housing, Infrastructure, and Watersheds and Natural Resources.

Section 2.1 General Information

Larimer County is located in north-central Colorado at the border with Wyoming. The county extends west to the Continental Divide and east to the edge of the Great Plains. Larimer County was established in 1861 as one of the 17 original counties of the Colorado Territory and covers an area of 2,640 square miles. The county had an estimated population of 324,122 in 2014, making it the sixth-largest Colorado county by population.[4]

Larimer County shares boundaries with the Fort Collins-Loveland Metropolitan Statistical Area, and includes both urban centers and rural areas. The seat of government and largest city is Fort Collins, with an estimated population of 156,480 in 2014.[4] Many small towns are spread across the eastern part of the county, with the western part dedicated to small rural communities and mountainous areas. Over 50% of land in the county is publicly owned, most of which lies within Arapaho-Roosevelt National Forest and Rocky Mountain National Park.[3,4,5,6,7]

A full list of incorporated and unincorporated communities located in Larimer County is provided in Table 2-1. Figure 2-1 provides a general map of the county, including urban and rural areas, major natural features, transportation corridors, and protected areas.

Table 2-1: Cities, Towns, and Unincorporated Communities in Larimer County

Cities and Towns[1]		*Unincorporated Communities*	
Name	**Population**	**Name**	**Population**
City of Fort Collins	156,480	LaPorte	2,691
City of Loveland	72,651	Bellvue	2,185
Town of Windsor[2]	21,106	Campion	1,832
Town of Johnstown[2]	13,306	Livermore	1,759
Town of Wellington	7,185	Drake	1,010
Town of Estes Park	6,165	Pinewood Springs	1,000
Town of Berthoud[2]	5,807	Red Feather Lakes	525
Town of Timnath	1,983	Glen Haven	151
		Buckeye	Unk
		Kinikinik	Unk
		Masonville	Unk
		Pingree Park	Unk
		Poudre Park	Unk
		Rustic	Unk
		Waverly	Unk

All population figures are drawn from the 2010 U.S. Census.

[1] Includes all Home Rule Municipalities, Statutory Cities, and Statutory Towns. U.S. Census Bureau 2014 population estimate.

[2] Portions of Berthoud, Johnstown, and Windsor are located in Weld County.

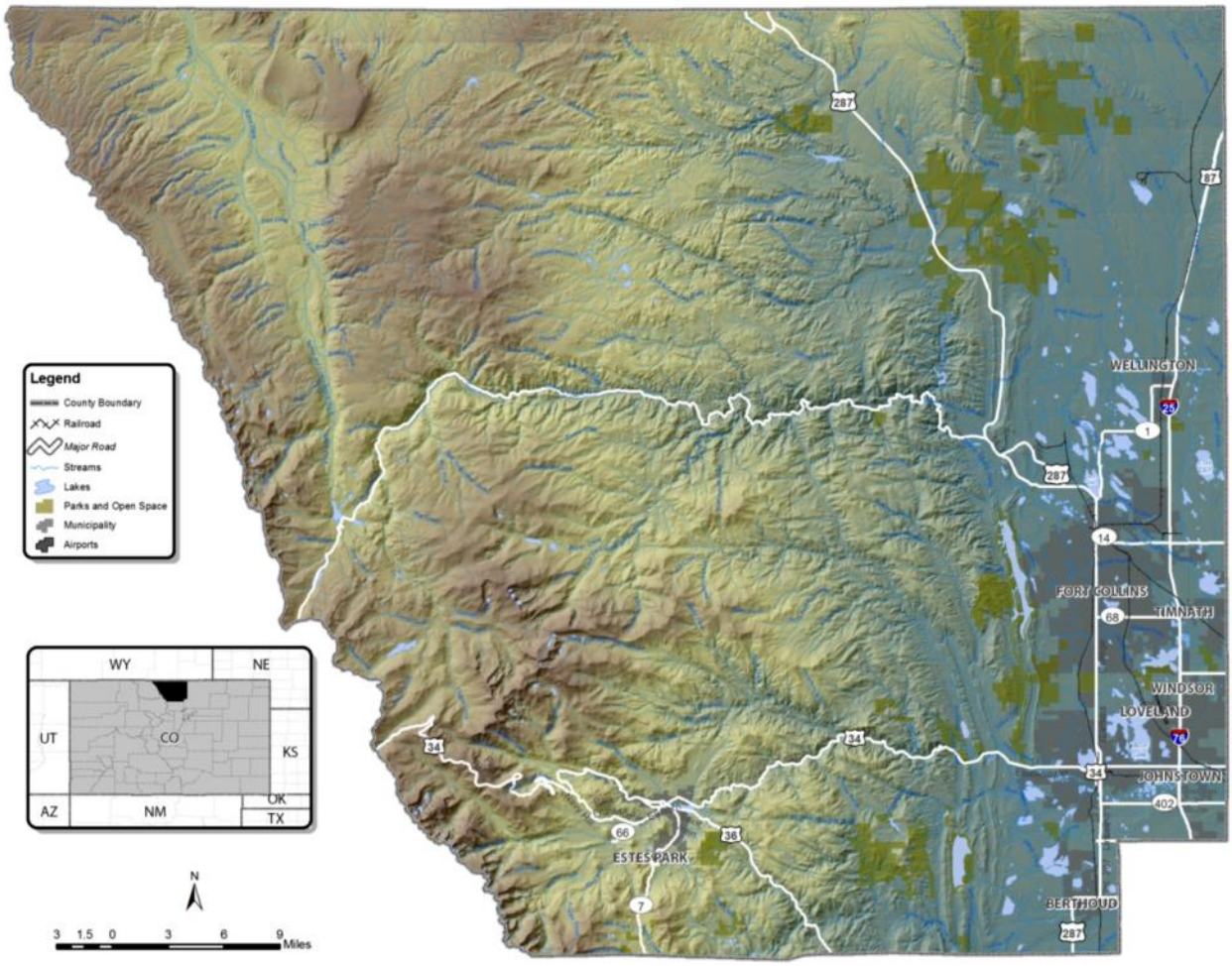


Figure 2-1: Map of Larimer County

Section 2.2 Community

A resilient community is one in which individual community members have the information and tools necessary to make resilient decisions, while an underlying culture of responsible governance drives local and regional decision making. Key elements include the capacity for institutions to make plans that are coordinated across disciplines (e.g., land use planning and emergency management), incorporate lessons learned from prior experience, take into account the needs and concerns of all local population groups, and make the link between local and regional concerns.

In this respect, the main strengths and challenges faced by local communities are the following:

- **Strengths**: Coordinated land use and hazard mitigation plans; recently updated Emergency Management Plan; strong non-profit sector.
- **Challenges**: Rapid growth in Fort Collins; ongoing unmet community needs from previous disasters; differences in culture, priorities, and access to services between communities located in different parts of the county.

The following briefly summarizes key aspects of local governance, demographics, and community organization that relate to community resiliency.

General Governance

The three-person Board of County Commissioners manages the Larimer County's business affairs, including apportioning and levying taxes and overseeing management and budgeting of all county programs. There are eight incorporated towns and cities in Larimer County. Each has its own government, body of elected officials, and the ability to assess taxes, provide public services, and regulate land use and building codes. Unincorporated areas rely more heavily on county resources distributed by the Board of County Commissioners.[8] Colorado law limits the types of services that county governments can provide to residents. To this end, the Larimer County has designated special districts to act as local governments to address the gaps between essential services the county provides and the services that residents need. These services include ambulance, health services, sanitation, fire protection, and water.

Land Use and Emergency Management Planning

In 1997, the County Partnership Land Use System published the Larimer County Master Plan as a long-term decision making framework for development, public services, capital facilities, and natural resource management in unincorporated areas. The county Land Use Code and zoning regulations guide how property is used and developed.[9] Since 2013, the code has included floodplain management regulations and a Disaster Re-Build Program to aid those affected by large-scale disasters. Additionally, the county has extensive Building Codes and Wildfire Codes in place.

The Larimer County Comprehensive Emergency Management Plan was adopted in January 2015.[10] The plan provides the legal basis for emergency management and information on all four phases of emergency management: preparedness, mitigation, response, and recovery. Additionally, the Larimer County plans to adopt an updated Hazard Mitigation Plan in 2016.

The county finalized an Unmet Needs and Community Fragility Study in December 2015 to assess the current state of communities affected by the 2012 High Park Fire and the 2013 floods. The study provides data on the unmet needs of residents and helps determine each community's ability to cope with future disasters. The study heavily emphasizes how systems fragility plays a role in a community's ability to recover, adapt, and overcome after large-scale events. The County's 2016 Hazard Mitigation Plan, Unmet Needs Study, and Emergency Management Plan will help inform community development, engineering, building, and emergency management partners in all future planning efforts.[11]

Demographics

Larimer County is the sixth most populous county in Colorado. Approximately 70% of county residents live in either Fort Collins or Loveland. The City of Fort Collins is the state's fourth-largest city.[12] The county population grew 19% between 2000 and 2010 and is expected to grow by more than 60% between 2010 and 2040, when the population will reach over 483,000.[13]

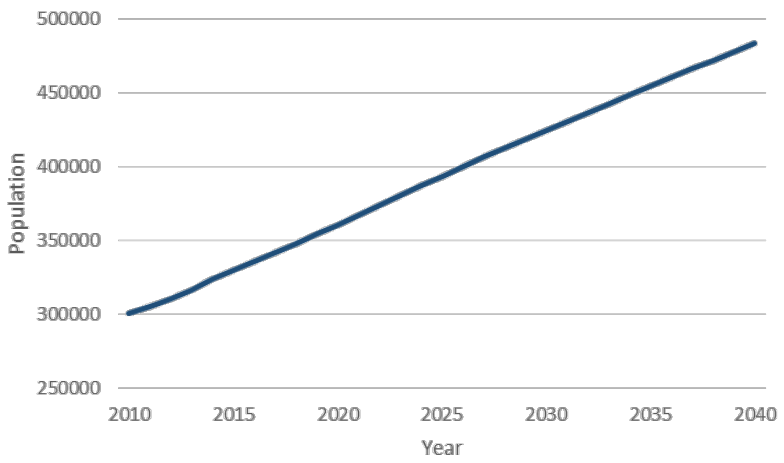


Figure 2-2: Larimer County Population Projections, 2010-2040

The 2010 Census found that 90.5% of Larimer County residents identified as White, and 10.6% of the population identified as Hispanic or Latino, regardless of race.[14] Hispanics are the fastest growing racial or ethnic minority group; except for White and Hispanic populations, no other group makes up more than 5% of the population. From 2000 to 2010, the Hispanic population in Larimer County increased 52%. Nonetheless, the number of Hispanics or Latinos as a proportion of total county population remains well below the state average.[14]

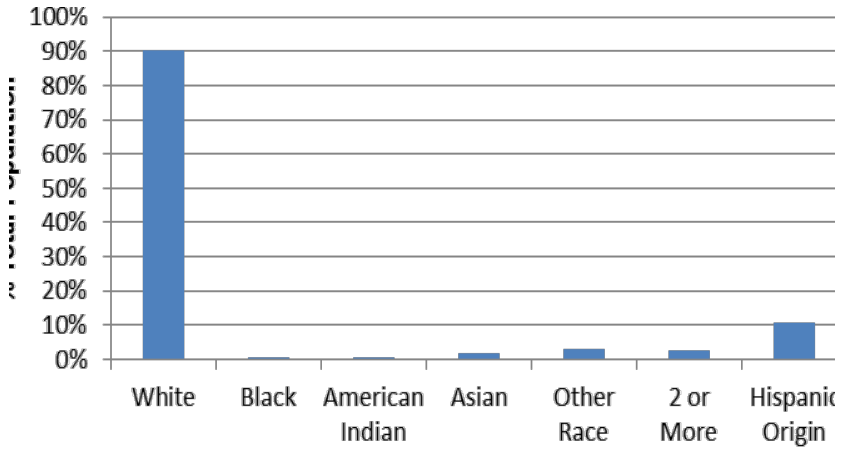


Figure 2-3: Larimer County Population by Race/Ethnicity

Cultural Resources and Community Non-Profits

Larimer County is home to a wide array of arts and culture resources. The county boasts a variety of artistic associations, historical museums, outdoor street performances, and more. In 2015, *The Coloradoan* newspaper reported that 375 non-profits currently operate in Larimer County. Fort Collins is a cultural hub of the county,[15] while the city of Loveland takes pride in being "one of the top arts

communities in our country".[16] Figure 2-4 shows that Fort Collins and Loveland account for 93% of non-profit income in the county.[14]

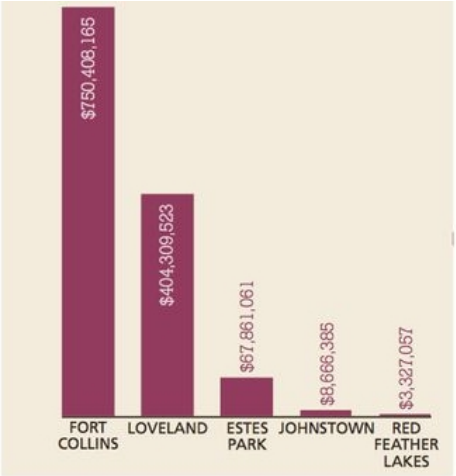


Figure 2-4: Non-profit Income by Location in Larimer County, 2015[17,a]

The Outdoors

Larimer County land is rich with opportunities for those who enjoy the outdoors. In fact, Rocky Mountain National Park and Arapaho-Roosevelt National Forest make up the majority of the county. In addition to the National Park and forest trails, Larimer County, itself manages and maintains 81 miles of multi-use public trails, and multiple public trails have been developed in the City of Fort Collins.[18]

[a] Adapted from: http://www.coloradoan.com/story/news/2015/07/10/nonprofits-larimer-county/29966361/

Section 2.3 Economic

The capacity of the local economy to absorb the impacts of events, such as natural disasters or economic downturns, while maintaining business volume and employment, is critical for the long-term survival of communities in Larimer County. Economic resilience can be strengthened through multiple means, including fostering strong base industries, encouraging the establishment of a wide range of businesses, facilitating access to capital, and developing a skilled workforce that can command steady and self-supporting incomes. Promoting the use of business continuity plans and back-up systems can also help reduce the time needed to get back to business following a disaster event.

In this respect, the main strengths and challenges faced by communities in Larimer County are the following:

- **Strengths**: Relatively low unemployment; education and research institutions; relatively varied industries and employment types.
- **Challenges**: Larimer County communities are net exporters of labor; dependence on a limited number of industries in some areas; impact of flood zone remapping on insurance costs for businesses impacted by past disasters; and increasing real estate pricing and business rents are pushing out small, local businesses.[19]

The following briefly summarizes key aspects of the local economy, including major employers, employment by sector, and household income.

Major Industries and Employers

At 68.9%, labor participation in Larimer County is comparable to the Colorado average of 67.9%.[20] The largest employment sectors are retail trade, health care and social assistance, professional and technical services, and accommodations and food services. Estimated total jobs by sector are listed in Figure 2-5.

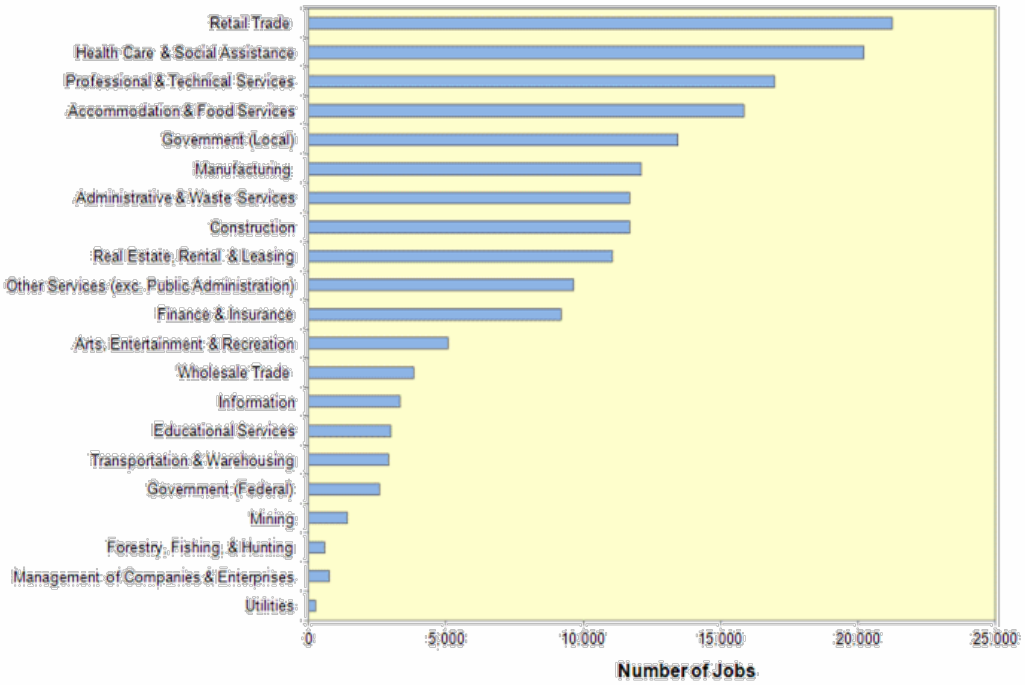


Figure 2-5: Larimer County Jobs by Industrial Sector, 2011

Retail trade, healthcare and social assistance, professional and technical services, and accommodation and food services together provide nearly 39% of jobs in the county.[21] Manufacturing, healthcare and social assistance, IT/software development, and research and development/engineering have been identified as important industries in the region based on concentration of firms, job growth potential, and relation to targeted industries.[11] Jobs in these sectors pay some of the highest wages in the county.[22] Although retail trade and food services account for 19% of all jobs in Larimer County, employees in these sectors earn some of the lowest average weekly wages.[22]

The 10 largest private employers in the county are listed on Figure 2-6.[21] Significant public employers include local government and school districts, as well as Colorado State University.

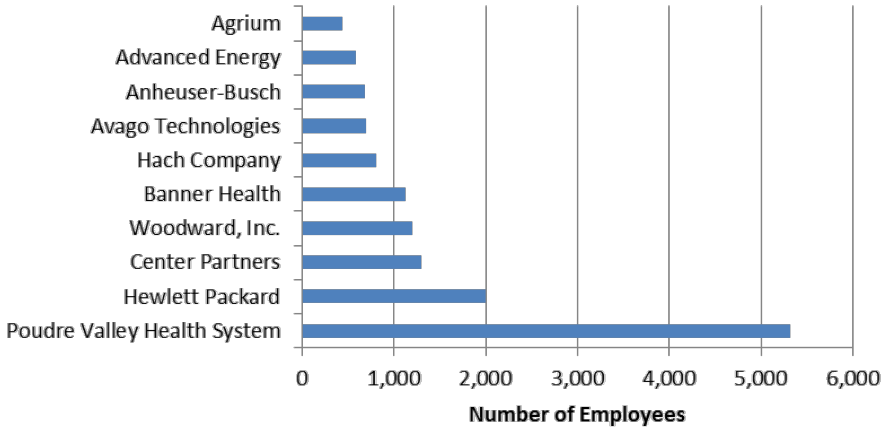


Figure 2-6: Largest Private Employers in Larimer County, 2012

Household Employment and Income

As of August 2015, the unemployment rate in the Fort Collins-Loveland Metropolitan Statistical Area was 3.2%, which was below state and national averages.[23] Median household income in the county from 2009 to 2013 was an estimated at $58,626.[24] From 2009 to 2013, the percentage of all Larimer County residents living below the poverty level was 14.1%.[25]

A majority of jobs in Larimer County are located in Fort Collins and Loveland. Figure 2-7 shows the breakdown of age and earnings among workers in Larimer County.[26]

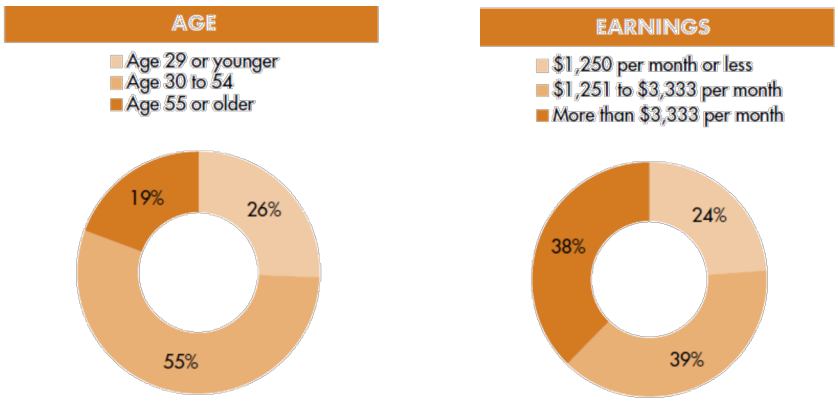


Figure 2-7: Age and Earnings of Workers in Larimer County[27].

Larimer County is a net exporter of labor, with thousands of residents holding jobs outside the county, especially in Denver and Greeley. The outflow of labor increases average commute time and has implications for county tax revenues, transportation infrastructure, quality of life, and the environment.[11]

Section 2.4 Health and Social

A more cohesive community, made of more resilient individuals, can better adapt to ongoing change. Community cohesiveness is related to a community's institutions (see Section 2.2), but also to the means provided for supporting individual needs. These needs range from the universal, such as safety and education, to the specific, including those experienced by groups that may be vulnerable or have access and functional needs (e.g., non-English speakers, the disabled, and the elderly). A broad network of federal, state, local, non-profit, and business organizations provide health and social services. The ability of this network to provide universal access is critical in ensuring the resiliency of individuals, families, and communities.

The main strengths and challenges faced by communities in Larimer County around health and social services are the following:

- **Strengths**: Network of cooperative health, fire, and public safety agencies; high educational attainment; strong culture of volunteerism.
- **Challenges**: Dependence on volunteerism for providing certain essential services; poverty rates increasing faster than population growth; increasing mental health demands and homelessness; increasing healthcare costs; limited access to services in remote areas.

The following briefly summarizes key aspects of access to basic services, educational attainment, vulnerable populations, and local crime rates in Larimer County.

Access to Basic Services

The Larimer County Human Services Department and the Larimer County Department of Health provide health and human services throughout the county. Services include energy, food, medical, and employment assistance. In addition, the Larimer County Office on Aging and the Disabled Resource Services Center provide resources and services to older and disabled adults.

Larimer County has a wide array of agencies to provide residents with basic fire and public safety services. The county has six hospitals: two in Fort Collins, two in Loveland, one in Estes Park, and one in Johnstown. Three Emergency Medical Services agencies provide ambulance service throughout the county.[11] The Larimer County Sheriff's Office is responsible for law enforcement in unincorporated areas of the county, search and rescue, and wildland fire efforts. Local police agencies provide law enforcement for municipal areas, and Colorado State University has its own campus police force.[11]

Firefighting in Larimer County is an inter-agency effort. The county has 19 local fire agencies: four are volunteer fire departments, 12 are Title 32 Fire Districts, and three are fire authorities. Additionally, fire personnel from Rocky Mountain National Park, the United States Forest Service, Colorado State Forest Service, and the Colorado Division of Fire Prevention and Control operate within Larimer County. Cooperation between fire agencies is necessary and common across the county since a vast majority of county residents live in proximity to areas at high risk of wildfire.[11]

Educational Opportunity and Attainment

On average, Larimer County residents have higher levels of educational attainment than Coloradans as a whole, with 52.3% of Larimer County residents having an associate's degree or higher, as compared to 44.4% statewide.[28]

Table 2-2: Education Attainment in Larimer County vs. the State of Colorado

	High School Diploma	*Associate's Degree or Higher*
Larimer County	94.2%	52.3%
Colorado	89.8%	44.4%

In Fort Collins, over 60% of residents have an associate's degree or higher level of education. Fort Collins is home to Colorado State University, where enrollment has remained steady from 2002 to 2012 despite tuition increases of 136% over the same time period.[29,30]

Larimer County consistently outperforms the state and nation in early education enrollment. Enrollment rates in the county are managed by the Child Care Assistance Program administered by the Larimer County Department of Human Services. In 2011, 51% of 3- and 4-year-olds in Larimer County were enrolled in preschool, nearly twice the 2010 Colorado state average.[31,32]

Vulnerable Populations

The number of families in Larimer County applying for assistance of all types has grown in recent years. From 2006 through 2012, there was a 41% increase in the average number of monthly applications for Temporary Assistance for Needy Families, with only a 1% increase of households actually receiving financial assistance over the same time period.[33] Over the same period, the average monthly number of households receiving Supplemental Nutrition Assistance Program benefits (food stamps) increased over 100%, while the average monthly benefit decreased 2.7%.[34]

The percentage of Larimer County's population that resides in a household where English is not the primary language is 1.5%, and there has been a slight increase in linguistically-excluded households since 2000[35]. Spanish is the most spoken language among linguistically-excluded households.

From 2000 to 2012, the number of individuals living in poverty in Larimer County increased 54%, a growth rate higher than in Colorado (42%) or the United States (23%). The number of children in poverty increased an astonishing 85% over the same time period.[25]

The Colorado Department of Public Health and Environment reported that in 2012, 34,982 (11.2%) of Larimer County residents age 18 to 64 were without health insurance coverage.[36]

Additionally, from 2010 to 2014, Larimer County experienced a 25.7% increase in residents aged 65-and-over.[6]

Crime

Crime rates vary across Larimer County, and are generally comparable to, or lower than, other parts of Colorado. Table 2-3 provides a summary of reported crimes in the county for 2013.[37,38]

Table 2-3: Crime Rates in Larimer County, 2013

Location	*Violent Crimes*	*Property Crimes*	*Violent Crime per 1,000 People*	*Property Crime per 1,000 People*
Fort Collins	357	3,808	2.37	25.38
Loveland	150	1,665	2.1	23.34
Windsor	6	172	0.3	8.56
Johnstown	4	84	0.35	11.34
Estes Park	5	44	0.81	7.14
Berthoud	3	45	0.56	8.47
Other Larimer County	121	835	2.49	17.18
State of Colorado	16,626	140,057	3.08	26.6

Section 2.5 Housing

Residents of communities in Larimer County require affordable, safe, and secure housing to go about their daily lives in a functional manner; without adequate housing, it can be nearly impossible to work, shop, run a business, or even receive basic services. In addition, housing is usually a household's most significant ongoing expense, their largest investment, or both. Natural disasters, human-caused events, and economic downturns can all have significant impacts on housing. Improving the resiliency of a community's housing stock is, therefore, essential to improving resiliency of the community as a whole. The resiliency of housing can be characterized as a function of its availability, affordability, quality, and vulnerability.

In this respect, the main strengths and challenges faced by communities in Larimer County are the following:

- **Strengths**: Ongoing active efforts being made by local governments to ameliorate housing availability and affordability.
- **Challenges**: Continued population growth, particularly in Fort Collins and Loveland, puts an ongoing strain on supply; wage growth is being outpaced by housing cost increases, in part due to speculative appreciation; construction is focused on meeting the needs of certain market sectors and not others (e.g., students vs. families); lack of capacity in long-term shelters.

The following briefly summarizes key aspects of housing availability and affordability in Larimer County, as well as the availability of insurance and emergency housing resources.

Housing Availability and Affordability

The number of available housing units in Larimer County in 2014 was 138,534, two-thirds of which were located in Fort Collins and Loveland.[39,40] The home ownership rate is 65.6%, on par with the state as a whole.[41] In 2012, 85.5% of houses sold in the Fort Collins-Loveland Metropolitan Statistical Area were affordable to families earning the median family income in the county. This rate was the fourth-highest in the state.[42] However, housing is becoming less abundant and more costly for residents. Vacancy rates in the county decreased through 2011, while rents have soared to a 10-year high. Fifty-four percent of renting households spent 30% or more of their income on rent between 2006 and 2010.[40]

In 2015, the City of Fort Collins adopted a five-year affordable housing strategy designed to increase supply of decent, affordable housing opportunities for low-income homeowners, renters, and the homeless.[43] The Fort Collins Housing Authority currently serves over 2,100 households and is consistently given a "High Performer" designation by the U.S. Department of Housing and Urban Development.[44] These efforts by the Fort Collins Housing Authority, Loveland Housing Authority, and the City of Loveland are important steps toward achieving quality affordable housing in the county. However, as population growth continues to bring additional households into the community, availability of affordable housing remains a concern within Larimer County. Fort Collins currently offers 2,400 permanently affordable housing units. However, this amount is not adequate for current demand, as nearly 1,500 households are on waiting lists for housing assistance.[45] A potential hurdle for obtaining housing assistance is the many measures that qualify a household for assistance. Depending on the measure of "affordable housing," and "low-income," and the source of the assistance, the range to obtain assistance within Larimer County can range from $23,050 (the 2012 Federal Poverty Level) to $62,150 (80% of the area median income).[56]

In addition, housing availability conditions vary in different market sectors, and tensions exist within communities regarding the need for different types of housing. Within Fort Collins, there is a strong divide between the need to expand student housing serving Colorado State University, and the need for

increased family housing. Recent student housing projects have prompted neighborhood appeals that the developments do not meet development standards, including zoning requirements and parking access.[46]

Housing Quality and Accessibility

Almost a quarter of all housing in the county is relatively new and has been built since 2000; over 50% of housing has been built since 1980. Less than 1% of homes lack complete plumbing or kitchen facilities.[47] However, housing quality is rarely uniform throughout a county. Access and proximity to services are important metrics for affordable housing development. The location of affordable housing impacts quality of life and cost of living. The lack of affordable housing in attractive markets also pushes vulnerable populations closer to flood zones and high wildfire risk zones.

Emergency Housing

Following shocks, emergency shelters are opened and operated through coordination with local emergency management agencies and the American Red Cross. However, the need for emergency housing extends past traditional emergency responses and, in many cases, the need existed prior to the shock. Therefore, emergency mortgage and rent assistance is provided within Larimer County through the Neighbor to Neighbor program. The program helps nearly 500 families per year, and also provides counseling services.[48]

In addition, nonprofits and faith-based organizations provide emergency and transitional housing for vulnerable populations within Fort Collins, Loveland, and Wellington.[49] However, despite this network, long-term homelessness and sheltering remains an ongoing problem in Larimer County, and county stakeholders have expressed that there is a lack of long-term sheltering capacity for the estimated local homeless population of 3,000 people, 250 of whom are designated as chronically homeless (homeless for more than one year).[50]

Section 2.6 Infrastructure

Resilient infrastructure facilities are typically designed and managed to answer complex engineering challenges. In a resilient infrastructure system, different facilities should function as an integrated network that allows the continuous provision of critical services, such as transportation, power, water distribution, waste management, and others. To achieve this, facilities should be sited and designed in a manner that addresses potential hazards (e.g., keeping infrastructure out of floodplains). At the same time, redundancy should be built, wherever economically feasible, to allow for continuously operating lifelines (e.g., multiple roads into and out of mountain communities) and to reduce the likelihood of cascading failures (e.g., communications shutdown due to power grid failure).

The main strengths and challenges faced by communities in Larimer County around infrastructure are the following:

- **Strengths**: Interstate 25 (I-25) connects major population areas; increasing public transportation use.
- **Challenges**: Lack of redundancy in supply lines for critical resources and services, such as water, power, and transportation corridors; aging facilities and equipment; population growth increasing demands on already fragile infrastructure; and the high-risk environment the infrastructure needs to function in.

The following briefly summarizes key aspects of infrastructure in Larimer County communities, such as transportation, water, energy, and communications.

Government Facilities

As the county seat of Larimer County, Fort Collins is home to the majority of the county's facilities. The Larimer County Courthouse and Justice Center are located in downtown Fort Collins and house multiple county functions, including the commissioners' office, district attorney's office, court rooms, the Engineering, Planning and Building Department, Veterans Service departments, and Workforce Center. Other important county facilities located in Fort Collins include the Sherriff's Department and detention center and emergency services. Loveland contains additional clerk and court offices, as well as the Larimer County Workforce Center. A single county facility is located in Estes Park and includes Building Inspections, Clerk offices, and the Sheriff's office.[51]

Transportation

Major transportation routes through Larimer County communities include I-25, other federal highways (US 287, US 34, US 36), and state highways (SH 392, SH 14, SH 402, SH 60, SH 56), as well as regionally significant county and city arterial and major collector routes. I-25 is the main north-south corridor through the county, connecting Fort Collins with other large population centers in the region.

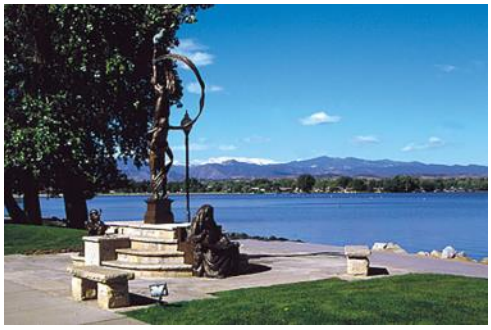
As the highest-capacity transportation corridor in Northern Colorado, I-25 is a critical connection between communities in Larimer County and areas to the north and south, for both economic and emergency evacuation purposes; this means that disturbances to I-25 can have significant and severe consequences. Three river crossings were overtopped in the 2013 floods, at the Big Thompson, Little Thompson, and St. Vrain rivers, causing I-25 to close for approximately 24 hours. A fourth crossing, at the Cache la Poudre River, is considered extremely vulnerable to future flooding.

The western two-thirds of Larimer County is mountainous terrain, and a limited number of highway and county roadways provide the only egress and ingress routes. These mountain roads include US 34, US 36, and SH 14, as well as county roads (CRs) 43, CR 52E, CR 27, CR 38E, CR 74E, CR 73C. As the High Park Fire and 2013 floods demonstrated, these roadways are vulnerable to both fire and flood impacts. Many of the roads follow major drainageways, which are subject to riverine flooding; roads also cross

alluvial fan depositional areas or have bridge crossings with varying flood conveyance capacity. Many of these county roads will remain exceptionally fragile until permanent repairs from the 2013 floods are complete.

Rail within the county is used to transport freight, and currently no passenger rail services are available within the county. The conditions of the rail system vary from good (Denver-Greeley-Fort-Collins) to poor (Fort Collins-Cheyenne and Loveland-Johnstown).[52]

Public transportation services are provided by Transfort, which operates a public bus system serving Fort Collins and Loveland. Ridership on Transfort steadily increased between 2009 and 2012.[53] In addition, an interregional Express Bus service through the Colorado Department of Transportation provides service between Fort Collins, Loveland, Boulder, and Denver.[54] In addition, TransFort operates the FLEX Regional Service between Fort Collins, Loveland, Berthoud, Longmont, and Boulder.[55]



Water and Wastewater

Along the Front Range urban corridor, water and wastewater services are provided by the various municipalities or from local water and wastewater districts. Water treatment plants operate at the western edges of Berthoud, Fort Collins, and Loveland. Major water sources are surface diversions from the Poudre and Big Thompson rivers and water delivered from the Colorado-Big Thompson (CBT) diversion project.

Centralized wastewater treatment facilities are located near the eastern sides of the communities, with return flows into the Poudre, Big Thompson, and Little Thompson river systems. In the Estes Valley, water and wastewater treatment is provided by the Town of Estes Park or local water and sanitation districts. Small community water and wastewater treatment facilities serve rural communities at various locations in the county.[11]

Annual agricultural irrigation requires from 1.5 to 2 million acre feet of water.[56] Groundwater is the main agricultural water source, and is used to augment recent trends in surface water quantity.

Energy

Residential and business electricity is largely provided by Xcel Energy, which provides power and natural gas. Many rural unincorporated areas are served by Poudre Valley Rural Electric Association. The county is also served by a number of publically and privately owned utilities.

Over three-quarters of the electricity produced in Larimer County comes from one combined natural gas and coal facility. A substantial amount of power is also created from hydroelectric facilities in the county.

Table 2-4: Power Plants in Larimer County

Energy Source	*Number of Facilities*	*Total Summer Capacity (MW)*
Natural Gas	1	388
Coal	1	280
Hydroelectric[1]	6	204.1
Solar	2	4.9
Total[1,2]	9	877

[1] The Flatiron Plant produces 90 megawatts of pumped storage electricity, and is a net consumer of electricity.

[2] Rawhide Plant is a combined natural gas and coal facility.

Communications

Broadband services, including DSL, cable, and fiber, generally are widely available in and around Fort Collins and Loveland. Broadband service is sparser in the western part of the county. Cellular service is widely available throughout the county, but service can become infrequent in the mountainous region and sparsely populated areas. High-speed internet is not widely available in the foothills communities.

In 1990, the cities, towns, county, fire, and hospital districts in Larimer County signed an Intergovernmental Agreement forming the Larimer Emergency Telephone Authority (LETA).[57] LETA provides oversight to 9-1-1, call center equipment, funds 9-1-1 programs within the county, and provides ongoing support to the five Public Safety Answering Points that provide emergency dispatch services as well as emergency alerts throughout the county.[58]

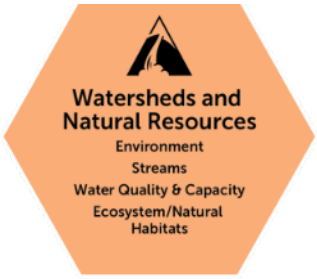
Solid Waste Management

Larimer County operates a county landfill disposal site that is located just east of the foothills off of CR 19, near the southern limits of Fort Collins. The Larimer County landfill site includes a single stream recycling operation that processes aluminum, paper, cardboard, plastic, and glass. This facility also allows consumers to drop off household hazardous waste and electronic waste.

Larimer County also operates four waste transfer stations located near Wellington, Berthoud, Red Feather Lakes, and Estes Park. Waste is collected and compacted at these sites, and periodically hauled by truck to the county landfill site for disposal. There is also a privately operated landfill site in Weld County near the town of Ault.[11]

The City of Loveland provides waste collection services and also operates a recycling center for city residents, and various private waste management companies provide collection services in the city of Fort Collins.[11]

Section 2.7 Watersheds and Natural Resources



Watersheds are an important part of the rich regional system of human communities and ecological services that define Larimer County. Their wellbeing is critical to maintaining the health, biodiversity, character, and economy of Larimer County communities. However, the functions of these systems can be significantly impacted by short-term shocks and long-term stresses. For example, a stream channel hit by a 500-year flood may be disturbed in a number of ways (bank breach, channel migration, destruction of riparian areas) that increase future flood risk in built areas. Resilient watersheds and natural resource systems are able to withstand disturbances over time while retaining their essential structure, functions, and support services. Ideally, resilient communities would benefit from the natural systems they inhabit, while remaining resilient to related environmental hazards. As an example, a resilient community developed within a forested area would benefit from the timber, scenic value, and ecosystem services provided by the forest, while nevertheless incorporating standards and means to protect life and property from wildfire.

The main strengths and challenges faced by communities in Larimer County regarding watersheds and natural resources are the following:

- **Strengths**: Strong vision and practices in watershed management, including protected headwaters on the Cache la Poudre and Little Thompson rivers, leading to high water quality; significant forest resources.
- **Challenges**: Potential for future flow depletions to lead to flow patterns that will not sustain a healthy river; dependence on inter-mountain water transfers; recurring seasonal severe weather; fire suppression has led to risk of extreme fires; development in outlying areas and at the Wildland-Urban Interface (i.e., the area where built structures interact with wildfire fuel loads).

The following briefly summarizes key aspects of natural and environmental resiliency in Larimer County communities, as well as land use trends and hazardous areas.

Environment and Climate

Larimer County has highly variable weather. The climate is best described as semi-arid, with strong seasonal variations in temperature and relatively low precipitation. The elevation in Larimer County ranges from 4,800 feet to 13,562 feet; mountain slope orientation, prevailing winds, and other topographical features further affect the variability in rainfall and temperatures.[59]

Daily high temperatures in Loveland and Fort Collins average between 81 to 85 degrees Fahrenheit between June and August. Daily low temperatures average between 21 to 23 degrees Fahrenheit between November and March. The Estes Valley is a high mountain valley that has a climate that differs from the rest of the Larimer County towns, with cooler summer temperatures and warmer winter temperatures. Average annual precipitation is 15 to 16 inches, with the greatest amount occurring in April and May.

Land Use/Land Cover Patterns and Change

Land use and land cover patterns vary widely across Larimer County. A significant portion of the county is forested and managed as public land. For example, 32% of the Cache La Poudre Watershed is forested and managed by the federal government. Most of this public land lies in the upper mountainous areas of the watershed. Rangeland/cropland tends to dominate the landscape east of the foothills, with 63% of the Cache La Poudre watershed composed of private rangeland or cropland, while only 3% of the watershed is dedicated to urban or industrial land.

Fort Collins, Estes Park, and Loveland provide most of the housing in the county and include urban and suburban land uses. Rocky Mountain National Park and Arapaho-Roosevelt National Forest are the largest undeveloped areas within the county. Low-density rural land use is common in western parts of the county. Many local and federal agencies have acquired land or conservation easements to protect wildlife habitat and farmland adjacent to protected areas such as the Roosevelt National Forest and Rocky Mountain National Park.

Most of the development in Larimer County is occurring in the foothills and plains east of the Front Range, much of it along the I-25 corridor. Mixed grass prairies and farmland are the most threatened plant communities in Larimer County because they are the most easily developed and are close to existing population centers.[11] The population of Larimer County is expected to increase by 30% in the next 15 years. This will increase the demand for new housing and is expected to change land use patterns throughout Larimer County and the Front Range.[11]

Water Resources

Larimer County communities are comparatively water-rich, with large federally-owned reservoirs and three major river systems, including Big Thompson River, Little Thompson River, and the Cache la Poudre River. However, prior appropriation of this water means that any new uses require retiring former appropriations. Peak precipitation is generally observed in late April to early May, but snowfall events can continue through late May. Water is stored in the mountain snowpack as precipitation accumulates through the winter and is released later in the spring. As a result, spring stream flows in Larimer County are primarily driven by snowmelt and, therefore, can be highly variable depending on annual snowfall.

The CBT diversion project serves the county by delivering water from the western slope Colorado River watershed to Lake Estes in Estes Park. Each year, the CBT project transports more than 260,000 acre-feet of water from the Colorado Basin across the Continental Divide to Larimer County, where the water is used throughout northern Colorado for agriculture, municipal, and industrial needs. CBT water is delivered via the Poudre, Big Thompson, and Little Thompson rivers and a series of pipelines and canals. The Poudre, Big Thompson and Little Thompson rivers also provide environmental and recreation benefits to the region—benefits that are often enhanced by the additional flows provided by the trans-basin water diversion. Horsetooth Reservoir and Carter Lake, located in Larimer County, are two of the largest water storage reservoirs in the CBT system.[11]

The Big and Little Thompson rivers and watershed experienced a major disturbance during the 2013 flood event, with significant impact to safety, property, and watershed health for residents. In some areas, the river is recovering well, due to normal river functions and processes. However, in other areas, there continues to be a great need for channel and bank stabilization, increasing connection of the river to the floodplain, and enhancing floodplain capacity to foster a resilient ecosystem.[11] In addition, river and stream systems can lead to erosion, deposition, and channel movement, particularly in mountain regions. Areas that may not appear to be within the floodplain could still be at risk given this potential movement.

Water quality in the headwaters/mountainous areas of the region's watersheds is very high (partially helped by the lack of hard-rock mining within the county) and, thus, helps support drinking water and agricultural water supplies. However, wildfires have had a strong negative impact on water quality in the Cache La Poudre Watershed due to increased post-fire erosion and flooding. Generally, basins in Larimer County have few water quality problems in the headwater areas. As the rivers leave the canyon mouths, water quality tends to degrade as it intercepts agricultural and urban return flows. For example, in the Cache La Poudre watershed, the U.S. Environmental Protection Agency lists 11 waterbody segments as impaired by eight different pollutants; the majority of these impaired segments are close to, or downstream of, the canyon mouth.[11]

Water management is one of the state and county's most controversial topics. Government agencies, private-sector companies, grassroots organizations, and other stakeholders have been called on to

address water concerns and help develop a statewide water management plan. Changing water use—from agricultural to municipal—could fundamentally change the quality of life in Larimer County communities. Many alternatives are being discussed, such as new storage, increased conservation, and water sharing mechanisms.[11]

Local governments in Larimer County have identified floodplain protection and restoration as high priorities to make Larimer County communities more resilient. Channel diversion and construction of levees was necessary to support over a century of agriculture in eastern Larimer County; today, the county's major river systems remain disconnected from the historic floodplains. Damage from recent major floods in the county highlights the need for floodplain restoration. Funding to acquire and restore historic floodplains will reduce downstream flood impacts and improve watershed resiliency.[11]

Forest Resources

Like water resources, forest resources have played a vital role in shaping Larimer County communities. The forest system, and all flora and fauna within it, plays a critical role in shaping the watershed, itself. Forests rely on the groundwater within the watershed, while the watershed system relies on the forest to serve as a natural filter and remove toxins and particulate matter from the water.

Approximately 70% of Larimer County (approximately 1 million acres) is forested. This includes 240,000 acres of private, local government, and state forest, the approximately 650,000-acre Arapaho-Roosevelt National Forest, and approximately 110,000 acres in Rocky Mountain National Park. Most of the Arapaho-Roosevelt National Forest and Rocky Mountain National Park forests are in the lodgepole pine, aspen, spruce-fir and alpine/subalpine forest types. Most of the private, local government, and state acreage is in the ponderosa pine and mixed conifer forest types. Disturbances, such as wildfires, flooding, avalanches, and insects or disease infestations, have helped to ensure that a diversity of forest types, age classes, and densities exist.[60]

The Larimer County Department of Natural Resources manages significant acreage of forested county lands and provides forest health education and promotes community awareness of forest functions and benefits.[61]. The Colorado State Land Board, Colorado Parks and Wildlife, Colorado State University, and Colorado State Forest Service manage significant acreage of forested state owned lands. The U.S. Forest Service is the largest land manager in the county.[11]

Private landowners manage the private forested lands with assistance from the forest industry, forestry consultants, and the Colorado State Forest Service. Issues that drive most private forest management in Larimer County include wildfire hazard mitigation, effects of the recent mountain pine beetle epidemic, and forest health concerns. Relatively little traditional timber harvesting occurs on private lands due to small parcel sizes and wood fiber markets. Larimer County has an active chapter of the Colorado State Tree Farm System. Colorado Tree Farmers are a network of land owners that share forestry resources.

Other Natural Resources

Agricultural land uses are common in eastern Larimer County communities, including irrigated cropland, dry land farming, feedlots, and open range ranching. Local food production and farmers' markets have increased significantly, and local governments are playing a larger role in local food supply issues.

Gravel mining is common within floodplains, and oil and gas development has increased in eastern Larimer County as horizontal drilling has become more frequent.[11]

With its tight link to Rocky Mountain National Park, the Estes Valley is one of the state's natural treasures, drawing over 3 million visitors annually to enjoy the natural resources. Tourism is the major source of income for the Estes Valley, and protection of those natural resources is critical. Non-profits, such as the Estes Valley Land Trust, have been working for years to preserve areas of open space and natural beauty in the Estes Valley.

Hazardous Areas and Sites

There are no National Priorities List Superfund sites in Larimer County; however, there are four non-National Priority List Superfund sites within the county.[62] A variety of other sites have had releases of hazardous materials from underground storage tanks and other sources.

With the presence of large interstate highways and state routes, hazardous materials are routinely transported through Larimer County communities. Similarly, hazardous materials passing through Fort Collins is a routine activity. In addition, railways within Fort Collins and Loveland are also frequently used to transport hazardous materials. The 2016 Larimer County Hazard Mitigation Plan Update refers to the risks associated with such transport and attempts to mitigate such risks. The Local Emergency Planning Commission is tasked with planning and preparedness efforts for hazardous materials. In addition, transportation-related incidents are tracked, and financial and human impacts are measured.[63]

Section 3
Shocks and Stresses

The overarching aim of the Larimer Community Resiliency Framework is to chart a path toward a resilient future in which Larimer County's vulnerability to adverse changes and potential disasters is reduced, and the ability to "bounce forward" is enhanced. To that end, this section describes the driving forces that can make any community vulnerable, and identifies specific vulnerabilities in the Larimer County.

Section 3.1 What Makes Communities Vulnerable

Section 3.1.1 Definitions

Vulnerability arises when a community, an asset, or an individual is exposed to a hazard *and* is likely to suffer adverse effects from this hazard. A **hazard** refers to a possible natural or human-induced event that would have adverse effects on exposed persons and assets. **Exposure** is the condition of being located in an area where hazard events may occur.

The more an individual or a community is vulnerable, the more likely the impacts of a hazard will translate into a **disaster**. However, individuals and communities that are vulnerable to hazards can also be resilient in the face of disaster. Vulnerability can be addressed in two ways:

- Mitigating **direct** vulnerability to acute **shocks**. Shocks include natural events, such as wildfires, floods, and winter storms, as well as human-caused events, such as industrial accidents, public health crises, and terrorism.
  - Direct vulnerability is often measured as potential **damage** to buildings and infrastructure and as personal risks, including **injuries** and **death**.
  - **Hazard mitigation** focuses on reducing direct vulnerability by reducing communities' exposure to shocks.
- Reducing **indirect** vulnerability due to chronic **stresses**. Stresses are underlying **economic, social,** and **environmental** attributes that undermine an individual's, community's, or asset's ability to respond to or recover from a shock. Stresses include environmental conditions (e.g., overuse of groundwater) and failures of human controlled systems (e.g., high unemployment). When multiple stresses occur simultaneously, they may exacerbate recurring negative outcomes.
  - The same shock event, causing the same amount of immediate damage, will cause a more or less long-term impact in a community depending on underlying **stress**.
  - A focus on **resiliency planning** seeks to reduce indirect vulnerability by harnessing the communities' ability to improve existing conditions and develop adaptive capacity.

Section 3.1.2 Relationships between Shocks and Stresses

The relationship between different shocks and stresses is complex, and communities are best served by taking a holistic perspective when planning for resiliency. Stresses can exacerbate the impact of shocks, and can even cause shocks to occur. At the same time, individual or repeated shocks can worsen existing stresses and sometimes create new stresses.

For example, the occurrences of many natural hazards are interrelated, such as drought, wildfires, and floods. Drought can create ideal conditions for wildfires or floods, while simultaneously exacerbating underlying economic stresses. This can increase a community's vulnerability.

Underlying stresses are a major factor in determining the extent of the impact of a shock on an individual or community. Two neighboring families, each with equal exposure to a hazard, may experience very different outcomes. For example, one resident living in a floodplain may have modified their home to limit potential damage and may evacuate before a flood, suffering relatively little impact. Meanwhile, a neighbor may not have invested in flood protection, resulting in major damage to their home. The extent to which this damage affects the neighbor will vary depending on whether or not the neighbor has flood insurance, savings, a job that provides the flexibility to deal with the reconstruction process, and a social safety net for temporary housing and emotional support.

The most resilient communities typically feature strong leadership and governance, social connectedness and healthy community networks, land use plans that integrate hazard considerations, a prosperous and diversified economy, a focus on individual health and wellbeing, and well-developed, maintained, and protected infrastructure. By contrast, communities that suffer from systemic socioeconomic stresses (e.g., high poverty, poor governance, limited land use planning, or aging/inadequate infrastructure) may have less capacity to respond to and recover from potential shocks. Shocks and stresses cannot be separated when thinking about vulnerability and resiliency.

Section 3.2 Shocks and Stresses in Larimer County

As identified in the 2016 Larimer County Hazard Mitigation Plan Update and as shown in Table 3-1[63], Larimer County communities are exposed to a wide range of hazards, both natural and human-caused, that can result in shocks to the community. (Note: For a detailed analysis of the hazards and current mitigation practices and plans, please see the 2016 Larimer County Hazard Mitigation Plan Update.)

Table 3-1: Hazards in Larimer County

Natural Hazards	*Human / Technological Risks*	*Other Risks / Multiple Causes*
■ Avalanche ■ Earthquake ■ Erosion Deposition ■ Drought/Extreme Heat ■ Landslide/Rockslide ■ Spring/Summer Storm (Hail, Thunderstorm, Windstorm) ■ Tornado ■ Winter Storm (Blizzard, Heavy Snow Accumulation)	■ Aircraft Accident ■ Civil Disturbance ■ Dam Failure ■ Hazardous Materials – Fixed Facility and Transportation ■ Terrorism/Weapons of Mass Destruction ■ Utility Interruption	■ Biological Hazards/Pandemic ■ Fire – Urban ■ Fire – Wildland ■ Flooding – Flash and Riverine

Vulnerability to the shocks these hazards can cause varies widely. Certain events may occur infrequently and unpredictably (e.g., aircraft accidents), while others occur every year (e.g., wildland fire). In addition, while some risks affect only specific locations (e.g., riverine flooding), others can affect all parts of the county (e.g., winter storm). Table 3-2 summarizes the hazards considered most likely to occur regularly over significant portions of the county according to the Northern Colorado Regional Hazard Mitigation Plan.[63]

Table 3-2: Most Likely and Significant Hazards in Larimer County

	Occur Every Year	*Occur at Least Once in 10 Years*
> 25% of Area Affected	*N/A*	■ Biological Hazards/Influenza Pandemic ■ Drought/Extreme Heat ■ Winter Storm – Severe
> 10% of Area Affected	■ Fire – Urban and Wildland ■ Hailstorms ■ Windstorm – Severe	■ Flooding – Flash and Riverine

A variety of underlying stresses and vulnerabilities also impact Larimer County on an ongoing basis. Like shocks, stresses differ in their frequency and consequences. Figure 3-1 shows the relative frequency and consequences of some of the shocks, stresses, and vulnerabilities of concern in Larimer County communities, drawing upon initial community input for this Framework.

Further discussions with community stakeholders also specifically highlighted the following shocks and stresses:

- **Shocks**: Hazardous materials spills, terrorism/mass violence incidents, pandemic disease, cyber failure, tornados.
- **Stresses**: Aging infrastructure, economic shifts and/or weakness, disconnected communities, population growth/resource issues, development in high-risk areas, climate change, increasing costs to energy utilities.

In the following sections, major shocks and stresses affecting Larimer County are summarized. This is not a comprehensive analysis, but rather an attempt to identify the shocks and stresses of greatest priority *from a resiliency perspective*, as expressed in planning charrettes and meetings, surveys, interviews, and local, state, regional, and national plans and reports. A detailed Hazard Identification and Risk Assessment profile can be found in the county's 2016 Hazard Mitigation Plan Update.

Figure 3-1: Shocks and Stresses in Larimer County

Section 3.2.1 Major Shocks

Based on a review of historic disasters, wildfires, floods, and drought are the natural hazards of most concern to Larimer County communities, due to their prevalence and the magnitude of their economic and human impacts.[64,63] Among these three hazards, wildfires and floods are generally considered shocks. Severe weather events can also result in widespread damage and have long-term impacts, constituting another type of shock.

Furthermore, Larimer County is increasingly subject to human-caused shocks, such as hazardous materials spills, terrorism and other acts of mass violence, and the emergence of new epidemic and pandemic diseases.

Natural Hazards – Wildfire

Wildfire is a recurring phenomenon in Larimer County, whether caused by nature or humans. Wildfires can directly threaten life and property. Additionally, they can exacerbate flood, debris flow, and erosion risk (destroying moisture absorbing vegetation), and degrade air and water quality.

Late summer has historically been the peak of the fire season. However, wildfires can occur at any time of the year, and are increasingly occurring in what have previously been considered shoulder-seasons. While lightning is the main natural cause of wildfire, human activity causes some of the largest and most devastating fires of recent years.

The number, size, and damage caused by wildfires have grown steadily across Colorado over the past decades. Reasons for this include warmer temperatures and more dry years, but also a history of fire suppression that has left many forests overloaded with potential fuel. In the past decade, multiple fires in Larimer County have burned areas greater than 1,000 acres. The largest of these, the 2012 High Park Fire, burned an area of 87,457 acres, destroyed 259 homes, and cost more than $39 million to suppress and an additional $97 million in insurance claims. The High Park Fire necessitated emergency watershed restoration activity to mitigate the damage to the hydrological cycle and ecosystem functioning.[65,63]

The central and western parts of the county (foothills and mountains) are subject to the greatest wildfire risk due to the vegetation/fuel load, among other factors. Approximately 7% of the county is in areas judged to be at moderate to high risk of wildfire.[66]

Development at the Wildland-Urban Interface has been extensive in the past few decades. The Larimer County requires that new development in the Wildland-Urban Interface implement measures to reduce fire risk and create defensible space. Additionally, Larimer County and several of its towns and cities have established Community Wildfire Protection Plans that guide efforts to protect residents and assets from the impacts of wildfire. Larimer County coordinates closely with the U.S. Forest Service, Colorado State Forest Service, and other agencies regarding wildfire planning and prevention, which is especially important given that approximately half the county is federal or state land.[67,68]

Natural Hazards – Flooding and Dam Failure

The record of severe flooding in Larimer County reaches back to the 1860s. Floods in the county are typically the result of one or more of the following: heavy rainfall (typically between May and September), large volumes of snowmelt, and/or dam failure.

Within the past 40 years, three floods have caused catastrophic damage in the county. In July 1976, heavy overnight rainfall caused a severe flash flood to sweep down Big Thompson Canyon. Damage reached $40 million (1976 dollars), and 144 people lost their lives. In July 1997, between 10 and 14 inches of rain fell in Fort Collins over a 31-hour period, causing Spring Creek to overflow its banks and flood surrounding areas. This flood resulted in five deaths and over $200 million in damage. During the most recent floods of 2013, the Big and Little Thompson rivers saw the greatest flooding since 1976, and record peak river flows were measured at multiple gages within Larimer County, including the North Fork of Big Thompson River outside of Drake and the Poudre River at Fort Collins.[69,70] Parts of Fort Collins received up to 12 inches of rain over five days, which caused the largest flood on the Poudre River in Fort Collins since 1930.[71] Some of the hardest hit areas in the 2013 floods included Estes Park, Glen Haven, Drake, and Loveland. An estimated 54 homes and businesses were destroyed, and another 363 were damaged.[72] In addition, five small dams in the Big Elk Meadows region failed.[73]

Dam failure events occur less frequently than flash or riverine floods, but are remarkably destructive over short periods of time. The largest recorded dam failure in Larimer County occurred in July 1982, when the Lawn Lake dam in Rocky Mountain National Park breached and released 29 million gallons of water in approximately 10 minutes into the Roaring River Valley. Downstream damage included three deaths, the destruction of 18 bridges and several roads, and damage to 177 businesses and 108 homes in Estes Park. The highest-threat dams in the county are Horsetooth Reservoir and Carter Lake. Failures at these dams would have massive impacts on Fort Collins (Horsetooth Reservoir) and Loveland (Carter Lake). Because of this threat, dams at both locations have undergone major renovations. In addition, federal guidelines have been developed for the protection of downstream communities through the development of Emergency Action Plans[74]. Nonetheless, the complex system of reservoirs and dams that make up the CBT project means that multiple other sources of dam failure could cause deaths, injuries, and large-scale destruction to communities in Larimer County.[63]

In response to the 1997 Spring Creek flood, the city of Fort Collins implemented significant flood mitigation activities aimed at reducing flood risk to critical facilities and infrastructure.[75] After the 2013 floods, the City of Fort Collins reported limited damage to structures, perhaps as a result of the prior mitigation efforts.

Larimer County communities at risk of flooding participate in the National Flood Insurance Program (NFIP). In addition, the cities of Loveland and Fort Collins participate in the NFIP's Community Rating System, which provides discounts on flood insurance for communities that take measures to reduce flood risk.[76] Fort Collins and Loveland adopted Flood Mitigation Plans in 2004 and 2005, respectively. The Boxelder Creek Regional Alliance was formed to address stormwater drainage problems in the Boxelder Creek watershed, and the Boxelder Creek Regional Stormwater Masterplan was completed in 2006. Fort Collins Utilities operates a flood warning system to notify people in the region of severe storm threats.[77,78]

In light of the 2012 High Park Fire and the 2013 Colorado floods, watershed coalitions were established within the county to coordinate volunteers, stakeholders, and County government representatives and to provide a long-term vision for the county's rivers and watersheds.[79] These coalitions have produced comprehensive river master plans for the Big Thompson[80] and Little Thompson[81] watersheds, with flood mitigation work ongoing in the Estes Valley and Cache la Poudre watersheds.

Natural Hazards – Severe Weather

A variety of severe weather types have been identified as posing significant risks to multiple communities within Larimer County, including hail, lightning, tornados, severe wind, and winter storms.[63]

Recurring destructive events, such as severe hailstorms, windstorms, and lightning strikes, occur along the whole length of the interface between the Great Plains and Rocky Mountains. While such events rarely cause injuries and deaths, damage to private property and interruptions in public utility services—particularly power outages—commonly occur in the most severe weather situations. The property damage associated with hailstorms is especially severe, reaching hundreds of millions of dollars. Every year, hail causes nearly $1 billion in damage to property and crops throughout the United States.[63,82,83]

Winter storms typically occur between November and April, and can result in heavy snowfall, blowing snow, and extreme cold. Particularly harsh or persistent winter storms may cause transportation disruptions, power outages, and/or damage to buildings, utility lines, and domestic water pipes. Winter storms may also result in deaths and injuries from various causes, including transportation incidents and exposure to low temperatures. Eight severe winter storms were recorded in Larimer County between 1996 and 2009. The most severe of these events, in December 2006, resulted in multiple closures of US 287, the death of at least 15,000 cattle from starvation, and millions of dollars in economic losses.[63,82,83]

Human/Technological – Terrorism and Acts of Mass Violence

In recent years, multiple mass shootings have taken place in Colorado, including the Columbine High School shooting in 1999 and the Aurora Theater Shooting in 2012.[84]

Although the emerging hazard of mass shootings has proved to be an increasingly frequent occurrence in communities throughout the United States, subject matter experts have struggled to accurately define or track the nature of these incidents. *USA Today* has estimated that 291 cases of mass killings

(four or more dead victims) have occurred since 2006. Among those incidents, 43 were public shootings, which tend to gather the most media attention and result in the largest death tolls.[84]

Mass killings, including public shootings, appear to occur in all parts of the country. Although certain incidents may be classifiable as terrorist attacks, many others are attributable to factors as diverse as domestic violence, financial stress, and mental health.[84]

Generally speaking, terrorism involves acts intended to: (a) intimidate or coerce a civilian population; (b) influence the policy of a government; or (c) affect the conduct of government. Traditional definitions of terrorism focus on mass destruction, assassination, and kidnapping[85]. However, future attacks could include instances of chemical, biological, radiological, or nuclear proliferation, as well as cyber-attacks, which have become a new means of attacking both civilians and governments (see Human Technological – Information Technology Failure, below).

The most destructive incidents of terrorism occurring in the United States in recent decades included the Oklahoma City bombing of the Alfred P. Murrah Federal Building in 1995 and the September 11, 2001 attacks. To date, no incidents have affected Larimer County, with the possible exception of an arson attack on a state research laboratory in Fort Collins in the mid-1980s. Federal buildings and research laboratories are believed to be primary potential targets, should there be future terrorist attacks in the county.[63]

Human/Technological – Hazardous Materials Release

Hazardous materials can include any substance posing a risk to the health, safety, or property of persons or to the natural environment. The production, transport, and use of such substances is considered critical to Larimer County's key industries, including agriculture, mining, manufacturing, and research. Hazardous materials are also frequently used in illegal activities, such as methamphetamine production. Furthermore, because these substances are so prevalent in the economy, hazardous materials are routinely transported along highways and railways.[63]

Uncontrolled releases of hazardous materials are an extremely frequent occurrence that can cause great harm. Local emergency services agencies in Larimer County respond to over 1,000 events each year. While most of these events are localized and quickly contained, certain incidents have the potential to quickly escalate into a wider public health and safety hazard. For example, in April 2006, a 500-pound liquefied propane gas container fell two stories onto a roadway and began leaking, requiring an evacuation and closure of the area for over four hours. In a 2002 incident, 2,700 gallons of bulk gasoline spilled in Loveland.[63]

The damage resulting from such incidents are limited only by the rapid action of first responders. It is possible that a future incident could result in large-scale structural fires, an explosion, or groundwater contamination. Because these events are so frequent, they cause a significant strain on the resources of local first responders in addition to any direct damage. Furthermore, there is potential for large-scale releases of hazardous materials to occur as a result of other shock events, such as floods and fires.

Human/Technological – Information Technology Failure

Contemporary society is increasingly dependent on an interrelated set of information technology tools that allow governments, businesses, non-profits, and individuals to store and retrieve data using computers. These tools are, themselves, dependent on the continuous functioning of the electric grid.

As a result, a number of potential system failures that would have grave personal, economic, and governance impacts have become possible. Examples of such failures include:

- Loss of critical government data to a failure in computer systems, insufficient backup systems, and/or insufficient protection to primary or backup systems.

- Interruption of critical public services as a result of a cyber-attack, or an interruption of telecommunications or electrical grid service.
- Personal identity theft as a result of hacking and data-skimming.
- Loss of ability to conduct commercial transactions at times when telecommunications or electrical grid services are down.

Certain small-scale failures (e.g., temporary localized outage in internet services) are common consequences of severe weather events such as winter storms. However, large-scale incidents, such as the Target credit card information theft in 2013 or the 2015 cyber-attacks on the U.S Federal Government, were deliberately caused and have impacted tens of millions of people.[86,87]

Another potential source of large-scale failure is a massive electromagnetic pulse (EMP), which could disable significant portions of the electrical grid, in addition to destroying large amounts of data stored electronically. A large-scale EMP could occur either as a consequence of a natural event, such as a solar flare, or as a result of detonation of an EMP explosive device.

While Larimer County has not been specifically targeted by large-scale cyber-attacks or suffered the consequences of large-scale information technology or electrical grid failure, steps should be taken to limit the ability of such an event to damage local infrastructure and to ensure the continuity of government and business operations.

Human/Technological – Pandemic Disease Outbreak

A disease epidemic or outbreak results when the amount of disease rises above the expected level for the area.[88] These types of events can have a severe impact on the community resulting in a homebound workforce due to social distancing, shutting down of basic services, and impacts on an already taxed healthcare system.[89]

Certain contagious diseases, such as strains of influenza (commonly called “flu”), have the potential for localized epidemics to spread into global pandemics. The most well-known global flu pandemic occurred from 1918 to 1919 and is believed to have killed between 20 and 40 million persons.[90] A Colorado Department of Public Health and Environment report on flu pandemics notes that a pandemic event could result in up to 30% of the population becoming sick, with 50% of those affected potentially needing medical care and 10% needing to be hospitalized.[91]

An equivalent event in Larimer County would result in nearly 100,000 residents becoming sick, nearly 50,000 of whom would require medical attention, and nearly 5,000 of whom would require hospitalization. In contrast, the most severe influenza season in the last decade (2014-2015) resulted in 203 hospitalizations in Larimer County, only 4% of what might be expected in a major pandemic event.[92] Key populations that are particularly vulnerable to a pandemic event include those aged 65 and older (over 58% of influenza hospitalizations in the 2014-2015 season), as well as persons in congregate care or institutional settings.

Section 3.2.2 Major Stresses

Numerous stresses affect Larimer County communities. These range from economic stresses (e.g., the presence of pockets of poverty, the high cost of housing, and unmet infrastructure maintenance and repairs), environmental stresses (e.g., drought and increased water demand), and social stresses (e.g., concerns regarding social cohesion, access to health services, and an aging population).

Aging and Inadequate Infrastructure

Residents of Larimer County are fortunate to be served by a robust network of infrastructure that meets the community’s day-to-day needs. However, like many counties in Colorado (and beyond), Larimer County’s infrastructure is aging and in need of maintenance and, in some cases, replacement. Many bridges, wastewater treatment plants, and dams in the county were built 40 or more years ago, bringing them near the end of their design life.[93]

As flooding and extreme weather become more frequent (see climate change discussion below), some infrastructure may require redesign or earlier replacement to accommodate the harsher conditions. In such conditions, it will also become increasingly important to maintain redundant facilities and networks wherever possible. Maintaining and replacing infrastructure is a cost that local municipalities and the state and the federal governments will have to bear. While Colorado's municipalities are generally in good fiscal shape[94], these investments need to be planned for and will be paid off over many years.

Furthermore, as the county continues to grow, the ability of current infrastructure to serve both present and future needs is likely to be diminished or compromised. Larimer County's population grew 1.7% from 2000 to 2010, and is expected to keep growing at a rate of at least 1.5% through 2030 and at a rate of over 1.1% through 2050. Larimer County's population is currently projected by the State Demography Office to reach 400,000 between 2025 and 2030, and to reach nearly 550,000 in 2050.[95]

Housing and Transportation Availability and Affordability

The population growth described above also puts significant pressure on the housing stock and the transportation infrastructure.[20]

Despite an increase in the vacancy rate from 2000 to 2010, access to affordable housing is a challenge for many of the county's residents. According to the Center for Neighborhood Technology's Housing and Transportation (H & T) Affordability Index, approximately 75% of the county's households spend more than 45% of their income on housing and transportation. The H & T Affordability Index considers a location to be affordable if residents spend 45% or less of their income on housing and transportation. Transportation costs tend to be particularly challenging for those residing in the rural parts of the county where fewer services are locally available.[96,97]

The recent population boom as well as shifts in the job market may explain the affordability challenges facing many of the county's residents. While median family income in Larimer County reached $58,626 in 2013, since 2000 there has been a consistent increase in the percentage of the county's population living in poverty, and a corresponding increase in other indicators of hardship, such as the number of children eligible for free or reduced lunch in K-12 schools.[25,98,99]

As a rapidly growing community, Larimer County has a need for new, affordable, and resilient housing (both for renters and buyers) that can meet the needs of low- and moderate-income families as well as the growing population of seniors. Resilient housing should be located outside the floodplain and in areas that are either not susceptible to, or are defensible from, wildfire. This makes higher-density infill particularly attractive as a solution. Where possible, distributed power generation and other utilities should enable "islanding" (i.e., providing power to the location, even after grid power is no longer present) during a disaster event. In addition, affordable housing development should be promoted along existing transportation corridors and within economically active areas. Transportation costs associated with getting from home to work can lead to a decrease in expendable income, and push low-income households closer to risks.

Increasing Homelessness

Homelessness is defined as "lack[ing] a fixed, regular, and adequate nighttime residence". Counting the number of homeless persons and households is challenging. Nonetheless, evidence from local schools, shelters, and human service providers in Larimer County shows that thousands of homeless persons sought assistance in 2010, and that the number of persons seeking assistance is growing significantly (e.g., a 22% increase in homeless students from 2009-2010 and 2010-2011). It is

challenging to obtain more recent figures, but the general conditions of the housing market since the 2013 floods have led to higher housing costs overall, and it is more likely than not that the homeless population has continued to steadily increase.[100]

Growth of the homeless population, and the associated demand for immediate human services, creates increased pressure on local human and social services providers. This may lead to challenges in mobilizing the additional capacity needed for the general population following a major disaster. Furthermore, homeless persons are likely to suffer disproportionate impacts from disasters due to their extremely vulnerable position.

Aging Population

Older adults contribute greatly to Larimer County's vitality through their experience, their volunteer work, and the support they provide to family and neighbors. However, the county's aging population presents challenges, with the population over 55 years in age growing considerably in the past 15 years, even in the face of ongoing growth of all age groups countywide.

Population projections suggest that the county's population will continue to grow over the next decade, with much of that growth forecast in those over 60 years of age. With an aging population comes a specific set of needs in social, health, housing, transportation, and emergency services. Meeting these needs in a timely and cost-effective manner will be a key resiliency challenge for communities in Larimer County as its demographic profile changes.[101]

Recurring Drought

Larimer County has experienced two major multi-year droughts in living memory: from 1952 to 1956 and from 2000 to 2003. More recently, a statewide drought disaster was declared in 2012 and again in 2013. According to the National Drought Mitigation Center's Drought Impact Reporter, since 2005 (when reporting began), Larimer County has had the most reported drought impacts of any county in the state of Colorado. The entire county has been, and will continue to be, exposed to drought.[63,102]

The effects of drought can be gradual or acute, depending on the sector and water-using activity being evaluated. In fact, the onset and type of drought are defined based on impacts to water users; for example, agriculture may be affected before specific communities or industries, and vice versa.

Agriculture is important to Larimer County; therefore, drought is a major economic concern. In addition, drought can also create conditions conducive to wildfires, floods, and the spread of invasive species and disease, and can be accompanied by extreme temperatures (hot or cold), thereby creating a public health risk.

Drought is tracked as part of the National Integrated Drought Information System, which provides early warning of drought conditions.[103] As such, it is possible for communities in Larimer County to plan and prepare for drought. However, the complexity of water rights, the wide array of users, and the diversity of supply and transportation infrastructure make integrated management of water resources challenging.

Much of Larimer County, including the cities of Fort Collins and Loveland, is dependent on surface water resources originating in the mountains to the west. A series of reservoirs as well as a large

intermountain transfer project (the CBT project) provide water to much of the population.[104,105] Given the semi-arid climate and the strong seasonal precipitation patterns, water storage is important for providing resiliency in the water supply. In addition, climate change and recent trends in snowpack increase the concerns related to water security. The City of Fort Collins has established a Water Supply and Demand Management Policy that outlines a series of actions to be taken to ensure water supply when water shortages arise, including utilization of the large number of ditch companies present within the county.[106]

Economic Downturns

Local and state resources tend to be further stretched during economic downturns, making it more difficult to effectively respond to and recover from disasters. Furthermore, for businesses already under stress in a weak economic climate, a major disaster can be the end of the line.

The local economy is intimately tied to the wider national economy, and is impacted by national downturns, such as the 2008-2009 recession. Unemployment in the Fort Collins-Loveland Metropolitan Statistical Area went from 3.4% in 2007 to 7.4% in 2010, paralleling trends at the state and national levels. This may be most acutely felt in economic sectors that depend on economic activity in other areas, such as tourism, which is important to many parts of the county.[20]

Section 3.3 Key Community Vulnerabilities

Larimer County has undertaken tremendous efforts to plan and prepare for shocks and to mitigate stresses. Nonetheless, certain key vulnerabilities remain.

Development in Floodplains and at the Wildland-Urban Interface

Larimer County has seen steady population growth since 1990 and is expected to continue to see growth in the near future.[107] Development within flood plains and the Wildland-Urban Interface is likely to place more people and property in danger from flooding or wildfires.

Large parts of Fort Collins, Loveland, and other communities throughout Larimer County are located within Federal Emergency Management Agency-identified 100-year floodplains. Furthermore, it is estimated that nearly 32% of land in the Wildland-Urban Interface is developed, putting a significant number of rural communities and second homes at risk.[108]

Watershed Health and Risk of Repeated Flooding

The county's rivers need extensive restoration work to recover from the impacts of the 2012 High Park Fire and 2013 floods and mitigate future flood damage. In many cases, the floods caused damage to stream channels (such as bank erosion) that reduce their flow capacity and make future flooding of infrastructure and property more likely. The floods also destroyed large amounts of riparian vegetation, impacting wildlife habitat and potentially reducing downstream water quality. Flooding in 2013 was also aggravated by the historic treatment of stream corridors that likely created poor drainage conditions. For example, the Cache La Poudre River has suffered from decades of gravel mining.[109] Reconnecting floodplains and mining sites to the river may help increase storage capacity and mitigate future flooding downstream.

Vulnerable Transportation Corridors and Emergency Response Routes

Many critical roads and bridges in Larimer County require modifications or upgrades to enable them to pass adequate flood flow and/or withstand the impacts of flooding and flood debris.

For example, the I-25 corridor, which is critical for the county, state and region, was closed for 24 hours during the 2013 floods. Multiple bridge crossings along I-25 need replacement or modification to enable them to withstand adequate water and sediment flows without suffering damage or overtopping. Additionally, the I-25/Cache La Poudre crossing is only designed for a 15-year flow, which makes it extremely vulnerable to flooding and flood damage.

The lack of viable alternatives to I-25 for regional traffic poses an issue for evacuation, emergency response, and disaster recovery. The parallel US 287 and US 85 corridors have significantly lower capacity and may also be vulnerable to closures or interruptions during a disaster. Regional mass transit options to replace vehicle traffic on I-25 remain very limited at this time, although plans for significant expansions of service are expressed in the North I-25 Environmental Impact Statement.[110]

Creating resilient transportation corridors will enable evacuation and facilitate response to many different types of potential disasters, while also minimizing disruption to regular economic activity.

Low Individual Preparedness and Vulnerable Populations

As evidenced in the aftermath of the 2013 floods, individual awareness of disaster risk and preparedness for potential impacts need to be fostered in order to increase community resiliency capacity. This will require continued engagement efforts over the long term. As one charrette participant remarked, “a dense community is not necessarily a connected community.” Building social connectivity will help strengthen the county’s resilience.

Larimer County is home to a number of groups that can be considered especially vulnerable populations during a disaster. These include low-income households, minority households, linguistically isolated households, elderly households, households with young children, and persons with disabilities, among other groups. These groups are often subject to financial strain and social isolation. Furthermore, certain communities located in the mountainous and remote plains areas of the county face special challenges due to their physical isolation.

Vulnerable populations are often unable to access the many resources and services available in the county due to their relative isolation (physical or social) and a lack of knowledge or communication between providers. This results in a higher level of vulnerability prior to a disaster, and a less effective response to these populations’ needs during and following a major event. Furthermore, access and functional needs populations usually have fewer financial resources for recovery, or may have special and higher-cost needs.

When planning for resiliency, it is important to keep the needs of these communities in mind, as some shocks and stresses may be particularly impactful on specific vulnerable populations. For example, the elderly and ill may be more vulnerable to heat stress, flood evacuation warnings may need to be translated to accommodate the needs of non-English speakers, and low-income households may need rapid financial assistance to mitigate the impact of a temporary or permanent job loss during an economic downturn or after a disaster strikes.

Water Supply and Resource Issues

Mirroring conditions throughout the Front Range, a large portion of the water supply to Larimer County communities comes from areas west of the Continental Divide. This water is conveyed by a series of pipelines, reservoirs, and pump stations known as the CBT project to populated areas. The CBT carries 200,000 acre-feet of water per year, irrigates 640,000 acres of farmland, and serves up to 860,000 people in eight counties.[111] The majority of the land area and population served by CBT water is located in Boulder, Larimer, and Weld counties. At the same time, natural conditions east of the Front Range are generally more arid, with limited rainfall and groundwater resources that recharge slowly and may not be available for consumptive use.

The transport of large quantities of water over the Rocky Mountains presents multiple points where the supply could be vulnerable to sabotage, malfunction, or equipment failure. Furthermore, this supply is dependent on mountain snowpack. Although snowmelt has proved itself a sufficient resource for the last 150 years, increasing population growth in the coming decades, the recurrence of drought years, and the possible effects of climate change (see below) suggest that the adequacy and stability of this supply may be challenged in future decades.

Small and Home-Based Business Vulnerability to Shocks

Approximately 42% of Larimer County employees work in firms with less than 100 employees[112], compared with 34.5% of employees in the U.S.[113] A significant number of small and home-based businesses contribute to the economy of Larimer County. Maintaining a high number of small businesses contributes to innovation, but also contributes to economic risk because new businesses experience higher failure rates and small businesses have more limited resources to recover after a major shock. In addition, small home-based businesses are also vulnerable to risks that affect private homes and are less likely to have continuity plans in place (e.g., they may keep records in a basement, may not do regular data backups, and are less likely to have off-site record storage).

Helping small businesses improve their preparedness, system redundancies, and ability to operate continuously through multiple shocks and stresses will help make Larimer County communities more economically resilient overall.

Section 3.4 How Changing Climate Affects Vulnerability in Larimer County

Larimer County's exposure to natural hazards has changed over the past several decades as a result of development and changes in ecosystems caused by, for example, land use, fire suppression, and invasive species and pest outbreaks. Climate change is becoming an increasingly significant third contributor to changing natural hazards exposure. The Colorado Energy Office and the Colorado Water Conservation Board have assessed multiple studies of climate change and summarized the results of global climate models and related hydrological models as they apply to Colorado. Statewide temperatures have increased 2.5°F within the last 50 years and are predicted to increase an additional 2.5 to 6.5°F by 2050.[114] Warming is expected to be more pronounced in summer than in winter. Higher temperatures are causing and will continue to cause a seasonal shift in peak runoff, with peak runoff occurring earlier in the year. Additionally, precipitation patterns may shift, with more precipitation falling during mid-winter and less in the summer. The frequency and magnitude of extreme precipitation events is also expected to increase, particularly in the winter. These potential changes have implications for Larimer County's shocks and stresses. There is considerable awareness of the risks

climate change poses to Larimer County, with cities like Fort Collins taking a proactive approach to plan for a changing climate.[115,116,114]

Increasing temperatures can exacerbate drought conditions and wildfire risk, impact agricultural productivity, and reduce snowfall/snowpack. Wildfire frequency and severity, already exacerbated by a century of wildfire suppression, is expected to increase due to climate change. An increase in extreme heat days can present a health risk, which is especially important in light of Larimer County's aging population.[114,115]

Changing precipitation and temperature has the potential to impact water supply and demand. Most of the county relies on stored surface water as a water source; water storage in the form of mountain snowpack, persisting until mid- or late-summer is a core storage mechanism. If precipitation falls during a shorter period of the year, with an earlier snowmelt and a longer, drier, hotter summer, the need for water storage will grow. This is especially true if the population continues to increase as projected. Climate change could augment the need for irrigation water in the agricultural sector, further impacting demand. Decreased water availability combined with increased demand may exacerbate water rights conflicts, especially given that a substantial portion of the county's water comes from the western slope (headwaters of the Colorado River). Increased winter precipitation has the potential to affect flood risk, especially if heavy rain falls on snowpack.

Finally, changing climate conditions can impact ecosystems, with complicated feedbacks that may affect ecosystem services that Larimer County residents rely on.

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Section 4
Resiliency Strategies

As presented in Section 1, Larimer County's vision for community resiliency is as follows:

"A connected, collaborative, and cooperative region where:

- *Land use planning is long-range, regional, and comprehensive, and values cities, rural communities, and agriculture.*
- *There is a diverse range of housing and multi-modal transportation options.*
- *Critical infrastructure is designed to be affordable, adequate, and resilient.*
- *County residents understand their risks, and individuals and their communities are self-sufficient and take responsibility for their own and their collective preparedness.*
- *The economy is diverse, vibrant, and sustainable with a trained, diverse workforce.*
- *There is equitable access to the social services, health care, and education needed to maintain capacity, flexibility, and high quality of life.*
- *The natural environment is valued, protected, and responsibly managed so that there is availability of and access to natural resources. Infrastructure is moved from/kept out of high risk, high value areas."*

Achieving this vision involves developing a culture and practice of strengthening community resiliency and will require coordinated and systematic work over many years. In support of this vision, Larimer County has outlined a series of goals, strategies, and projects that will contribute to the county's overall resiliency.

- **Goals** are broad policy statements describing the themes that Larimer County communities seek to address in order to improve overall community resiliency and realize its vision statement.
- **Strategies** describe distinct plans of action that will be undertaken in an effort to achieve this Framework's goals. In some cases, multiple strategies may be developed to achieve a particular goal. Strategies are developed within the context of the six **resiliency sectors**.
- **Projects** are specific undertakings that contribute to the execution of a strategy. For example, a strategy may be to "expand the use of green infrastructure to mitigate storm water runoff in urban areas," whereas a project may be to "install bio-swales along Main Street between 4th and 10th Streets."

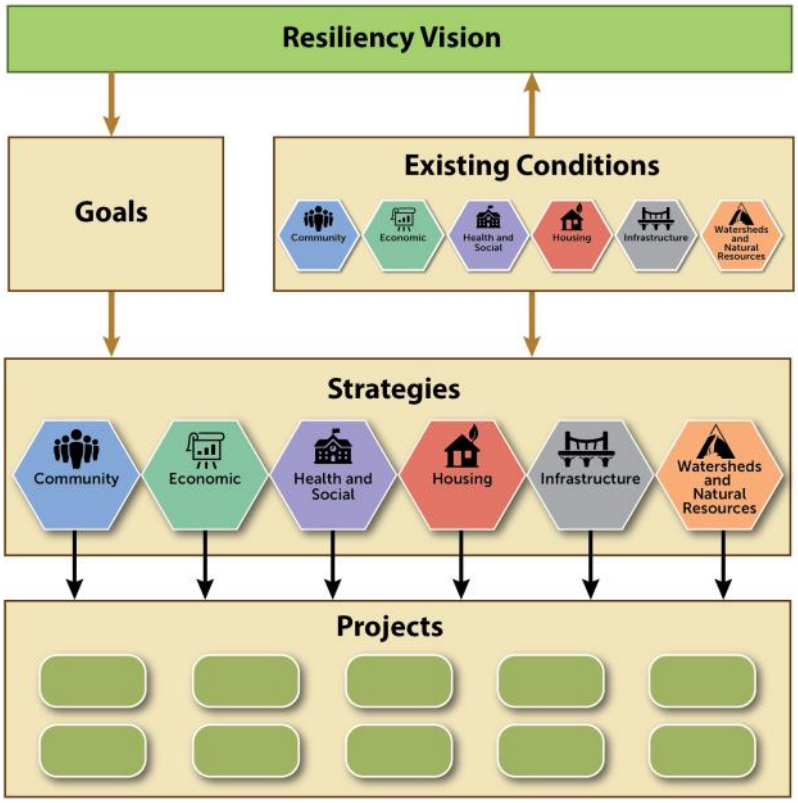

Figure 4-1: Resiliency Vision, Goals, Strategies and Projects

Section 4.1 Strategy Development

As described in Section 1, this Framework was developed through a collaborative process that engaged a wide variety of stakeholders—experts and laypersons alike—in the planning process. Stakeholders shaped Larimer County's vision statement and outlined important resiliency goals. The community engagement process extended to developing strategies and projects to forward Larimer County's resiliency goals.

Section 4.1.1 Approach and Process

Goals, strategies, and projects have been identified for Larimer County through a multi-step process that combined technical analysis with a robust process of community engagement. This process is explained in detail in **Section 1.4: Resiliency Planning and Community Engagement in Larimer County,** and materials and documentation used throughout the community engagement process are provided in Appendix B. Detailed process outputs are included in the Charrette #1, Charrette #2, and Draft Framework Review Session reports.

In identifying strategies and projects, participants in the planning process were challenged to begin a **deeper cultural shift in decision making** by evaluating strategies and projects from multiple perspectives and against multiple criteria. These cultural shifts included new thinking about building partnerships across jurisdictional and sectoral lines, encouraging individual responsibility while providing local services, building and maintaining infrastructure to mitigate damage from hazards, paying for the infrastructure and services desired, and analyzing the effects of long-term stresses in addition to better-known shocks, such as fire and flood.

Section 4.2 Resiliency Goals

Building on the community's vision for a resilient future, community members and leaders who were engaged in the resiliency planning process have identified the following goals to address and improve disaster resiliency for Larimer County communities:

Goal 1: Develop regional, long-range, comprehensive planning that is adaptive and collaborative.

Goal 2: Foster awareness, preparedness, self-sufficiency, and a greater sense of community by engaging and educating residents of the county.

Goal 3: Increase energy and resource efficiency and reduce risk appropriate to rural and urban contexts by developing and implementing appropriate construction standards.

Goal 4: Increase the range of housing options and increase stock of affordable housing through traditional means as well as creative land use, building codes, and measures for innovative housing.

Goal 5: Develop and fund a regional, multi-modal transportation network using public and private partnerships at all levels.

Goal 6: Manage natural resources through adaptive planning and management of land use, especially watersheds, floodplains, agricultural land, and the Wildland-Urban Interface.

Goal 7: Build public/private/non-profit sector partnerships to support and achieve the community's vision and goals.

Goal 8: Support the diverse production and supply needs of a sustainable supply chain for the regional food system.

These goals are for all stakeholders in the county, calling on all to play a role. In no way should these goals be construed to mean that they are the sole responsibility of staff and leadership of the Larimer County political and administrative structure. Achieving the outlined resiliency vision and goals will require an ongoing, countywide commitment.

Section 4.3 Strategies by Resiliency Sector

The strategies identified for communities in Larimer County are described and summarized according to their primary resiliency sector in the following sections. However, many activities are cross-sectoral in nature, and all will benefit from multi-sector engagement and participation.

Additionally, the Colorado Resiliency Framework outlines a series of statewide strategies and goals organized into the six resiliency sectors. The Larimer Community Resiliency Framework has taken into consideration the strategies and goals elaborated in the Colorado Resiliency Framework, and the strategies and projects proposed in this Framework are organized into those same sectors.

Section 4.3.1 Community

Resilient communities are diverse and utilize that diversity to their advantage. Community members are involved, have the information necessary and tools available to make proactive, wise decisions, and know how to access resources to supplement local capacity, when necessary. Changing hazards are understood by decision makers and incorporated into local plans. Tools such as land use, comprehensive emergency management, hazard mitigation, and governance work in concert and reinforce mutual goals.

Issue Statement

The key themes identified in the community sector in Larimer County included: the need to support and build high social capital; to increase individual understanding and awareness of personal risk and vulnerability countywide; to increase individual capacity to prepare and respond; and to build a much stronger culture of self-sufficiency, community connection, and mutual dependence. Coupled with this, participants identified a need for a push to incorporate risk mitigation into planning and land use, and to regionalize emergency management. This is particularly critical for Larimer County's rural and mountain communities, but should not be overlooked in urban areas, as cities experiencing long-term stresses can have weakened capacity to respond, and acute shocks can overwhelm formal response mechanisms, leaving households to cope on their own for multiple days.

Strategies

To achieve this, several core strategies were identified, including:

C1. Shift cultural norms toward increased social and physical connection, interdependence, and risk awareness and preparedness.

C2. Create innovative development that integrates housing, transportation, and employment to create a diversity of options.

C3. Scale emergency management, both up and down, to integrate responses from the individual, household, community, municipal, county, and regional levels.

C4. Provide more support to formal and informal community leaders (e.g., emergency services, fire departments, faith-based organizations).

C5. Continue work toward the development of an integrated multi-jurisdictional emergency management program and Emergency Operations Center to better share resources and enhance efficiency to respond to and recover from large-scale emergencies and disasters.

C6. Develop a county master plan tailored around community needs that proactively places development where the community desires it and limits development in high-risk, hazardous areas.

C7. Incentivize sustainable development.

C8. Strengthen and maintain relationships among multi-sector teams.

Section 4.3.2 Economic

In a resilient economic sector, systems and markets can maintain function and absorb and rebound from immediate stress or shock. There is a diversified base of industries with free-flowing, accessible capital not overly reliant on any one sector of the economy. The workforce is healthy, well-trained, and mobile. Business continuity plans, back-up electronic files, and telecommunications redundancies reduce the time needed to get back to business after disruptions.

Issue Statement

In Larimer County, core economic themes include access to services for rural and/or remote communities, workforce education, and encouraging new economic activities while maintaining existing activities and revitalizing older activities. In particular, stakeholders identified the potential to incorporate new technology into agriculture and manufacturing to create vital new industries. This could be coupled with an evaluation of workforce adequacy for jobs and refinement of educational strategies to address demographic shifts and ensure the workforce has the training to meet the job market's needs.

Strategies

Key strategies to build the resiliency of the economic sector in Larimer County communities include:

E1. Diversify the economy beyond a few large employers such as the university and government.

E2. Develop alternative career paths that build on different work and education experiences and the policy initiatives to support them. Change cultural perceptions around jobs, debt, and the idea that "good" jobs require a college education.

E3. Foster development of communities with a work, life, and play balance for a variety of economic classes.

E4. Foster communication and collaboration between groups already focused on economic issues in the county.

E5. Promote local production and storage of energy to enhance source diversity, create jobs, increase energy redundancy and modularity, and protect against the potential economic impacts of grid failure.

E6. Improve the economic stability of vulnerable populations.

Section 4.3.3 Health and Social

In a resilient health and social sector, health and well-being of the community is a shared responsibility among all levels of society. Mental and physical health, preventative care, access to care, environmental health, and managing the impact of the built environment play equally important roles. Federal, state, non-profit, and private organizations work together in a coordinated fashion to achieve this outcome. Extremes in social inequity are addressed, and health and social service programs are tailored to specific population needs, including vulnerable populations. Social cohesion, high quality of life, healthy lifestyles, preventative care, and overall better physical and mental health are fostered.

Issue Statement

To build the resilience of the Larimer County Health and Social sector, stakeholders felt the county should focus on meeting the communities' basic needs. This would include ensuring access to services across the whole community (including rural and remote areas), addressing an aging population, and helping foster a cultural shift around organizational and personal responsibility for emergency planning. This should be coupled with efforts to foster a cultural behavior shift—to build, in county residents, an underlying value of personal responsibility and self-sufficiency and an increased sense of community and civic engagement.

Strategies

Core strategies to increase health and social resiliency include:

HS1. Increase individual and community preparedness by enhancing training and education opportunities for emergency preparedness and resilience education, identifying vulnerable populations, empowering local leaders, and promoting resiliency conversations with the public.

HS2. Achieve equitable distribution of social service facilities and resources around the county to maximize redundancy and decentralization and to develop sustainable social "safety nets."

HS3. Develop an understanding of how small plans and organizations fit into emergency master planning at the municipal and county level.

HS4. Ensure Larimer County residents have access to healthcare and mental health services.

HS5. Foster collaborative planning across agencies and sectors.

HS6. Incentivize connection to basic health and social services through outreach.

Section 4.3.4 Housing

Resilient housing is located outside of high-risk areas, includes access to community resources and support systems, and is connected to places where jobs are located. Construction uses safe, durable materials and design features that limit the impact of natural disasters while also allowing for short-term sheltering-in-place. Renewable energy systems foster self-reliance and make homes more affordable to operate. Housing is diverse and able to meet a wide range of affordability criteria and varying needs of residents at different points in life.

Issue Statement

Homes are the epicenter of the community, and the foundation on which community members thrive. Consequently, safe, affordable housing that provides ready access to employment and services must be a foundational element of resiliency in Larimer County communities.

Currently, however, affordable housing, a diversity of housing that meets the needs of the breadth of the county population, and inter-linkages between housing and transportation are significant issues in Larimer County communities. Housing prices are rapidly rising, driven by low vacancy rates and an increase in migration to the county. Single-family housing prices are rising beyond the reach of middle-income families. County housing authorities are already moving toward models that incorporate resilience principles—building multi-income communities, providing on-site services to support aging-in-place, partnering with teachers and schools to provide summer literacy programs for at-risk youth—but the needs outstrip the county's ability to supply. There is clearly a need for broader engagement and creative thinking and funding to address current housing challenges.

Key themes identified in the housing sector to build resilience include:

- Develop a diverse spectrum of housing, including affordable and transitional options.
- Build housing in low-risk locations, in a resource-efficient manner (particularly power and water), and include access to a variety of transportation options and other services.
- Increase support to vulnerable populations who need equal access to housing, and create "safety nets" to keep people in their homes.
- Design housing projects to enhance community connectivity. In particular, mixed-income communities are more resilient.

Strategies

Strategies identified to meet housing sector resiliency challenges include:

H1. Integrate region-wide and community-level housing strategies into long-range, comprehensive planning, including encouraging housing development out of high hazard zones

H2. Increase transitional housing available for different populations and needs.

H3. Educate new homeowners, particularly in rural or remote areas, about location-specific risks and preparedness best practices.

H4. Develop the services and policies needed to support diverse options for the county's aging population.

H5. Diversify housing options by reviewing and changing codes and scaling the development fee system to allow co-housing, smaller green-spaces, mixed housing, and other new, innovative housing options in areas where urban infrastructure is available or feasible.

Section 4.3.5 Infrastructure

Resilient infrastructure resists and bounces back quickly from acute shock events, including human-caused threats, accidents, extreme weather events, and changing climate. It incorporates redundancy and back-ups as needed to minimize disruptions to critical infrastructure, such as roads, power, clean drinking water, and waste management. In addition, it allows critical services to remain active, such as police, fire and rescue, and hospitals. In the absence of shocks, resilient infrastructure provides access to homes, work, businesses, schools, and health/medical services for a variety of populations. It develops in step with housing, jobs, and recreation, providing multiple benefits from all sectors.

OCTOBER 10, 2013 NOVEMBER 4, 2013

Issue Statement

Key infrastructure resiliency issues in Larimer County communities include the need for redundant and interoperable systems that can meet changing customer needs and growing demand. Current infrastructure in established communities is aging; rural infrastructure is being faced with growing demand for which it was not originally designed. The majority of older county infrastructure was built with only a partial understanding of the local risk and may not be designed to address emerging issues. There is a need to explore and understand key system vulnerabilities, including risks due to human-caused threats. With transportation becoming more expensive and difficult, the county's growth has shifted to areas that offer more job opportunities and areas that supply infrastructure for traveling to these jobs.

A particular resilience challenge for Larimer County is transportation infrastructure. A significant portion of the Larimer County workforce regularly travels on I-25 or on parallel north-south roads. All of these roads cross major drainages. During the August 2013 floods, all north-south roads west of I-25, including I-25, were closed for some period of time at the St. Vrain, Little Thompson, Big Thompson, and Cache la Poudre river crossings. The closure of I-25 is particularly problematic because it is a regional interstate that carries intra- and inter-regional traffic. Extended closure of I-25 north of Denver would force Colorado residents to make lengthy detours on back roads not designed for major

transit, and would force interstate transit east to I-35 and I-29 or west to I-15, both at substantial time and fuel costs. Disruption of interstate transit has implications for food security and business continuity for a number of surrounding states. All four I-25 crossings were flooded at 100-year or lesser flows, and it was primarily luck that prevented significant damage that would have required extended closure and repairs. These issues point to a clear need for infrastructure review and redesign at the I-25 river crossings.

Strategies

Key strategies identified for the infrastructure sector include:

I1. Develop emergency action plans for infrastructure failure, including security procedures/systems for critical infrastructure.

I2. Utilize technology/innovation in infrastructure projects to increase robustness, modularity, and diversity.

I3. Develop a clear hierarchy of needs in infrastructure repair/upgrade/installation.

I4. Decrease risk in hazardous areas through land use planning.

I5. Identify and address key system vulnerabilities.

I6. Incentivize backup systems that support sheltering in place.

I7. Proactively educate the public before a disaster regarding potential infrastructure response and implications.

Section 4.3.6 Watersheds and Natural Resources

Resilient watersheds and natural resources can withstand disturbances over time while retaining their structure, function, and support services. In addition, the watersheds and natural resources protect infrastructure and provide economic benefit, provide recreational opportunities and support human health, and work in harmony with communities. Healthy forests promote water and soil retention and protect communities from flooding. Healthy soils and farms continue to provide good harvests, financial prosperity, and food security under a variety of conditions. Clean water supports human and animal health. Well-maintained natural areas attract tourists and provide resources for residents.

Issue Statement

In Larimer County communities, the natural environment, including rivers, lakes, forests, mountains, and agricultural land, is highly valued. Healthy ecosystems provide recreation opportunities, food, water, and clean air. They also help protect against fire, flood, and drought. While under stress, healthy, diverse ecosystems are better able to deliver ecosystem services than degraded systems.

County stakeholders recognize that disasters are interconnected (e.g., fires degrade landscapes and increase flood risk, droughts intensify fire risk) and that damage to watersheds and natural resources will have cascading impacts on infrastructure. The stakeholders also recognize that climate change is altering the nature and intensity of events, placing increasingly greater demands on ecosystems. Preserving and maintaining ecosystems through regional-scale forest management, re-channeling, repairing, and restoring water systems and rivers, and mitigating flood and fire impacts is, therefore, a core interest for county stakeholders.

Strategies

Core watershed and natural resource strategies for Larimer County communities include:

W1. "Design with nature," incorporating natural processes such as flood, fire, and drought into land use planning and project design, while balancing inherent and acceptable levels of risk.

W2. Update floodplain maps and integrate these maps into zoning and planning.

W3. Build relationships and increase collaboration across jurisdictions for watershed and natural resource planning and management.

W4. Develop better flood warning systems, including applications of strategically placed real-time rain and stream gauge monitoring systems.

W5. Collaborate and support integrated multi-jurisdictional forest management to include a multi-pronged approach, including reduced fuel loads, natural fire breaks, soil mitigation, and zoning, to achieve improved forest health.

W6. Increase public education around natural resource interactions and hazard mitigation.

Section 5
Roadmap to Resiliency

The strategies and projects identified in this Framework are critical to strengthening resiliency in Larimer County communities. Not all projects can be implemented simultaneously—some will be easier to implement or provide more immediate benefits, while others may come at a higher cost or have less tangible, longer-term benefits. Therefore, this section of the Framework prioritizes efforts by balancing factors, such as project benefits, costs, effectiveness, and ease of implementation.

In addition, the communities of Larimer County cannot "achieve" resiliency by implementing a project or reaching set milestones. Resiliency is something that requires continuous work and adapting processes, plans, and projects as the context changes. The focus should be on improving the qualities that make Larimer County resilient today, while also addressing the long-term factors that make the community and its members vulnerable to the impacts of shocks and stresses.

Section 5.1 Implementing the Framework Today

The communities of Larimer County are committed to ensuring that the resiliency strategies and projects identified in this Framework are implemented to the fullest extent possible. To that end, projects have been prioritized, and specific leaders and stakeholders have been identified as responsible for ensuring the implementation of each listed project.

Section 5.1.1 Identification of Resiliency Projects

Larimer County stakeholders came together, in service of their resiliency vision and goals, to identify projects that could be tangible implementations of the strategies identified in Section 4.

This discussion proceeded from the basis that projects should foster a cultural shift in decision making, emphasizing benefits across sectors, with special emphasis on the impact on vulnerable populations. Using a cross-sector approach ensures projects have multiple benefits that are distributed throughout the community.

Brainstorming exercises conducted during the charrettes produced project ideas that cut across all six sectors and jurisdictions, and are designed to bring the Framework's vision, goals, and strategies to life in ways that would help Larimer County communities thrive under a variety of conditions. During this iterative process of brainstorming and selection, stakeholders developed nearly 50 project concepts.

Participants then used the Resiliency Prioritization Criteria (see Figure 5-1) to review these ideas, bundle similar projects together, and choose the top five priority projects for further development. Additional important criteria in choosing these priority projects included the degree to which they engaged multiple jurisdictions in recognition of the fact that problems do not stop at political borders, and fostered a culture of more integrated problem solving, overall. In Charrette #2, participants reviewed, commented on, and suggested project leads and project participants for, not only the five priority projects, but also the full original list of 50 project ideas.

Section 5.1.2 Project Areas

For the purposes of this Framework, projects are grouped into the following three project areas.

- **Resilient Community Building**: Resiliency is rooted in the notion that citizens, communities, and the systems that serve them are all connected—connected through social capital and relationships, connected by watersheds and transportation corridors, and, most importantly, connected through shared priorities and needs. This project area, therefore, includes

actions meant to realize and improve these connections, and primarily includes planning, education, and outreach efforts.

- **Risk Management:** Risk management provides foundational information for communities to make informed land use, development, and capital improvement decisions to reduce exposure as communities grow and climate changes. Implementation of resilient strategies and projects depends on the availability of current and comprehensive risk data, analysis, and mapping.
- **Capital Investment:** Investments involve projects that address shocks and stresses through concrete improvements, achieve triple bottom-line returns (economic, social and environmental), and demonstrably enhance regional resilience. They also provide benefits across multiple sectors and geographic regions.

Section 5.1.3 Scoping Resiliency Projects

Resiliency projects can take many shapes, ranging from relatively low-cost planning and education activities to multi-million dollar infrastructure projects. In their development and review, all projects in this Framework were assessed in terms of how well they demonstrate the Resiliency Prioritization Criteria outlined in the Colorado Resiliency Framework. These criteria are described in Figure 5-1.

Co-Benefits:

Provide solutions that address problems across multiple sectors creating maximum benefit.

Cross-sector Strategy: Develop a statewide guide and online resource on how to assess, analyze, and integrate all hazards data into local government land use planning.

Project Example: Develop model codes.

Innovation:

Advance new approaches and techniques that will encourage continual improvement and advancement of best practices serving as models for others in Colorado and beyond.

Cross-sector Strategy: Explore the use of captured biogas produced in the natural wastewater treatment process from wastewater treatment plants as a continual (though limited) and emergency backup energy supply.

Project Example: Conduct research, then design and build a model plant using biogas as an alternative fuel and backup.

High Risk and Vulnerability:

Ensure that strategies directly address the reduction of risk to human well-being, physical infrastructure, and natural systems.

Cross-sector Strategy: Encourage local governments to develop floodplain standards that prohibit future development in flood plains through a public/private partnership between state agencies and associated private or non-profit partners.

Project Example: Create a statewide risk and vulnerability assessment tool.

Adaptive Capacity:

Include flexible and adaptable measures that consider future unknowns of changing climate, economic, and social conditions.

Cross-sector Strategy: Work with local planners, residents, and builders to incorporate water and energy-efficiency measures into existing and new homes.

Project Example: Adopt performance-based energy and water building codes for all new housing, and provide labeling for all existing housing for renters and buyers.

Economic Benefit-Cost:

Make good financial investments that have the potential for economic benefit to the investor and the broader community both through direct and indirect returns.

Cross-sector Strategy: Incorporate risk and resiliency analyses into funding decisions, including state grant programs.

Project Example: Develop resiliency design standards and incentivize their application in projects utilizing public funds.

Harmonize with Existing Activity:

Expand, enhance, or leverage work being done to build on existing efforts.

Cross-sector Strategy: Continue to engage community stakeholders to determine resiliency needs and priorities in watersheds.

Project Example: Expand on the current watershed-wide collaborative focus of 75 watershed groups to include a focus on all hazards.

Social Equity:

Provide solutions that are inclusive with consideration to populations that are often most fragile and vulnerable to sudden impacts due to their continual state of stress.

Cross-sector Strategy: Promote and educate decision makers and program managers about the value of and the opportunities for using the Community Inclusion mapping project.

Project Example: Integrate Community Inclusion map analysis into planning and funding decisions.

Long-Term and Lasting Impact:

Create long-term gains to the community with solutions that are replicable and sustainable, creating benefit for present and future generations.

Cross-sector Strategy: Establish a new resiliency funding bank to support lapses in current funding opportunities.

Project Example: Create the Colorado Community Resiliency Partnership Fund.

Technical Soundness:

Identify solutions that reflect best practices that have been tested and proven to work in similar regional context.

Cross-sector Strategy: Develop guidance and share best practices to help communities plan for the potential impacts of changing risks and hazards and incorporate this information into policies and actions in comprehensive and other plans.

Project Example: Develop resiliency design and policy guides and a case study database.

Figure 5-1: Resiliency Prioritization Criteria

Section 5.1.4 Priority Projects

The following five concepts were identified as priority projects in implementing the Larimer Community Resiliency Framework. Table 5-1 summarizes the associated resiliency sectors, strategies, and responsible stakeholders for each priority project.

Priority Project 1: Larimer Connects - Community Conversations

Larimer Connects seeks to build community connections—within communities and between communities, and the connections that reach past communities into formal structures (municipalities, special districts, counties, region, and the state). By building a community culture of resilience, the project has the potential to cross generational lines leading to a more resilient population for years to come. The project starts with an assessment of unmet needs and community fragility, which is currently underway and is fully funded by Larimer County. Community fragility takes a systems approach to evaluating the connections between emergency management and an affected community to identify potential failures within a system. It helps provide a framework to understand how these failures may sometimes result in cascading effects that can lead to systemic failures and collapse. The study looks at several distinct factors that could cause a community to be more or less fragile before, during, or after a disaster. These factors include many of the same concepts currently used in the field to determine resilience, such as community connections, social ties, trust in formal systems, network structure, governance, social capital, flexible plans, accessibility to lifelines, adaptive capacity, and the ability to recognize cascading failures.

Building on the foundation of the Unmet Needs and Community Fragility Study, the Larimer Connects team will analyze all of the collected data, along with all available reports and studies, to determine the best outreach approach for individual communities in the county. The team will create a suite of learning modules, and communities will be able to choose those that most meet community needs. Finally, the team will identify pilot communities to formalize the program, develop expanded modules that are multi-sector and address resiliency and fragility, create online learning modules and tools in partnership with Colorado State University, and host an annual community competition. Programming will be based on the audience within each community and determining the best ways to reach them.

Larimer County government will serve as the managing entity and fiscal sponsor of the initiative and is prepared to launch this initiative as soon as funding is secured. The project will be carried out through a partnership with the Larimer County Office of Emergency Management, Larimer County Long-Term Recovery Group, Larimer Voluntary Organizations Active in Disasters, and other governmental and non-governmental organizations.

Priority Project 2: Mobile Resource Van

The Mobile Resource Van would be a countywide partnership between public and private agencies to bring resources, information, and services to rural communities within Larimer County. Services would include:

- Medical and public health services;
- Testing and information;
- Mental health services; and
- Emergency response and preparedness information.

By bringing resources to residents, problems are more likely to be identified and addressed earlier, decreasing the impacts on both individuals and the community as a whole. Target audiences could include the elderly, rural populations, households lacking transportation, individuals without health insurance, and low-income families and individuals.

This project would also generate co-benefits by establishing greater collaboration among various public and private entities, allowing them to better coordinate their resource distribution.

Priority Project 3: Regional Affordable Housing and Transportation Assessment and Strategy

Affordable housing in Larimer County is currently addressed primarily at the municipal level. This project would:

- Conduct a countywide assessment of housing needs and availability as the foundation of a countywide housing strategy.
- Develop a strategy and implementation that will build on existing affordable housing projects and also develop a clear strategy for a broader mix of housing options to meet the needs of diverse income populations and projected population growth.
- Survey transportation alternatives and needs, and incorporate feedback into the assessment to acknowledge that affordable housing strategies should enable access to job markets and services.

Priority Project 4: Northern Colorado Community Connectivity Project

During the 2013 floods, rescuers evacuated over 1,700 citizens throughout the Front Range, most by helicopter, out of canyon communities that were totally cut off by floodwaters, leaving $3.9 billion dollars in impacts. The closure of I-25 in Weld and Larimer counties during the critical 24 hours after the disaster left vulnerable populations at risk. The disaster impact area was over 200 miles (north-south) by approximately 50 miles (east-west), with over 400 miles of federal-aid roadways and over 130 bridges impacted. All the major north-south oriented highways were closed due to flooding, including the state's most critical route, I-25. The closure impeded emergency response and evacuations, and limited access to key local and regional hospitals. The economic losses of the shutdown were estimated at $800,000 per hour.

The Northern Colorado Community Connectivity Project (NCCP) strengthens resilience across the region's four watersheds by improving watershed health, protecting the region's most critical and highly vulnerable arterial transportation route, and avoiding disaster-related economic losses to households, Northern Colorado communities, and the state. The NCCP will integrate affordable housing, green infrastructure, transportation resiliency, multi-modal transportation hubs, low-income housing, and bike and pedestrian access for commuting and recreation, with forward-looking planning for population growth and climate impacts. The NCCP consists of the following components:

- 200 new units of Transit-Oriented Development affordable housing;
- Regional trail connectivity;
- River corridor improvements;
- Critical at-risk Interstate bridge improvements to the Little Thompson, Big Thompson, and Poudre river crossings;
- Redesign of water diversion systems;

- A watersheds climate study;
- A smart growth development study; and
- A gravel pit floodplain connectivity feasibility study.

The integrated approach of the project will also enhance future transit-oriented development opportunities.

Benefits of this project include:

- Ensuring that access to housing, jobs, and emergency and health services will maintain community connectivity and will improve the watershed and floodway;
- Enhancing bike transportation networks and recreational opportunities; and
- Begin shifting cultural perception regionally by beginning to breach the "other side of the tracks" divide that I-25 represents in northern Colorado between communities.

Priority Project 5: Resilient Natural and Built Infrastructure

This project would be a broad, multi-watershed effort to plan and implement projects that have a system-wide ecosystem benefit. To accomplish this, the project would develop new design criteria for low-impact development and green infrastructure in watersheds across the county. These criteria would consider:

- The "new normal" post-disaster and anticipating climate change; and
- Conservation easements, zoning to remove and prevent development in high hazard areas, and other best management practices in watershed management.

Section 5.1.5 Roles and Responsibilities

The strategies and projects identified in this Framework require a long-term process and committed people to make them a reality. Forward movement toward Larimer County's resiliency vision requires identifying persons and organizations who champion projects and initiatives and who can devote time and resources and take responsibility for implementing each piece of the Framework.

Each project needs to develop a **lead stakeholder.** This is the organization deemed responsible for advancing a strategy or project. In some cases, the lead stakeholder will be the local government agency with authority and responsibility over the types of projects, services, and policy implied by the strategy. In other cases, a private sector or non-profit lead stakeholder will be selected as the lead stakeholder because it is already leading in this area and has the needed contacts and relationships to further the work.

Projects also need **supporting stakeholders** to make them a reality. These are organizations that have demonstrated interest, capabilities, and commitment to a strategy or project, but are not in a position to assume authority or responsibility over its success. These may include local government agencies or special districts that are contributing players within a larger project scope, state or federal agencies that do not have primary jurisdiction in Home Rule areas, and private sector and non-profit organizations who provide ground-up connections and/or critical knowledge but do not have a mission or mandate to deliver the full project scope.

Table 5-1 identifies possible stakeholders for the priority projects discussed above. Stakeholders should identify a lead and ensure that all the relevant supporting stakeholders are also identified. By participating in the project, lead and supporting stakeholders make a commitment to support Larimer County's resiliency goals, as well as the specific strategies and projects identified in the Framework. Ensuring continued commitment and action in service of specific objectives and projects may require formal agreements in certain cases.

Table 5-1: Larimer County Priority Projects

Project	*Resiliency Sectors and Strategies*	*Regional Benefits?*	*Project Description*	*Potential Project Owner(s)*
Larimer Connects – Community Conversations	Community: C1, C3, C4, C5, C8 Health and Social: HS1, HS3	Y	Develop education modules and outreach programs throughout Larimer County to increase community knowledge of hazards, risks, and preparedness options; to enhance community connectivity; to decrease community fragility; and to support the development of a culture of self-sufficiency and mutual-support.	Larimer County OEM Fort Collins OEM Loveland OEM CSU Office of Engagement
Mobile Resource Van	Community: C1, C4 Health and Social: HS1, HS2, HS4, HS5, HS6	Y	A countywide partnership between public and private agencies to bring resources, information, and services to vulnerable communities within Larimer County. Services would include medical and public health services, testing and information, mental health services, and emergency response and preparedness information.	Larimer County Health Districts Healthcare Providers Colorado DOLA Colorado DPHE
Regional Affordable Housing and Transportation Assessment and Strategy	Housing: H1, H2, H4, H5 Infrastructure: I2, I4, I5, I7	Y	Conduct a countywide assessment of housing and transportation needs and availability as the foundation of a countywide housing/transportation plan. Plan and implementation will build on existing affordable housing projects and also develop a clear strategy for a broader mix of housing options to meet the needs of diverse income populations and projected population growth.	Larimer County Planning Department Municipal Planning Departments Housing Authorities Nonprofits Colorado DOLA
Northern Colorado Community Connectivity Project	Economic: E3, E4, E6 Infrastructure: I1, I2, I4, I5, I7 Watersheds and Natural Resources: W1, W3	Y	Construct a robust and resilient corridor connecting Northern Colorado. In the initial phase, the three I-25 bridges at Little Thompson, Big Thompson and Poudre river crossings would be replaced, simultaneously implementing stream improvement projects and installing greenways that connect the west and east sides of I-25.	CDOT

Table 5-1: Larimer County Priority Projects

Project	*Resiliency Sectors and Strategies*	*Regional Benefits?*	*Project Description*	*Potential Project Owner(s)*
Resilient Natural and Built Infrastructure	Infrastructure: I1, I2, I4, I5, I7 Watersheds and Natural Resources: W1, W2, W3, W5, W6	Y	Plan and implement projects that have a system-wide ecosystem benefit. To do this, develop new design criteria for low-impact development and green infrastructure in watersheds across the county. Take into account the "new normal" post-disaster and anticipating climate change. This would include conservation easements, zoning to remove and prevent development in high hazard areas, and other best management practices in watershed management.	Larimer County Municipalities CSU Institute for the Built Environment Colorado DOLA Colorado DHSEM

Section 5.1.6 Ongoing State Support for Local Resiliency

Following adoption of the Colorado Resiliency Framework, the State of Colorado has made a long-term commitment to a resilient future. To demonstrate this commitment, Governor Hickenlooper has expanded the mission of the Colorado Recovery Office and renamed it the Colorado Resiliency and Recovery Office (CRRO). In addition, the State has developed and proposed the creation of the Colorado Resiliency Program that will apply a deliberate, systematic, and regional approach to address both acute risk from shocks and increased vulnerability from underlying social, economic and environmental stresses. In addition to addressing known risks, this approach will also provide communities with a process to systemically address the need for adaptive capacity and measures in the face of changing conditions and climate.

The CRRO's commitment to resiliency at the local level has been demonstrated through a number of key areas:

- **Technical Assistance:** CRRO has, and will continue to provide technical support such as:
  - Resources: Funds and grants, as well as equipment.
  - Insights: Access to CRRO staff, and research.
  - Technology and Data: improved mapping, and risk information technology.
- **Identification of Funding Opportunities:** The CRRO has identified the need for funds that would support ongoing community-based projects and programs that advance the future adaptability and resiliency of communities to sudden shocks and reduce ongoing stresses. Securing funds for local projects will continue to be a priority through the Community Resilience Partnership Fund, which will follow these objectives:
  - Fill critical financing gaps with strategic investments;
  - Be a catalyst for changing existing funding systems to include resiliency;
  - Attract new investors that see the value of investing in resiliency measures;
  - Leverage existing resources to create multiple benefits;
  - Improve the affordability of projects targeted to vulnerable populations; and
  - Provide a stable and sustainable source of funding for resiliency programs and projects.
- **Support for Local Planning Processes:** The CRRO understands that local plans require local knowledge. Therefore, the state will continue to serve in a facilitation role during local resiliency planning, in order to foster ideas that will address unique local challenges.
- **Project Prioritization:** Through the pilot local planning processes (including Larimer County), over 100 resiliency project ideas were identified for inclusion in long-term local resiliency frameworks. Sectors served as the organizing element in the Framework strategy development and are also being applied to the local resiliency strategy and Framework development process to ensure all aspects of a resilient community are engaged and included.
- **Project Implementation:** While local knowledge may foster better location-specific plans and projects, local entities may lack the resources to implement such plans and projects. CRRO will continue to provide support for implementing projects, and will seek additional funding to enhance such projects.

Section 5.2 Sustaining Progress toward Resiliency

All projects identified in this Framework are promising ideas—ideas that cut across the normal lines of action and need to be developed further by the coalition of lead and supporting stakeholders—combined with ongoing actions and plans that support them, and funded by the necessary resources to make them viable. Sustaining progress toward resiliency will entail a series of

long-term efforts centered on leadership and collaboration, capacity building, and community engagement.

This section provides an outline, based on stakeholder discussions at Charrette #2 and further discussion during the Framework Review Session, for making the Larimer County vision, goals, and strategies a reality.

Section 5.2.1 Leadership and Collaboration across Disciplines and Jurisdictions

The charrette process created the Larimer Community Resiliency Steering Committee, coordinated by the Larimer County Office of Emergency Management. Participants agreed that this Steering Committee will continue after the Framework planning process is complete to further build resiliency countywide. The understanding of participants is that the work of implementing this Framework is not the work of the Office of Emergency Management, or even the whole staff and leadership of Larimer County. Instead, the participants recognized that making this vision a reality will require contributions from all the stakeholders who participated in the process. In addition, the group recognizes that there are other stakeholders who were not able to participate in the Framework process, yet should be part of implementation.

To implement the Framework, the Steering Committee will seek to achieve the following throughout 2016:

- Broaden membership of the Steering Committee to include, to the best extent practicable, participants from all six resiliency sectors and from all geographical areas of Larimer County.
- Identify organizations to participate in a broader resiliency network, including those who participated in the original charrette process as well as others who were not in attendance. These organizations would include schools, faith-based organizations, community organizations, and businesses, especially large employers who can communicate with large numbers of people.
- Identify what each organization brings to the network.
- Create an active, engaged network of these organizations.
- Create opportunities for these networked organizations to work together to take resilience actions, share knowledge, and build lessons learned.
- Search for funding opportunities to encourage active network function.
- Gain support from local governments.
- Engage insurance companies that are proactively engaged in hazard mitigation.

The Framework also recommends the following new approaches to coordination and governance:

- Foster shared responsibility in leadership and increased cooperation across jurisdictions including making agreements.
- Create incentives for non-government organizations to participate.
- Learn from examples of other disasters around the country.
- Take a long-term role.
- Organize periodic resiliency network meetings every six months, or a minimum of once each year.
- Develop brand resiliency in Larimer County; create a slogan to keep people thinking about resiliency.

- Encourage Colorado Counties Inc. and Colorado Municipal League to make resiliency an agenda item.
- Encourage state involvement in education, funding, and information sharing to give meetings and exercises more importance.

The Steering Committee understands that maintaining leadership in the long-term will require the creation of a perennial body with a direct stake in maintaining all stakeholders engaged and keeping governments at the table. To that end, the Steering Committee will seek the best means and methods to develop such an organization.

Section 5.2.2 Capacity Building and Programmatic Opportunities

The Framework process identified a number of steps to build the capacity of people and organizations around the county to implement these ideas, including:

- Identify existing Memoranda of Understanding, Mutual Aid Agreements, and other cross-sector and cross-jurisdictional agreements, and create new ones to promote collaboration and integration.
- Build on existing efforts and groups.
- Expand Community Emergency Response Team training for community members.
- Develop funding mechanisms.
- Address policy deficiencies at Federal Emergency Management Agency and the state that constrain resilient recovery.
- Educate government and citizens in hazard mitigation.
- Create a public relations or marketing campaign to instill confidence, trust, and capacity.
- Create curricula for use in schools on preparedness and resiliency.

The Larimer Community Resiliency Steering Committee is the lead stakeholder in these efforts, coordinated by the Larimer County Office of Emergency Management. It is important to continually engage political leaders in the municipalities and county. For each sector, specialists in that sector should be involved in leadership roles.

Section 5.2.3 Ongoing Community Involvement

To engage communities directly in building resiliency, it will be important to use the many outreach and education programs already available, including Community Emergency Response Team programs, utility bills, social media, service providers, faith communities (especially for non-English speaking communities), large employers, Larimer County Voluntary Organizations Active in Disasters, Colorado State University Extension, schools, community organizations like 4-H, flyers in grocery stores and casual restaurants, Colorado State University athletic events, homeowner associations, and city and county websites. Since people are inundated daily by messages, it is important to have a menu of options. At the same time, engagement will work best by avoiding jargon like “resiliency” and “fragility,” and translating messages to be relevant for each community.

The following strategies will build capacity to support vulnerable populations:

- Identify champions specific to vulnerable groups—senior citizens, people with disabilities, monolingual, etc.

- Use resiliency ambassadors to address specific neighborhoods and vulnerable groups.
- Modify delivery methods for hard to reach parts of the county, especially where cell phone coverage is not reliable.
- Explain the importance of stresses as well as shocks. Include the everyday shocks and stresses, not just the worst-case scenarios.
- Engage with organizations that provide support to vulnerable populations.
- Engage people in multiple languages, including braille and sign language.
- Go door to door for vulnerable populations.
- Use mascots, symbols, and slogans to make resiliency recognizable.
- Share stories.

In engaging communities, there are a number of stakeholders who should take the lead:

- Larimer Connects
- Colorado State University Office of Engagement and Extension
- Larimer County Voluntary Organizations Active in Disasters and their Long Term Recovery Group
- Interfaith Council
- United Way 211
- Larimer Community Resiliency Steering Committee
- Insurance companies and advocacy groups for the insured, such as United Policyholders
- National Park Service
- Emergency Management partners

Section 5.3 Maintaining and Updating the Framework

Section 5.3.1 Framework Approval

This Framework represents a vision and strategy for community resiliency that is the result of stakeholders from communities across Larimer County coming together. The strategy presented herein is not intended as a "one size fits all" approach, but as a framework within which interested communities and the stakeholder group can craft a tailored approach, drawing on a shared vision and goals.

As such, all interested communities, agencies, and organizations in Larimer County are encouraged to formally approve, adopt, or otherwise publicly resolve to support the Framework to signal the community's commitment to thinking about these issues in a new way.

Section 5.3.2 Regular Review and Maintenance

While the notion of resiliency is unlikely to change, community goals may shift with time, and the strategy proposed in this Framework is not intended to be static. The community's understanding of what it means to be resilient will grow as shocks and stresses are experienced, lessons are learned, new science and technologies emerge, and community connectivity increases.

Therefore, the Larimer Community Resiliency Steering Committee (or future body in charge) should convene on an annual basis to review the Framework and make updates to reflect the following:

- How have existing conditions in Larimer County changed and how has that enhanced or reduced the county's resiliency?

- Are the goals and strategies presented in the Framework still reflective of the county's shared vision?
- What is the status of projects discussed in the Framework? What new ideas or activities should be included?

At present, the Larimer County Office of Emergency Management will facilitate the coordination of the various stakeholders across the county. This does not mean that this effort is a project of the Office of Emergency Management, merely that keeping a broad coalition of stakeholders moving forward requires a focus group to perform executive functions, such as calling meetings and facilitating group decision making. The Steering Committee will provide overall guidance to the effort.

Resources for gathering information and data on resiliency are provided in Appendix E.

Section 5.3.3 Developing an Annual Operating Plan

The actions and projects identified in this Framework are a reflection of the planning process and current thinking on resiliency among stakeholders in Larimer County. They are not intended as a list of projects to be set in stone, but as an example of the types of forward-thinking ideas communities may choose to implement to enhance resiliency. To that end, the Larimer Community Resiliency Steering Committee and organizations seeking to implement this Framework are encouraged to develop an Annual Operating Plan that identifies specific actions to be achieved over the next year. The Annual Operating Plan should describe the scope of these actions by providing information on:

- Related goals and strategies from the Framework;
- Desired outcomes;
- Challenges;
- Lead and supporting stakeholders;
- Priority level; and
- Milestones and timeline.

A template Annual Operating Plan matrix is provided in Appendix C.

Table 5-2 presents a variety of further ideas developed by stakeholders from around the county. These ideas illustrate the variety of actions that resiliency programs can take.

Table 5-2: Larimer County Future Project Ideas

Title	Resiliency Sectors and Strategies Addressed	Regional Benefits?	Project Description	Potential Project Owner(s)
Resilient Community Building				
Regional Governance Project	Community: C1-C8 Housing: H1, H4 Watersheds and Natural Resources: W3, W5, W6	Y	Form a Council of Governments to coordinate regional issues such as infrastructure, housing, watershed management, etc.	Larimer County North Front Range Metropolitan Planning Organization
Re-educating the Businesses and Workforce of Tomorrow	Community: C1, C4, C8 Economic: E1, E2, E3, E4, E6	Y	Rethink, remake, and reintroduce old industries to young students to give them different alternatives to traditional education and jobs. This could help youth avoid unworkable college debt, develop and retain a workforce ready for the future, and reinvent old industries in dynamic, new, competitive ways.	Municipalities Community Colleges School Districts
Complete the North Front Range Workforce Development Plan	Economic: E1, E2, E3, E4, E6	Y	Under new federal legislation, local workforce boards must develop a workforce plan for their region. This plan would identify business needs, existing skills, and educational programs as well as developing a vision and goals for the future.	Larimer County Workforce Center
Know Your Housing Rights and Responsibilities	Health and Social: HS1, HS2, HS6 Housing: H3	Y	Create an education, community outreach, and advocacy program for current renters and homeowners around hazards, risks, access to services, and rights and responsibilities as owners and renters.	Housing Authorities

Table 5-2: Larimer County Future Project Ideas

Title	Resiliency Sectors and Strategies Addressed	Regional Benefits?	Project Description	Potential Project Owner(s)
Regional Economic Development Plan	Economic: E1-E6	Y	Collaboratively—with engagement from Larimer County, Weld County, and Larimer County localities and municipalities—develop a regional economic development plan for Larimer County. This will include defining how and where the county wants to grow, and will consider/incorporate municipal and county zoning and land use. This will coordinate and align economic development activities in the county and create a long-term plan and vision for creating a resilient, robust, and responsive economy.	Larimer County Municipalities Local Chambers of Commerce Economic Development Organizations Community and Nonprofit Groups
Sustainable/Solar Tour of Homes	Economic: E1, E4, E5, E6 Housing: H3, H4, H5	Y	Host a regular Larimer County sustainable/solar homes tour to educate residents about the options and opportunities available. Focus more broadly in the context of rebuilding post-disaster and resilient reconstruction.	Northern Colorado Renewable Energy Society Poudre Valley Rural Electric Association CSU Extension Home Builders Association Colorado Solar Energy Industry Association
Disaster Response Bike Competition	Community: C1, C2, C3, C4, C8	N	Host a cargo-bike emergency-response competition where cyclists compete to deliver supplies in a hypothetical disaster setting. This will engage the community in a fun event, while raising awareness about both the hazards and risks of cycling as an alternative transportation option.	City of Fort Collins – FC Bikes

Table 5-2: Larimer County Future Project Ideas

Title	Resiliency Sectors and Strategies Addressed	Regional Benefits?	Project Description	Potential Project Owner(s)
Risk Management				
Front-Range Food System Study	Community: C1, C2, C4, C7, C8 Economic: E3, E4, E6 Health and Social: HS1-HS6	Y	Identify gaps in current vs. ideal future state of the food system, considering land use planning, water, economic policy, and workforce development.	Colorado Department of Agriculture Colorado State University Food Cluster
Emergency Action Plans for Dams	Infrastructure: I1, , I3, I4, I5, I6, I7 Community: C3, C4, C5, C6, C8	Y	Approve and implement emergency action plans for county dams to better prepare response agencies and the community for an array of potential dam-related emergencies.	Larimer County Colorado DHSEM FEMA
Critical Infrastructure Choke Point Identification	Community: C3, C4, C5, C6, C8 Infrastructure: I1, I2, I3, I5, I6	Y	Identify potential weak or choke points in infrastructure, and develop mitigation strategies and/or education for emergency response and community members.	CDOT County and City Transportation Departments
Policy, Planning and Strategy Development for Residential Housing	Economic: E3, E4, E6 Housing: H1, H4, H5 Infrastructure: I2, I4, I7	Y	Review current policy and planning around building, such as the current moratorium on height restriction, and develop new strategies to increase housing density and housing stock in key locations while maintaining the local tax base, reducing traffic, and addressing population growth in realistic ways.	County and Municipal Planning Departments Real Estate Developers
Increase Frequency of Community Emergency Response Team Training	Community: C1, C3, C4, C5, C8	Y	Community Emergency Response Team trainings are currently being offered in Larimer County once a year; increased frequency of training would benefit everyone. These trainings coach people at the neighborhood level to prepare for and help each other in disaster.	Larimer County Municipalities

Table 5-2: Larimer County Future Project Ideas

Title	Resiliency Sectors and Strategies Addressed	Regional Benefits?	Project Description	Potential Project Owner(s)
Landowner Watershed Restoration Support	Housing: H1, H3, H5 Watersheds and Natural Resources: W1, W3, W6	Y	Facilitate landowner restoration of waterways through creation of a toolkit of watershed restoration techniques, sponsored fieldtrips to see restored sites, permitting information, and sponsorship of a watershed restoration group. Through focus on education and support, on the ground, positive restoration will be fostered at relatively low community cost.	Watershed Coalitions Colorado Water Conservation Board
Connecting Wildfire Restoration/Mitigation to Energy Development	Economic: E3, E5, E6 Watersheds and Natural Resources: W1, W3, W5, W6	Y	Link forest thinning projects to biomass reuse opportunities. This will support forest restoration/mitigation projects, which in turn will reduce the potential for catastrophic fires while providing economic benefits, such as alternative energy sources and workforce development.	Watershed Coalitions Larimer County Natural Resources Colorado Timber Industry Association Colorado State Forest Service U.S. National Resource Conservation Service
The Poudre Runs Through It	Watersheds and Natural Resources: W1, W2, W3, W5, W6	Y	This existing collaborative provides opportunities for participants to learn more about the river and to engage in ways to make it "the world's best example of a healthy, working river." One of their actions, using historical flood events as learning opportunities for ways to improve watershed plans, can serve as a case study for replication in other Larimer County communities. Lessons from this program have included the value of preserving open space and recreation areas as floodplain buffers and how to secure the built environment from floodplain impacts.	Colorado Water Institute

Table 5-2: Larimer County Future Project Ideas

Title	Resiliency Sectors and Strategies Addressed	Regional Benefits?	Project Description	Potential Project Owner(s)
Innovative Land-Use Planning	Community: C1-C8 Economic: E1, E4, E5, E6	Y	Allow for diversity in growth management and economic resiliency while supporting and protecting our natural environment. Include agricultural land protection where this doubles as floodplain and natural resource protection.	North Front Range Metropolitan Planning Organization Larimer County Municipalities
Address vulnerabilities across the integrated water production, distribution system and wastewater facilities system (system-Wide Approach)	Infrastructure: I1, I5, I6	Y	Generate chlorine onsite to keep operations when treatment plants are cut off	Water Utilities
Capital Investment				
Resilient Power for Critical Facilities	Economic: E3, E4, E5, E6 Health and Social: HS4, HS5, HS6 Infrastructure: I1, I2, I5, I6	Y	Develop redundant back-up power systems, possibly via renewable energy (solar, wind) for critical facilities to keep those facilities operational and avoid outcomes of displaced or decreased workforce and increased social/health stress.	Municipalities Platte River Power Authority School Districts Colorado Energy Office
Community Access Improvement	Community: C1, C2, C3 Economic: E1, E3, E4, E6 Health and Social: HS1, HS2, HS4, HS5, HS6 Infrastructure: I1, I3, I4, I5, I6	N	Many small communities in the county have only one access point. Communities' access should be reviewed and, where needed, upgraded to ensure resilient ingress and egress. Assess viable options to improve access to these areas and integrate into building, land use, and public works planning documents.	Larimer County Road and Bridge Department
Competitive Broadband	Economic: E1, E3, E4, E6; Infrastructure: I2, I5, I7	Y	Recommend the repeal of HB2005-152 and support countywide development of broadband.	Colorado Municipal League Local Governments

Table 5-2: Larimer County Future Project Ideas

Title	Resiliency Sectors and Strategies Addressed	Regional Benefits?	Project Description	Potential Project Owner(s)
US 34 Permanent Repairs between Estes Park and Loveland	Economic: E1, E3, E6 Infrastructure: I3, I4, I5	Y	Completing the US 34 project will "harden" the roadway and provide additional transportation redundancy to Estes Park and other mountain communities.	CDOT Local Governments
Little Thompson and Big Thompson Floodplain Rehabilitation	Infrastructure: I2, I3, I4, I5, I7 Watersheds and Natural Resources: W1, W3, W6	Y	Restore the natural flow of the Little Thompson and Big Thompson rivers, stabilize the streambed, and repair infrastructure in ways that best fit the profile of the floodplain to mitigate impacts during future flood events and provide clearer, more stable water resources in the future.	Watershed Coalitions Conservation Districts Local Floodplain Managers U.S. Bureau of Reclamation U.S. Army Corps of Engineers FEMA
Net Zero Energy Housing Program	Community: C1-C4, C7, C8 Housing: H1, H3, H4, H5 Infrastructure: I1, I2, I4-I7	Y	Work with FortZED, a zero energy initiative led by the City of Fort Collins in partnership with Colorado State University and the Colorado Clean Energy Cluster, to establish net-zero energy/water/waste neighborhoods to be used as shelter-in-place locations. Shelter-in-place using islanded neighborhoods allows for fewer evacuations and more sustainable use of resources.	City of Fort Collins

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Appendix A
Local Steering Committee and Planning Team

The following persons were represented on the Larimer Community Resiliency Steering Committee from August 2015 to January 2016. The committee will be seeking to expand its membership to include representatives from all resiliency sectors and all geographic areas of Larimer County throughout 2016.

- **Lori Hodges**, Larimer County Office of Emergency Management
- **Laura Levy**, Larimer Long-Term Recovery Group and Volunteer Organizations Active in Disaster (VOAD)
- **Chris Wolf**, Fort Collins Office of Emergency Management
- **Joel Max**, Fort Collins Office of Emergency Management
- **Shayna Jones**, Big Thompson Watershed Coalition
- **Geniphyr Ponce-Pore**, Colorado State University
- **Paula Mills**, Colorado State University
- **Kim Meyer-Lee**, Larimer County Department of Health and Environment
- **Gordan Thibedeau**, United Way of Larimer County
- **Megan Flenniken**, Larimer County Natural Resources
- **Amy Irwin**, Loveland Housing Authority
- **Jacob Castillo**, Larimer County Workforce Center
- **Terry Gilbert**, Larimer County Community Development Division
- **Jennifer Kovecses**, Coalition for the Poudre River Watershed

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Appendix B
Plan Process Materials

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Larimer County Charrette #1 Summary

August 25-26, 2015

Loveland, CO

Introduction

On August 25-26, 2015, a wide set of stakeholders from Larimer County began a resiliency planning process. Sixty-five representatives of local, state, and federal government, and non-profit organizations met for two days to create a Local Resiliency Plan for Larimer County.

The County has been hit with several major natural disasters in recent years, including fires in High Park and widespread flooding along the Front Range. The majority of charrette participants have spent significant time and resources in recovery planning efforts on the heels of diverse natural hazard events, collaborating on long-range policy planning efforts and implementing local preventative improvements. The charrette agenda was developed to:

- leverage work generated to-date by local agencies, entities, municipalities non-profits and Larimer County,
- provide opportunities for the sharing of information, and
- identify goals, strategies and projects to be included in the Larimer County Local Resiliency Plan.

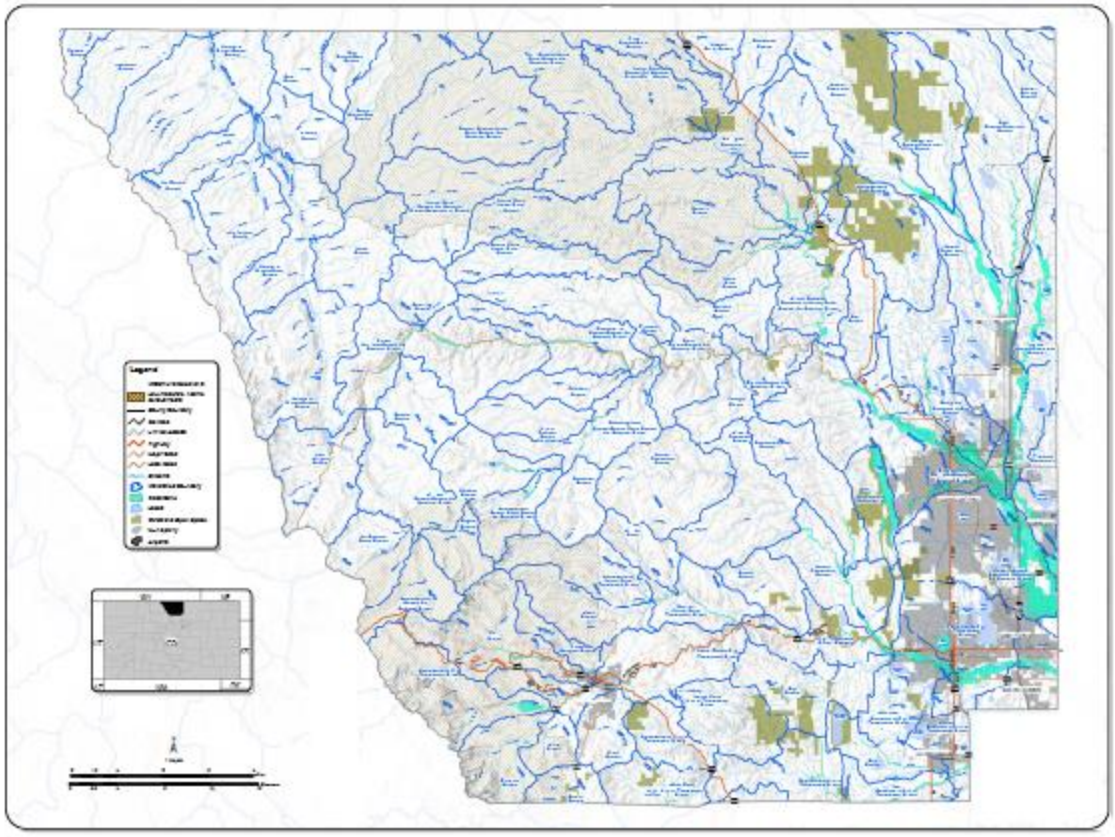
Day #1 focused on visioning, goal setting and sector strategies. Day #2 allowed participants to identify specific projects necessary to implement the strategies of each sector.

This Resiliency Process is being piloted in three counties – Boulder, Larimer, and Larimer – and will develop lessons learned for helping other counties around the state to build their resiliency.

Overall Charrette Objectives

Objectives of the charrette included:

- **Objective 1:** Provide participants with an overview of the planning process, and build awareness around local resiliency planning efforts and how they fit together.
- **Objective 2:** Identify high level potential shocks and stresses in the County.
- **Objective 3:** Establish plan vision and goals, and identify strategies for increased resiliency based on the sectors presented in the Colorado Resiliency Framework.
- **Objective 4:** Identify, summarize, and prioritize projects for inclusion in the resiliency plan.



Charrette Format

The Charrette was designed to develop a County Resiliency Plan based on the perspectives of a wide variety of stakeholders. The format combined prepared presentations, guided discussion, small group work, and consensus building discussions.

Participation

Sixty-five representatives of local, state, and federal government, and non-profit organizations participated in the meeting.

Existing Plans

The Charrette was designed to build on the existing plans and planning processes in the County, and not to replace them. Participants reported on the major plans so everyone was aware of what had gone on before and what is in process.

These plans included:

- 2016 Hazard Mitigation Plan update
- Unmet Needs and Community Fragility Study
- Fort Collins Climate Adaptation planning
- Regional Economic Development Strategic Plan
- Larimer County Code (Fire, Land Use, Building) updates
- DOLA Hazard Mitigation and Land Use Guide

Participants recognized that there are other important plans as well, but that these were the most relevant for these discussions.

Results

The workshop produced an overview of shocks and stresses that affect county vulnerabilities, a resiliency vision statement, resiliency goals, and resiliency strategies for the six state resiliency sectors.

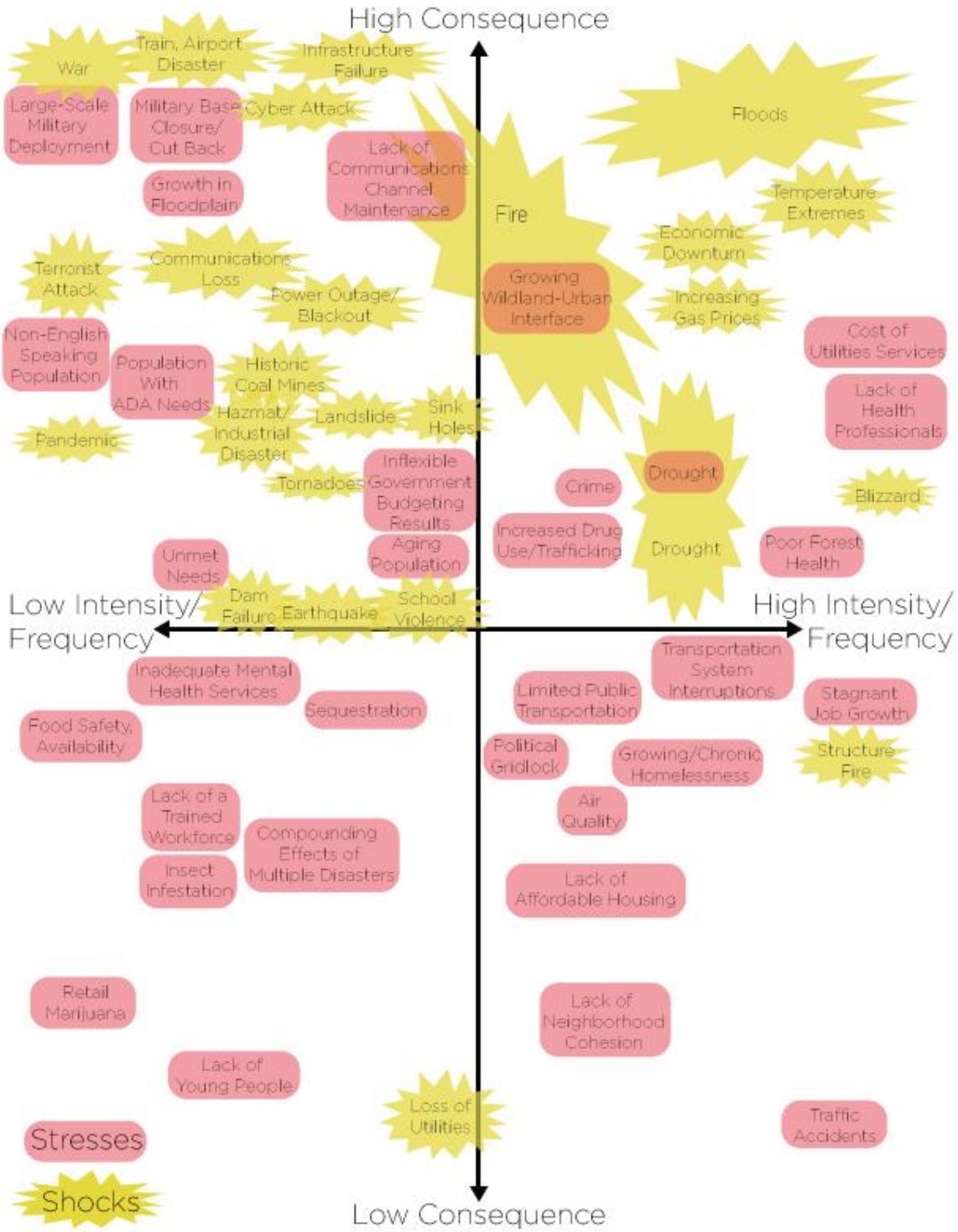
Resiliency to What?

One of the first steps in the workshop consisted of analyzing the shocks and stresses that contribute to or exacerbate vulnerabilities in Larimer. Participants identified the most important shocks and stresses, categorizing them by frequency and potential consequences.

Shocks include natural events such as wildfires, floods, winter storms and man-made events such as industrial accidents, public health crises, and terrorism. When most people think of hazards, they have shocks in mind.

Stresses are underlying **economic**, **social**, and **environmental** attributes that undermine an individual, community, or asset's ability to respond to or recover from a shock. Simultaneously, stresses may contribute to or cause recurring negative outcomes.
Resiliency can be enhanced by reducing vulnerability to acute **shocks** and chronic **stresses.**

The shocks and stresses identified by participants are summarized in the following chart.


High Consequence
Low Consequence
Low Intensity/ Frequency
High Intensity/ Frequency
War
Train, Airport Disaster
Infrastructure Failure
Large-Scale Military Deployment
Military Base Closure/ Cut Back
Cyber Attack
Floods
Lack of Communications Channel Maintenance
Growth in Floodplain
Fire
Temperature Extremes
Economic Downturn
Terrorist Attack
Communications Loss
Growing Wildland-Urban Interface
Power Outage/ Blackout
Increasing Gas Prices
Non-English Speaking Population
Population With ADA Needs
Historic Coal Mines
Cost of Utilities Services
Lack of Health Professionals
Pandemic
Hazmat/ Industrial Disaster
Landslide
Sink Holes
Tornadoes
Inflexible Government Budgeting Results
Crime
Drought
Blizzard
Increased Drug Use/Trafficking
Drought
Poor Forest Health
Unmet Needs
Aging Population
Dam Failure
Earthquake
School Violence
Transportation System Interruptions
Inadequate Mental Health Services
Sequestration
Limited Public Transportation
Stagnant Job Growth
Food Safety, Availability
Political Gridlock
Growing/Chronic Homelessness
Structure Fire
Lack of a Trained Workforce
Air Quality
Compounding Effects of Multiple Disasters
Insect Infestation
Lack of Affordable Housing
Retail Marijuana
Lack of Neighborhood Cohesion
Lack of Young People
Loss of Utilities
Traffic Accidents
Stresses
Shocks

Community Vision and Goals

Participants worked in groups to develop a vision statement, resiliency goals, and high level strategies for each sector. Participants broke into groups that cut across sectors and jurisdictions and discussed the following questions:

1. What should resilient Larimer County communities look like 30 years from now? How will they function?
2. How does this differ from what Larimer County communities look like and how they function today?

Participants wrote down this information and reported back to the whole group. The facilitators then consolidated this thinking into an overall set for the workshop.

Vision

A connected, collaborative, cooperative region where:

- Cities, rural communities and agriculture are valued and supported by long-range, regional, comprehensive planning.
- There is a diverse range of housing and multi-modal transportation options.
- Critical infrastructure has built-in redundancy.
- Citizens understand their risks, and communities and individuals are self-sufficient and take responsibility for their own and their collective preparedness.
- The economy is diverse, vibrant, and sustainable with a trained, diverse workforce with equitable access to the social services and education needed to maintain capacity, flexibility and high quality of life.
- The natural environment is valued, protected, and responsibly managed. Infrastructure is moved from/kept out of high risk areas.

Goals:

- Implement regional, long-range, comprehensive planning.
- Engage and educate county residents to foster awareness, preparedness, self-sufficiency, and a greater sense of community.
- Develop and implement construction standards that increase energy and resource efficiency and reduce risk.
- Increase range of housing options and increase stock of affordable housing through traditional means and via creative land use, building codes, and measures for innovative housing.
- Develop and fund a regional, multi-modal transportation network.
- Manage natural resources through watershed restoration and floodplain and land use planning.

- Build public-private sector partnerships to support and achieve this vision and goal.

Strategies

Participants then moved on to developing strategies for resiliency by sector. The six sectors are:

To develop these strategies, participants divided up in to sector groups and discussed the following questions:

1. What does resiliency mean for your sector? What does this look like?
2. What are the shocks and stresses most often associated with this sector?
3. Identify potential strategies to implement resiliency in this sector.

Key strategies developed by charrette participants included:

Community

Key Themes

- LIP – Protect life, incident stabilization, property
- Support vulnerable populations
- Sustainable development
- Community connectedness

Strategies

- Regionalize emergency management
- Limitations on development in hazard zones
- Community education
- Leverage social/community networks "build trust"

Economic

Key Themes

- Economic diversity (encourage the new, maintain/revitalize existing)
- Access to services for rural/remote communities
- Workforce education – assess workforce adequacy for jobs
- Address demographic shifts
- Links to infrastructure and community sectors

Strategies

- Assess 'laborshed' migration patterns
- Develop alternative career paths that build on different work and education experiences
- Address vulnerable populations as part of economic responsibility
- Change cultural perceptions

Health and Social

Key Themes

- Meet communities basic needs
- Ensure access to services across the whole community (including rural and remote areas)
- Address an aging population
- Links to infrastructure, community, and housing sectors
- Address cultural shift around organizational and personal responsibility for emergency planning

Strategies

- Public education
- Develop sustainable safety net within communities
- Assess patient distribution
- Collaborative planning
- Incentivize connection to basic health and social services such as mobile clinics

Housing

Key Themes

- Community should have a spectrum of housing including affordable and transitional
- Housing access for vulnerable populations
- Education of homeowners
- Smart planning
- Community connectivity

Strategies

- Develop region-wide and community-level housing strategies
- Scale the development fee system
- Increase transitional housing resources
- Provide counseling for new homeowners
- Keep the aging in their homes

Infrastructure

Key Themes

- Address aging infrastructure
- Need for redundant and interoperable systems
- Access to systems across communities
- Meet changing customer needs and growing demand
- Understand key system vulnerabilities
- Address human-caused threats

Strategies

- Identify and address key system vulnerabilities
- Develop emergency action plans for infrastructure
- Utilize technology/innovation in infrastructure projects
- Develop security procedures/systems for critical infrastructure
- Avoid hazards through land use planning

Watersheds and Natural Resources

Key Themes

- Preserve and maintain ecosystems
- Address changing climate
- Planning needs to recognize the interconnectedness of disasters
- Links to infrastructure (dams, water delivery, wastewater, transportation)
- Regional approach to resource management

Strategies

- Update floodplain maps
- Collaborate across jurisdictions for watershed management
- Forest management practices
- Public education around hazard mitigation
- Flood warning system

Projects

The workshop also produced project ideas that cut across sectors and jurisdictions, designed to help Larimer County thrive under a variety of conditions. These project

ideas will be explored over the next month, and will be considered in the Larimer Resiliency Plan to be developed over the next three months.

Resiliency thinking calls for a different emphasis in project selection criteria than we have used traditionally. The state framework cites the following criteria as the most important:

- Co-Benefits
- High Risk and Vulnerability
- Economic Benefit-Cost
- Social Equity
- Technical Soundness
- Innovation
- Adaptive Capacity
- Harmonize with Existing Activity
- Long-Term and Lasting Impact
- Regional Benefits

Projects should foster a cultural shift in decision-making, emphasizing multiple benefits across sectors, with special emphasis on the impact on vulnerable populations.

Through an iterative process of brainstorming and selection, the Charrette resulted in identification of the following projects for further consideration:

I-25 Corridor: To construct a robust and resilient corridor connecting Northern Colorado. Initial phase is replacing 3 bridges at Little Thompson, Big Thompson and Poudre River crossings, simultaneously implementing stream improvement projects and installing greenways that connect the west and east sides of I-25.

Community Conversations – Larimer Connects: Develop education modules and outreach programs throughout Larimer County to increase averall community knowledge, education and readiness long-term, leading to a new culture of resiliency.

Regional Housing Assessment and Strategy: Conduct a county-wide assessment of housing needs and availability as the foundation of a county-wide housing plan. Plan and implementation will build on existing affordable housing projects and also develop a clear strategy for a broader mix of housing options to meet the needs of diverse income populations.

Mobile Resource Van: A countywide partnership between public and private agencies to bring resources, information and services to vulnerable communities within Larimer County. Services would include medical and public health services, testing and information, mental health services, emergency response and preparedness information, and employment and housing resources.

Resilient Natural and Built Infrastructure for Larimer County: Create a county level plan that holistically identifies vulnerabilities, threats and stressors, weak points, and planning/lifecycle opportunities for built infrastructure. In parallel, develop design criteria for built infrastructure that address our "new normal" post disasters and climate change driven adaptation needs (similar to the NIST-CORE model) and incorporating best management practices criteria and guidance. Pilot the design criteria and plan in at least one location.

Interactive Exhibit

In addition to the discussions and exercises, participants had a chance to express their ideas in another non-verbal format. An open sheet was posted on the wall for writing down thoughts on this statement: **"What are your greatest ambitions for Larimer County for resilience?"**

The following are the results.

What are your greatest ambitions for Larimer County for resilience?

- Watershed-level management of resources and infrastructure
- Rich local foods programs
- Preserve agriculture, small agriculture
- Develop multi-disciplinary risk assessment and response plan
- Identify when carrying capacity is met (then stop) (i.e. water, roads, land)
- Develop systems hierarchy to prioritize
- Strong regional connection and support while maintaining individual sense of character/place for communities
- Anticipatory sustainable standards and practices that can absorb all citizens' needs and goals and also absorb change
- Citizen empowerment

Process Overview

At the end of each day, participants were asked to share their insights regarding the local resiliency planning process, as well as their impressions regarding the charrette format. The following are representative comments as expressed by participants.

Format: Very good – it was well organized and worked! Very collaborative, fostered cross-sector conversation and networking which provided different perspectives and expertise on challenges we all face, and helped us think about both big picture

vision and drill down to concrete ideas. There was a lot of interaction and discussion between attendees!

The small teams approach to sharing data was good, as was the balance between visioning and strategic thinking and between information download and breakout sessions. It was a good opportunity to work with a diverse group of stakeholders, and the interactivity and discussions were very interesting. The long time for each breakout session was appreciated, it meant we weren't rushed and perfunctory and could draw people out. Intentionally mixing up participants for the vision and goals session helped us stay engaged and think outside our discipline areas.

Having seen both days, the format made more sense and it all came together. The funneling process over the two days to narrow and prioritize the project list was good; high-level, visionary ideas came down to detailed projects. However, on Day 2, people were running out of gas after lunch which limited creativity and big picture thinking. Maybe spread it over 3 days?

Content: There was a lot of good information shared, which is very beneficial to the community as a whole. It would be nice to have this as an on-going effort and not just focused on this HUD grant – the topic is so broad and touches on so many areas, and it feels like we just scratched the surface today. There was a good cross-section of experts, and it was valuable to collect ideas and suggestions from the group. The content was relevant and applicable to a multi-sector, multi-issue, complex county goal. The resiliency framework is useful in helping sort through that complexity.

It was nice the way the workshop started at a policy level with high goals before drilling down to the sector discussions. The sector model was very helpful for structuring conversations and identifying interdependencies. However, more information on current activities and efforts would have been useful, as would more time to incorporate outside perspectives and talk with other sectors. The facilitators could also have done more to encourage really big picture, out of the box thinking – what is really innovative and a game changer for Larimer County to build long-term resiliency?

Gaps/Topics Missing: Provide resources around best practices (or are we truly setting the standard nationally?). More background information on the six sectors would have been helpful, as would information on how each of those sectors has been impacted over the past 2-3 years in Larimer County. There were some very specific ideas and challenges that people are working on – I didn't get a sense of how these would ultimately be tied together. Stakeholder representation needs to be even more diverse, i.e. vulnerable populations, minorities, broader scope of industry, social science, non-profits. More municipal/local entity participation is also needed. How can people not able to attend this charrette comment on the process or add to what was accomplished here?

Differing opinions as to goals and solutions led to an emphasis on some ideas of more vocal individuals.

Are there the needed resources to go forward with the suggestions and recommendations made today? And is there the political will to implement the ideas about land use or getting residences out of the floodplain?

I didn't have an understanding of the criteria for the HUD competition to thoughtfully select/vote between candidate projects.

Suggestions: Include more breakout group time in specific groups to hash out more concrete solutions. Humor is great. Consider how to do this as half-day events to increase participation; it's hard to commit a whole day. Handouts for every participant to reference later would be useful, funding permitted, as would more prep-material. More small group focus on specific projects was needed to flesh out how to get to a resilient community from here. More time in the sector discussions would also have been useful (particularly given that we ended early). Better facilitate the small group discussions to encourage formulation of/ a deeper dive into concrete projects.

Circulate a report on the results of this meeting prior to the next one, and build in time and opportunity somewhere in the process to seek validation and feedback on the plan from stakeholders, particularly those groups not represented at this meeting. Analyze and report on the suggested priorities from this meeting for the next session, e.g. which have benefits better than costs? Try to get more municipal/city/county decision-makers and influencers in the room. In particular, provide more advance notice for the next meeting, and reach out to key members in organizations to get them to come. Consider also including key participants from neighboring counties.

Additional or follow-up meetings with similar or additional participants will likely help plan a solid path forward. A "Next Time" is key.

In Boulder, the Charrette opened with a presentation by a restaurant business, Spice of Life, the flood impacts they suffered, and how their recovery is modeling resiliency — this got everyone tuned to the importance of the meeting. Something similar in Larimer would have been good.

Ideas for next time: Assign "pre-work" so that the group comes in already oriented to the concept of resiliency. Provide examples of innovative ideas or plans from other communities to help spark creativity and/or get the Steering Committee to seed the conversation with visionary ideas. A frank discussion on severe weather events and man's role in the climate crisis would be productive; acknowledging the problem is the first step. Be sure to let participants know their efforts were acknowledged and that improvements and actions came from the first meeting.

In terms of some of the projects that were proposed, look at the capacity building idea and explore which organizations can actually implement it, what resources are still needed, and where those resources can be obtained.

Next Steps

Information generated at Charrette #1 will be used to draft the Larimer County Local Resiliency Plan. The initial draft will be available for review and comment prior to Charrette #2, tentatively scheduled for October 14, 2015.

This process builds on the work of a multi-stakeholder effort to construct a Resiliency Framework for the State.

The Framework:

- Establishes a vision and definition of resiliency for the State of Colorado
- Seeks to empower a culture of resiliency in Colorado communities
- Identifies guiding principles
- Outlines specific strategies across sectors that the State commits to implementing.

The process may also contribute to the State's application for a funding opportunity with the US Department of Housing and Urban Development (HUD). This funding opportunity is the National Disaster Resilience Competition (NDRC). Colorado has already passed the first round of the competition, and Phase 2 applications are due October 27th. *This resiliency planning process will contribute to this application. However, the broader objective of this process is to change the way we do business around these issues for the long run. The current HUD funding opportunity is only one part of the larger process.*

Attachments

1 Agenda
2 Sign-In Sheets
3 Vision and Goals Worksheets
4 Resiliency Sector Worksheets
5 Project Identification Worksheets

Attachment 1 Agenda

Day 1 – August 31

Time	Activity
8:30 – 9:00	Sign In
9:00 – 9:30	Introduction and Process Overview
9:30 – 10:00	Shocks, Stresses and Vulnerability
10:00 – 10:30	Current Planning Efforts
10:30 – 10:45	Break
10:45 – 12:15	Vision and Goals Work Session
12:15 – 1:15	Working Lunch
1:15 – 2:45	Resiliency Sectors Break Out Session #1
2:45 – 3:00	Break
3:00 – 3:45	Resiliency Sectors Break Out Session #2
3:45 – 4:30	Break Out Session Report Out
4:30 – 4:45	Project Identification – Stakeholder Input
4:30 – 5:00	Feedback Forms, Next Steps, and Adjourn

Day 2 – September 1

Time	Activity
8:30 – 9:00	Sign In
9:00 – 9:30	Day One Review
9:30 – 10:00	Project Identification 101
10:00 – 12:00	Project Identification and Prioritization
12:00 – 1:00	Lunch
1:00 – 2:00	Co-Benefits and Interconnectedness
2:00 – 3:00	Project peer review
3:00 – 3:30	Feedback Forms, Next Steps, and Adjourn

Attachment 2 Sign-In Sheets

Larimer County Strategic Resiliency Planning
August 25, 2015

	Name	Title	Organization	Phone	Email
1	Dustin Barrington	Dir. of Ops @ HNS	HNS Life Center	970 342-2311	dbarrington@honservice.org
2	John van de Lindt	Professor Co-Dir NIST Res. Cent	Colo State Univ	970-491-6697	jwv@engr.colostate.edu
3	S. Race	Asst. chief	C.L.V.F.D.	970-881-3521	Treasurer@CLVFD.ORG.
4	Tim Haas	Engineer	D.O.D.	303-677-5356	THAA54@7@GMAIL.COM
5	Andrew Short	RFL Fire Board Grant Dev. RFLVFD	RFLVFD RFL Fire Oper Bd.	970-881-3877	andrewshortmessage@gmail.com
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Larimer County Charrette #2 Summary

October 14, 2015

Loveland, CO

Introduction

On October 14, 2015, stakeholders from Larimer County reconvened to continue the Resiliency Planning Process begun August 25-26, 2015. Forty-one representatives of local, state, and federal government, private sector, public utilities, and non-profit organizations met to review and validate Local Resiliency Framework content for Larimer County developed in Charrette #1, to bring forward new ideas for community resiliency, and to build a "Roadmap for Resiliency" that establishes the community's path forward.

The morning activities focused on reviewing the whole resiliency planning process across the state, reviewing and validating shocks and stresses, the county resiliency vision and goals, and the strategies to achieve that vision and goals. In the afternoon, participants focused on the potential roadblocks to and opportunities for building resiliency within the County, focusing on how to address those roadblocks and opportunities, and who needs to be at the table to make that happen.

This Resiliency Process is being piloted in three counties – Boulder, El Paso, and Larimer – and will develop lessons learned for helping other counties around the state to build their resiliency.

Overall Charrette Objectives

Objectives of the Charrette included:

- **Objective 1:** Review and validate shocks and stresses, vision, goals and strategies from Charrette #1.
- **Objective 2:** Engage stakeholders in bringing forward new ideas for community resiliency.
- **Objective 3:** Assign ownership to identified resiliency projects.
- **Objective 4:** Build a "Roadmap to Resiliency" that establishes the community's path forward.

Charrette Format

The charrette was designed to further develop input for the County Resiliency Framework based on the perspectives of a wide variety of stakeholders. The format combined prepared presentations, guided discussion, small group work, and consensus building discussions.

Participation

Forty-one representatives of local, state, and federal government, private sector, public utilities, and non-profit organizations.

Validation Results

Shocks and stresses, vision, goals and strategies were validated by participants working in small groups, in plenary, and interacting with materials posted around the room.

Shocks and Stresses

In Charrette #1, participants identified a broad range of shocks and stresses affecting the county.

- **Shocks** include natural events such as wildfires, floods, winter storms and man-made events such as industrial accidents, public health crises, and terrorism. When most people think of hazards, they have shocks in mind.
- **Stresses** are underlying **economic**, **social**, and **environmental** attributes that undermine an individual, community, or asset's ability to respond to or

recover from a shock. Simultaneously, stresses may contribute to or cause recurring negative outcomes.

The results from this activity were included in the Larimer County Charrette #1 Summary. In Charrette #2, participants, working in small groups, were asked to think about four of highest intensity, highest consequence shocks and stresses identified. Shocks included fire, flood, drought and blizzard/extreme cold. Stresses included: aging population, affordable housing, lack of individual awareness and disaster preparedness, and ecosystem health.

Participants were first asked whether these were the correct shocks and stresses to highlight, and invited to add one **additional shock and stress** if they so chose.

Key shocks of concern participants felt should be included were:

- Cyber failure
- Hazardous materials spill, especially on the railroad tracks through Fort Collins or on I-25
- Pandemic
- Terrorist or mass violence event
- Tornado

Key stresses participants felt should be highlighted included:

- Economic system fragility or long term economic shifts resulting in unemployment
- Disconnected communities, especially due to language or rural communication barriers
- Climate change
- Aging infrastructure, lack of redundancy
- Population growth and its strain on resources, especially water
- Land use policy that increases risk of wildfire or flood
- Second home populations in high risk areas
- Increasing costs to energy utilities as customers move off the grid
- Limited transportation options

Participants were then asked to consider **what happens when these shocks and stresses combine**, including who is most impacted and how this then ripples out to the larger community. Observations included:

- The combination of drought, fire, and flood can all make the effects of each one more pronounced. Increased temperatures from climate change exacerbate all three. Low individual disaster preparedness makes it more difficult for emergency responders. Drought can be seen as both a shock and a stress, acting to disrupt other systems, and stretching over time to undermine the ability to cope in many other ways.

- Lack of affordable housing underlies difficulties when recession hits. Floods cause much damage in high risk areas, where low cost housing is often located.
- All disasters can reduce income from tourism.
- Lack of redundancy in infrastructure makes emergency response difficult, especially in mountain towns with few routes in or out. Aging infrastructure is more vulnerable to shocks.
- Shocks and stresses can ripple throughout the region, such as floods cutting off I-25, drought affecting regional food supply, fire affecting water supply far away. These shocks can also ripple over time, undermining capacity to weather shocks and stresses in the future.
- Groups who were already vulnerable due to language and cultural constraints, age, handicap, and poverty are disproportionately affected when shocks hit.

Finally, participants were asked **what existing conditions exacerbate or ameliorate the impacts of combined shocks and stresses**. This activity begins to identify core strengths or gaps in the county around which resilience efforts can be focused. Participants noted both physical system conditions and social systems in their assessment here.

Exacerbates Impacts:

- Aging Infrastructure
- Lack of immediate financial resources, or resources for small disasters
- Lack of multi-modal transportation system
- Inflexible bureaucratic processes inhibit disaster recovery
- Aging population

Ameliorates Impacts:

- Talking about resiliency
- High degree of community strength, extensive NGO resources
- Good emergency notification system and emergency response capacity
- Codes and zoning that reduce risk
- Redundancy in water resources, such as the use of Colorado Big Thompson Project water as an alternative in the High Park fire
- Forest health programs such as the Colorado Conservation Exchange and Firewise Communities

Validation of Community Vision and Goals

Participants came back together following the small group shocks and stresses work to collaborate in plenary on revising and validating the vision and goals statements developed in Charrette #1.

Overall, participants noted that this process is not producing a "plan" per se, since there are many other planning processes in the County that have timetables and resources attached to them, and many have statutory bases. This process actually is **producing a framework**, a guide for how planning and implementation should take place to produce more resilient results.

Vision

The vision from Charrette #1 was the following:

A connected, collaborative, and cooperative region where:

- Cities, rural communities, and agriculture are valued and supported by long-range, regional, comprehensive planning.
- There is a diverse range of housing and multi-modal transportation options.
- Critical infrastructure has built-in redundancy.
- County residents understand their risks, and communities and individuals are self-sufficient and take responsibility for their own and their collective preparedness.
- The economy is diverse, vibrant, and sustainable with a trained, diverse workforce that fosters equitable access to the social services and education needed to maintain capacity, flexibility, and high quality of life.
- The natural environment is valued, protected, and responsibly managed. Infrastructure is moved from/kept out of high risk areas.

Participants reviewed the vision and made the following comments and changes.

A connected, collaborative, and cooperative region where:

> *Cities, rural communities, and agriculture are valued and supported by long-range, regional, comprehensive planning.*
> This statement works better as follows: "Land use planning is long-range, regional, and comprehensive, and values cities, rural communities, and agriculture."
>
> *There is a diverse range of housing and multi-modal transportation options.* No changes here.
>
> *Critical infrastructure has built-in redundancy.*
> Redundancy only covered one aspect of resilient infrastructure. The group reworded it to read "Critical infrastructure is designed to affordable, adequate, and resilient."
>
> *County residents understand their risks, and communities and individuals are self-sufficient and take responsibility for their own and their collective preparedness.*

No changes here.

The economy is diverse, vibrant, and sustainable with a trained, diverse workforce that fosters equitable access to the social services and education needed to maintain capacity, flexibility, and high quality of life.
This statement tried to include too much at once. Participants suggested dividing it into two: "The economy is diverse, vibrant, and sustainable with a trained, diverse workforce," and "There is equitable access to the social services, health care, and education needed to maintain capacity, flexibility, and high quality of life." Participants pointed out the need to explicitly cite health care, since it was not clear if the term "social services" included that.

The natural environment is valued, protected, and responsibly managed. Infrastructure is moved from/kept out of high risk areas, and works in harmony with natural systems.
Participants adjusted thus statement to the following: "The natural environment is valued, protected, and responsibly managed so that there is availability of and access to natural resources. Infrastructure is moved from/kept out of high risk, high value areas."

These revisions will be included in the next draft of the County Resiliency Framework.

Goals:

Turning to goals, the group reviewed the goals established in Charrette #1, and revised them as follows:

Goal 1: Implement regional, long-range, comprehensive planning.

This goal needed to reflect more the concepts of collaboration and adaptation. It needs a sense of process and relationships that empower, not dictate. An improved version reads as follows:
Goal 1: Develop regional, long-range, comprehensive planning that is adaptive and collaborative.

Goal 2: Engage and educate residents of the county to foster awareness, preparedness, self-sufficiency, and a greater sense of community.

No changes here.

Goal 3: Develop and implement construction standards that increase energy and resource efficiency and reduce risk.

Participants were reluctant to recommend something that created a one size fits all system, and preferred to recognize the different contexts of rural and urban housing. The following rewording of the goal adds in that concept:
Goal 3: Develop and implement construction standards that increase energy and resource efficiency and reduce risk appropriate to rural and urban contexts.

Goal 4: Increase the range of housing options and increase stock of affordable housing through traditional means as well as creative land use, building codes, and measures for innovative housing.
Participants pointed to a possible tradeoff between this Goal and Goal 3 – the desire for more resource efficient housing may be difficult to balance with a desire to increase the stock of affordable housing. While participants recognized that trade off, the group was committed to pursuing both goals and finding a balance.

Goal 5: Develop and fund a regional, multi-modal transportation network.
Participants pointed out that the wording here suggests that somehow the County would do this all on its own, which is not realistic or desirable. The following adjustment addresses this concern: *Goal 5: Develop and fund a regional, multi-modal transportation network using public and private partnerships at all levels.*

Goal 6: Manage natural resources through watershed restoration and floodplain and land use planning.
The group observed that the language here specifies some land uses and not others that are also relevant. A more complete statement is: *Goal 6: Manage natural resources through adaptive planning and management of land use, especially watersheds, floodplains, agricultural land, and the wildland-urban interface.*

Goal 7: Build public-private sector partnerships to support and achieve the community's vision and goals.
Participants added reference to non-profit organizations to this goal, so it now reads *Goal 7: Build public-private-nonprofit sector partnerships to support and achieve the community's vision and goals.*

Participants discussed adding another goal addressing the regional food system. Such a goal would read as follows:
Goal 8: Support the diverse production and supply needs of a sustainable supply chain for the regional food system.
Participants did not have time to develop this specific language, and will review this new goal in November at a draft Framework review session.

As a general observation for all the goals, the group agreed that the general understanding is that these goals are for all stakeholders in the county, calling on all

to play their roles. In no way should these goals be construed to mean that they are the responsibility solely of staff and leadership of the Larimer County political and administrative structure.

Strategies

Participants then moved on to reviewing the strategies for resiliency by sector that were developed in Charrette #1. The six sectors are:

To review these strategies, participants divided up in to groups. Each group had the strategies from two sectors to review, distributed so that each sector got reviewed twice. Groups looked at the strategies proposed, made comments and revisions, and suggested related project ideas.

The following are the revisions made:

Community

Original Strategy	Revised Strategy	Related Project Ideas/Comments

Original Strategy	Revised Strategy	Related Project Ideas/Comments
C1. Work to shift cultural norms toward increased connection, interdependence, risk awareness and preparedness. This could include supporting and leveraging existing social/community networks, engaging the insurance and real estate industries around educating new residents, building "trusted support networks" within communities, supporting integrated development, developing innovative zoning to foster greater connectedness and access to services, etc.	**C1.** Shift cultural norms toward increased social and physical connection, interdependence, risk awareness and preparedness.	• This could include supporting and leveraging existing social/community networks, engaging the insurance and real estate industries around educating new residents, building "trusted support networks" within communities, supporting integrated development, developing innovative zoning to foster greater connectedness and access to services, etc. • Foster a culture of volunteering and local involvement. • Provide more support to formal and informal community leaders (e.g., emergency services, fire departments, faith-based community).
C2. Foster a customized approach for development in Larimer County that allows for different types of conversations and exploration of different available options, including balancing needs for housing, transportation and employment.	**C2.** Create innovative development that integrates housing, transportation and employment to create a diversity of options.	
C3. Scale emergency management both up and down—integrate and regionalize current emergency management systems, and also develop neighborhood-based Community Emergency Response Teams to provide education, prevention, and support, particularly	**C3.** Scale emergency management both up and down to integrate responses from the individual, household, community, municipal, county, and regional level.	• Establish mutual aid agreements in advance of high priority hazards. • Improve communication plans and systems for remote areas.

Original Strategy	Revised Strategy	Related Project Ideas/Comments
for vulnerable populations.		
C4. Provide more support to formal and informal community leaders (e.g., emergency services, fire departments, faith-based community).		
C5. Develop a county master plan tailored to community wants and needs that proactively places development were the community wants it and limits development in high-risk, hazardous areas and needs that proactively places development were the community wants it and limits development in high-risk, hazardous areas.	**C5.** Develop a county master plan tailored around community wants and needs that proactively places development were the community wants it and limits development in high-risk, hazardous areas	
C6. Incentivize sustainable development.		• Pass ballot measures to fund key sustainable development needs, such as increasing energy efficiency and removing housing from high risk areas.
	C7. Strengthen and maintain relationships among multi-sector teams	• Hire a high level County Resilience Coordinator • Encourage continued networking across sectors and jurisdictions

Economic

Original Strategy	Revised Strategy	Related Project Ideas/Comments
E1. Diversify the economy beyond a few large employers such as the university and government.		• Develop tools and incentives for small and mid-size businesses, both new and existing

E2. Develop alternative career paths that build on different work and education experiences, and the policy initiatives to support them.		• Collaboration with small and large educational entities to connect students and local businesses for internships and opportunities • Change cultural perceptions around jobs, debt, and the common wisdom that "good" jobs require a college education, etc.
E3. Assess 'laborshed' migration patterns to understand job locations vs. housing vs. transportation, where job growth is occurring, workforce housing needs, etc.	**E3.** Foster development of communities with a work, life, play balance for a variety of economic classes	• Assess 'laborshed' migration patterns to understand job locations vs. housing vs. transportation, where job growth is occurring, workforce housing needs, etc. • Change land use codes to facilitate novel approaches to affordable houses (tiny homes, high density infill development, etc.) that are appropriate to diverse conditions across the county • Understand and anticipate trends in economic development, job needs, and shifts in the labor force, and respond to them and communicate them widely
E4. Foster communication and collaboration between groups already focused on economic issues in the county.		
E5. Promote local production and storage of energy to enhance source diversity, create jobs, increase energy redundancy and modularity, and protect against the potential economic impacts of grid failure.		• Create incentives to increase affordability of alternate energy sources and systems, and promote energy efficiency and demand management • What is the strategy here? Address climate impacts, job diversity, or grid maintenance?

E6. Address vulnerable populations as part of economic responsibility.	**E6.** Improve economic stability of vulnerable populations	
E7. Change cultural perceptions around jobs, debt, and the meme that "good" jobs require a college education, etc.		• This should be integrated with E2

Health and Social

Original Strategy	Revised Strategy	Related Project Ideas/Comments

Original Strategy	Revised Strategy	Related Project Ideas/Comments
HS1. Conduct public education around emergency preparedness and available local, municipal and county services.	**HS1.** Enhance training and education opportunities for emergency preparedness and resilience education, and promote resiliency conversations with the public.	• This is an activity. • Youth Preparedness Initiative (based on Mississippi's MiPI)
HS2. Sponsor community events and workshops to build skills, identify vulnerable people, and publicize available services.		• This is an activity
HS3. Identify, educate, and empower leaders within small communities.		• This is an activity
HS4. Develop sustainable safety nets and social services within communities.	**HS4.** Achieve equitable distribution of social service facilities and resources around the county to maximize redundancy and decentralization	• Explore alternative options for service provision
HS5. Develop an understanding of how small plans and organizations fit into emergency master planning at the municipal and county level.		• Put this strategy under HS7
HS6. Assess patient distribution and healthcare and mental health access throughout the county.	**HS6.** Ensure Larimer County residents have access to healthcare and mental health services.	• Assess patient distribution and healthcare and mental health access throughout the county.
HS7. Foster collaborative planning across agencies and sectors.	**HS7.** Foster collaborative planning across agencies and sectors, including understanding how small organizations and plans fit into emergency master planning at the municipal and county level.	• Think inclusively – invite others to planning efforts for feedback, etc. Encourage dialogue outside of planning periods

Original Strategy	Revised Strategy	Related Project Ideas/Comments
HS8. Incentivize connection to basic health and social services through outreach.		• Revise the strategy to make clear who we are incenting • Emphasize preventive care

Housing

Original Strategy	Revised Strategy	Related Project Ideas/Comments

Original Strategy	Revised Strategy	Related Project Ideas/Comments
H1. Develop region-wide and community-level housing strategies.	**H1.** Integrate region wide and community level housing strategies into long range comprehensive planning, including steering housing out of high hazard zones	• Explore how much individual risk we are willing to accept • Develop understanding of the housing dynamics of the region • Convene regional conversations about housing, trends, etc.
H2. Scale the development fee system to allow for a diversity of housing options.		• Combine with H6
H3. Increase transitional and permanently supportive housing available for different populations and needs.		
H4. Educate new homeowners, particularly in rural or remote areas, about location-specific risks and preparedness best practices.		
H5. Develop the services and policies needed to support aging-in-place.	**H5.** Develop the services and policies needed to support diverse options for our aging population.	
H6. Review and change codes to allow co-housing, smaller green-spaces, mixed housing, and other new, innovative housing options.	**H6.** Diversify housing options by reviewing and changing codes and scaling the development fee system to allow co-housing, smaller green-spaces, mixed housing, and other new, innovative housing options.	

Original Strategy	Revised Strategy	Related Project Ideas/Comments
H7. Keep housing development out of hazard zones.		• Combine with H1

Infrastructure

Original Strategy	Revised Strategy	Related Project Ideas/Comments
I1. Develop emergency action plans for infrastructure failure.	**I1.** Develop emergency action plans for infrastructure failure, including security procedures/systems for critical infrastructure.	• Identify vulnerabilities between systems • Address linkage to community plans
I2. Develop security procedures/systems for critical infrastructure.	Combine with I1	
I3. Utilize technology/innovation in infrastructure projects to increase robustness, modularity, and diversity.		• Standards and codes may be a roadblock to solutions
I4. Develop a clear hierarchy of needs in infrastructure repair/upgrade/installation.		• Create a funding plan that takes into account all agencies and political responsibilities
I5. Avoid construction in hazardous areas through land-use planning.		• Coordinate across jurisdictions to ensure that similar infrastructure facilities are not exposed to the same hazard

Original Strategy	Revised Strategy	Related Project Ideas/Comments
I6. Identify and address key system vulnerabilities.		• Review policy of using private facilities to host public assets, such as emergency communications
I7. Incentivize backup systems that support sheltering in place.		
I8. Educate the public proactively before disaster about potential infrastructure response and implications.		

Watersheds and Natural Resources

Original Strategy	Revised Strategy	Related Project Ideas/Comments
W1. "Design with nature", including determining inherent and acceptable levels of risk.	**W1.** "Design with nature", incorporating natural processes such as flood, fire, and drought into land use planning and project design, while balancing inherent and acceptable levels of risk.	
W2. Update floodplain maps.	**W2.** Update floodplain maps and integrate maps into zoning and planning	
W3. Build relationships and increasing collaboration across jurisdictions for watershed and natural resource planning and management.		
W4. Develop better flood warning systems, including applications of real-time rain gauging systems.	**W4.** Develop better flood warning systems, including applications of strategically placed real-time rain gauging systems.	
W5. Increase forest management, in particular around reducing fuel loads.	**W5.** Collaborate and support integrated multi-jurisdictional forest management to include a multi-pronged approach including reduced fuel loads, natural fire breaks, soil mitigation, zoning, etc. to achieve improved forest health	
W6. Increase public education around hazard mitigation.	**W6.** Increase public education around natural resource interactions and hazard mitigation.	

Projects

The workshop also reviewed the list of project ideas developed in Charrette #1. In order to respect all the contributions from that charrette, the entire list of project suggestions were posted on the wall for review and comment.

Resiliency thinking calls for a different emphasis in project selection criteria than we have used traditionally. The state framework cites the following criteria as the most important:

- Co-Benefits
- High Risk and Vulnerability
- Economic Benefit-Cost
- Social Equity
- Technical Soundness
- Innovation
- Adaptive Capacity
- Harmonize with Existing Activity
- Long-Term and Lasting Impact
- Regional Benefits

Projects should foster a cultural shift in decision-making, emphasizing multiple benefits across sectors, with special emphasis on the impact on vulnerable populations.

In Charrette #1 participants took the brainstormed list and consolidated the top priority projects into five. These are the first projects in Table 1 below. The remainder of the projects are listed in Table 2 in order to show the variety of ideas that could be carried forward to build resilience. In both tables, participants suggested appropriate project owners to take the ideas forward, and provided comments to make them better. At the end of Table 2, participants also added a new project idea.

Table 1: Larimer County Project Identification Matrix

Priority Projects

Title	Resiliency Sector Addressed	Regional Benefits?	Project Description	Project Owner	Comments
Community Conversations — Larimer Connects	Community	Y	Develop education modules and outreach programs throughout Larimer County to increase community knowledge of hazards, risks and preparedness options, to enhance community connectivity, and to support the development of a culture of self-sufficiency and mutual-support.	County and city Emergency Management & nonprofits (Red Cross, United Way) CSU Office of Engagement	
Mobile Resource Van	Health and Social	Y	A countywide partnership between public and private agencies to bring resources, information and services to vulnerable communities within Larimer County. Services would include medical and public health services, testing and information, mental health services, emergency response and preparedness information, and employment and housing resources.	Nonprofits, FC Dial a Ride, County, FEMA ? Dola & CDPHE to break boundaries. Health care providers Health District	

Title	Resiliency Sector Addressed	Regional Benefits?	Project Description	Project Owner	Comments
Regional Affordable Housing and Transportation Assessment and Strategy	Housing, Infrastructure	Y	Conduct a county-wide assessment of housing needs and availability as the foundation of a county-wide housing plan. Plan and implementation will build on existing affordable housing projects and also develop a clear strategy for a broader mix of housing options to meet the needs of diverse income populations and projected population growth.	County Zoning Municipal Planning Depts. Local Housing Authorities CO Division of Housing Nonprofits: Habitat for Humanity, etc.	Affordable Housing Coalition between gov't, service providers & nonprofits. Ties in to Regional Gov't Project—requires regional planning.
A Resilient North I-25 Corridor	Infrastructure, Economic	Y	Construct a robust and resilient corridor connecting Northern Colorado. In the initial phase, the three I-25 bridges at Little Thompson, Big Thompson and Poudre River crossings would be replaced, simultaneously implementing stream improvement projects and installing greenways that connect the west and east sides of I-25.	CDOT & local gov'ts. CDOT & Ft. Collins/Timnath/Larimer => Poudre Bridges	Create a traffic loop for area i.e. C470/E470

Title	Resiliency Sector Addressed	Regional Benefits?	Project Description	Project Owner	Comments
Resilient Natural and Built Infrastructure	Watersheds and Natural Resources, Infrastructure	Y	Plan and implement projects that have a system-wide ecosystem benefit. To do this, develop new design criteria for low impact development and green infrastructure in watersheds across the County. Take into account the "new normal" post-disaster and anticipating climate change. This would include conservation easements, zoning to remove and prevent building in high hazard areas, and other best management practices in watershed management.	County & city planning Depts. County and city Engineering/stormwater and natural resource dept./floodplain managers County/City Elected Officials Consultants from CO DOLA/OEM CSU Institute for the Built Environment, Construction Management, Architecture & Engineering Depts.	

Table 2: Larimer County Project Identification Matrix

Additional Projects

Project	Resiliency Sector Addressed	Regional Benefits?	Project Description	Project Owner	Comments
Front-Range Food System Study	Health & Social, Economic, Community	Y	Identify gaps in current vs. ideal future state of system, considering land use planning, water, economic policy, workforce development	Dept. of Ag. CSU (?) Food Cluster	
Resilient Power for Critical Facilities	Infrastructure, Economic, Health & Social	Y	Develop redundant back-up power systems, possibly via renewable energy (solar, wind) for critical facilities to keep those facilities operational and avoid outcomes of displaced or decreased workforce and increased social/health stress.	Municipalities (PRPA) Schools (as community gathering places) Governor's Energy Office	Define "critical facilities" Schools—feasible? Redundancy already included for Ft. Collins critical facilities? • Light and power • Water treatment • Water reclamation
Stagecoach Trail Bridge	Community, Health & Social, Infrastructure, Economic	N	Replace the dysfunctional culvert crossing of the Little Thompson River at Stagecoach Trail with a clearspan bridge to improve the resilience of the sole access point to homes for 200 full-time residents.	Larimer County and local/private landowners	Form a Private Improvement District to pool funds?
Competitive Broadband	Infrastructure, Economic	Y	Repeal HB2005-152 and support county-wide development of broadband	CO Muni League & local gov'ts (legislative liaisons)	

Project	Resiliency Sector Addressed	Regional Benefits?	Project Description	Project Owner	Comments
Emergency Action Plans for Dams	Infrastructure, Community	Y	Approve and implement emergency action plans for county dams to better prepare response agencies and the community for an array of potential dam related emergencies.	County/State Feds	Only "high hazard" dams require EAPs. What requirements exist or could be adopted for others?
Critical Infrastructure Choke Point Identification	Infrastructure, Community	Y	Identify potential weak or choke points in infrastructure; develop mitigation strategies and/or education for emergency response and community members.	CDOT County/City transportation dept.	
US34 Permanent Repairs between Estes Park and Loveland	Infrastructure, Economic	Y	Completing the US34 project will "harden" the roadway and provide additional transportation redundancy to Estes Park.	CDOT & local gov'ts	In progress

Project	Resiliency Sector Addressed	Regional Benefits?	Project Description	Project Owner	Comments
Little Thompson Floodplain Rehabilitation	Watersheds and Natural Resources, Infrastructure	Y	Restore the natural flow of the Little Thompson River, stabilize the streambed, and repair infrastructure in ways that best fits the profile of the floodplain to mitigate against future flood events and provide clearer, more stable water resources in the future.	River Coalition Conservation Districts Little Thompson River Restoration Coalition Bureau of Reclamation Army Corps of Engineers FEMA City/County Floodplain managers	
Affordable Housing Through Use of High Rises in Designated Areas	Housing, Economic, Infrastructure	Y	There is a current moratorium on height restriction. By allowing increased building heights in designated areas, housing density and housing stock can be increased in key locations, maintaining the local tax base, reducing traffic and addressing population growth in realistic ways.	County & Local comp plan updates Real Estate companies Investment Groups or venture capitalists	Increase density to increase affordability Don't limit to housing Coordinate with transit-oriented development Don't enact 2 + you plan-limits Develop "tiny house" community

Project	Resiliency Sector Addressed	Regional Benefits?	Project Description	Project Owner	Comments
Sustainable/Solar Tour of Homes	Housing, Economic	Y	As part of the American Solar Energy Associations national event in October, host a Larimer County sustainable/solar homes tour to educate residents about the options and opportunities available.	No Co Renewable Energy Society (NCRES) PVREA Fed/local grant programs/rebates CSU Extension Home Builders Association COSEIA? (CO solar Energy Industry Association)	Include wind turbines
Increase Frequency of CERT Training	Community	Y	Community Emergency Response Team trainings are currently being offered in Larimer County once a year; increased frequency of training would benefit everyone. These trainings train people at the neighborhood level to prepare for and help each other in disaster.	County & Municipalities (Energy Management, risk management, etc.)	More publicity through HOAs, road associations, etc.

Project	Resiliency Sector Addressed	Regional Benefits?	Project Description	Project Owner	Comments
Regional Governance Project	Community, Infrastructure, Watersheds and Natural Resources, Housing	Y	Form a Council of Governments to coordinate regional issues such as infrastructure, housing, watershed management, etc.	Led by Larimer County North Front Range Metropolitan Planning Organization	See PPACG (El Paso County) for example. Form a Regional Transportation Authority?
Landowner Watershed Restoration Support	Housing, Watersheds and Natural Resources,	Y	Facilitate landowner restoration of waterways through creation of a toolkit of watershed restoration techniques, sponsored fieldtrips to see restored sites, permitting information, and sponsorship of a watershed restoration group. Through focus on education and support, on the ground, positive restoration will be fostered at relatively low community cost.	Watershed coalition CO Water Conservation Board ??	

Project	Resiliency Sector Addressed	Regional Benefits?	Project Description	Project Owner	Comments
Connecting Wildfire Restoration/Mitigation to Energy Development	Watersheds and Natural Resources, Economic	Y	Link forest thinning projects to biomass reuse opportunities. This will support forest restoration/mitigation projects which in turn will reduce the potential for catastrophic fires while providing economic benefits such as alternative energy sources and workforce development.	Colorado State Forest Service CO Wood Forest Industry Forestry Service Providers NRCS & Watershed coalitions/Alliances Larimer County Natural Resources Private Enterprise	
Re-educating the Businesses and Workforce of Tomorrow	Economic, Community	Y	Rethink, remake and reintroduce old industries to young students to give them different alternatives to traditional education and jobs. This could help youth avoid unworkable college debt, develop and retain a workforce ready for the future, and reinvent old industries in dynamic, new, competitive ways.	Municipalities, private sector, junior colleges, high schools, alternative high schools, middle schools	

Project	Resiliency Sector Addressed	Regional Benefits?	Project Description	Project Owner	Comments
Complete the North Front Range Workforce Development Plan	Economic	Y	Under new federal legislation, local workforce Boards must develop a workforce plan for their region. This plan would identify business needs, existing skills, and educational programs as well as developing a vision and goals for the future.	Workforce boards and staff	
The Poudre Runs Through It	Watersheds and Natural Resources	Y	This existing program, which uses historical flood events as learning opportunities for ways to improve watershed plans, can serve as a case study for replication in other Larimer County communities. Lessons from this program have included the value of preserving open space and recreation areas as floodplain buffers and how to secure the built environment from floodplain impacts.	Colorado Water Institute	Be sure to emphasize all considerations that include Poudre River as an amenity and a resource and a public safety improvement. I would suggest this project description far oversells what this group is/can do. It also casts this as the primary group on the Poudre. I suggest "support all major collaborative groups on Poudre to encourage system-wide mgt/success."
Know Your Housing Rights	Housing, Health and Social	N	Create a renter education, community outreach and advocacy program for current renters around what their rights are as tenants.	Housing Authorities	Include info & training for home ownership opportunities.

Project	Resiliency Sector Addressed	Regional Benefits?	Project Description	Project Owner	Comments
Net Zero Energy Housing Program	Housing, Community, Infrastructure	Y	Work with FortZED to establish net-zero energy/water/waste neighborhoods to be used as shelter-in-place locations. Shelter-in-place using islanded neighborhoods allows for fewer evacuations and more sustainable use of resources.	City of Fort Collins (Fort ZED partner)	• Isolation of islands from grid (safety/line loss) • Other source of energy • Complexity of tying different sources together
Regional Economic Development Plan	Economic	Y	Collaboratively — with engagement from Larimer County, Weld County, and Larimer County localities and municipalities — develop a regional economic development plan for Larimer County. This will include defining how and where the county wants to grow, and will consider/incorporate municipal and county zoning and land use. This will coordinate and align economic development activities in the county and create a long-term plan and vision for creating a resilient, robust and responsive economy.	County gov't commissioners City Gov't (City Council) Local Chambers of Commerce Economic Development organizations Community groups including neighborhood, environmental orgs	

Project	Resiliency Sector Addressed	Regional Benefits?	Project Description	Project Owner	Comments
Building Out Economic Sector Partnerships	Economic	Y	Continue existing sector partnerships, adding in resiliency conversations, and launch new partnerships, such as energy and agriculture. These can bring industry, education, workforce and economic development together to address regional, sector-wide challenges and opportunities.	Local; embrace new ideas and change	
Innovative Land-Use Planning	Economic, Community	Y	Allow for diversity in growth management and economic resiliency while supporting and protecting our natural environment. Include agricultural land protection where this doubles as floodplain and natural resource protection.	Regional and by jurisdiction	Emphasize relationship between land use & transportation Emphasize prudent floodplain preservation and management economic incentives/tax credits for ag/open space
Disaster Response Bike Competition	Community	N	Host a cargo-bike emergency-response competition where cyclists compete to deliver supplies in a hypothetical disaster setting. Engages the community in a fun event while raising awareness about both hazards and risk cycling as an alternative transportation option.	FC Bikes Bicycle coop Local gov't	This seems to me an idea or sub-plan of the community outreach project

Project	Resiliency Sector Addressed	Regional Benefits?	Project Description	Project Owner	Comments
Address vulnerabilities across the integrated water production, distribution system & wastewater facilities system (system-Wide Approach)			Generate chlorine onsite to keep operations when treatment plants are cut off		

Roadmap to Resiliency

Participants worked in small groups to develop the outline of a plan for making the vision, goals, and strategy a reality. The group considered the following questions.

Leadership and Collaboration

1. How will **existing organizations** be leveraged to support ongoing resiliency actions in the community?
2. What **new approaches** to coordination/governance may be needed?
3. Who will take the lead?

Capacity Building

1. What three actions can the community take **now** to immediately enhance resiliency?
2. What **funding avenues** might the community explore to finance resiliency actions?
3. Who will take the lead?

Community Engagement

1. How will **ongoing public outreach and education** be used to empower the community to move toward resiliency?
2. What strategies to support **vulnerable populations** will be used?
3. Who will take the lead?

Leadership and Collaboration

1. How will **existing organizations** be leveraged to support ongoing resiliency actions in the community?

   Participants developed the following recommendations:

   - Identify the organizations to participate, including those in this meeting and others who may not be here. These organizations would include school, faith-based organizations, community organizations, and businesses, especially large employers who can communicate with large numbers of people. Identify the comparative advantage of special contribution each organization brings to the network
   - Create a distributed network of these organizations
   - Create opportunities for these networked organizations to work together in resilience actions to share knowledge and build lessons learned
   - Search for funding opportunities to encourage active network function
   - Gain support from local governments

- Engage insurance companies, who are proactively engaged in hazard mitigation

2. What **new approaches** to coordination/governance may be needed?

   - Foster shared responsibility in leadership, increased cooperation across jurisdictions including making agreements
   - Create incentives for non-government organizations to participate
   - Learn from examples of other disasters around the country
   - Take a long term role instead of short term, with minimal grant funding
   - Organize periodic resiliency network meetings every six months or once a year
   - Brand resiliency in Larimer County – come up with a slogan to keep people thinking about resiliency
   - Colorado Counties Inc. and Colorado Municipal League make resiliency an agenda item
   - Encourage state involvement in education, funding, and information sharing to give meetings and exercises more importance

3. Who will take the lead?
   - Regional Resiliency Steering Committee, led by the Office of Emergency Management

Capacity Building

1. What three actions can the community take **now** to immediately enhance resiliency?
   - Identify existing Memoranda of Understanding, Mutual Aid Agreements and other cross sector and cross jurisdictional agreements, and create new ones to promote collaboration and integration
   - Build on existing efforts and groups
   - Expand CERT training for community members
   - Develop funding mechanisms
   - Address policy deficiencies at FEMA and the State that constrain resilient recovery
   - Educate government and citizens in hazard mitigation
   - Create a public relations or marketing campaign to instill confidence, trust and capacity
   - Create curricula for use in schools on preparedness and resiliency

2. What **funding avenues** might the community explore to finance resiliency actions?
   - Corporate sponsorship
   - Federal, state, and private grants

- License plates
- Sales tax
- Existing local government budgets, as a staff function
- Incentives from property insurance companies for risk reduction measures by property owners
- Colorado Conservation Exchange payments for ecosystem services
- New fees or taxes to discourage development or occupation of high risk areas
- CSU Extension to develop education curricula

3. Who will take the lead?
   - Resiliency Committee with high level decision makers or their designates
   - Emergency Management
   - Commissioners and Municipal Leaders
   - Specific interests per sector

Community Engagement

1. How will **ongoing public outreach and education** be used to empower the community to move toward resiliency?
   - Use the many outreach and education programs already going on – CERT programs, utility bills, social media, service providers, faith communities (especially for non-English speaking communities), large employers, VOAD, CSU Extension, schools, community organizations like 4-H, flyers in grocery stores and pizza parlors, CSU athletic events (Go Rams), HOAs, city and county web sites.
   - Since people are already inundated daily by messages, have a menu of options
   - Avoid jargon like "resiliency" and "fragility," translate messages to be relevant for each community

2. What strategies to support **vulnerable populations** will be used?
   - Identify champions specific to vulnerable groups – senior citizens, handicapped, monolingual, etc.
   - Use resiliency ambassadors to address specific neighborhoods and vulnerable groups
   - Modify delivery methods for hard to reach parts of the county, especially where cell phone coverage is not reliable
   - Explain the importance of stresses as well as shocks. Include the every day shocks and stresses, not just the worst case scenarios
   - Engage with organizations that provide support to vulnerable populations
   - Engage people in multiple languages, including braille and sign language
   - Go door to door for vulnerable populations
   - Use mascots, symbols, slogans to make resiliency recognizable
   - Share stories

3. Who will take the lead?
    - Larimer Connects
    - CSU Office of Engagement and Extension
    - VOAD
    - Interfaith Council
    - United Way 211
    - Resiliency Committee
    - Insurance Companies
    - National Park Service

Process Overview

At the end of the day, participants were asked to share their insights regarding the local resiliency planning process, as well as their impressions regarding the Charrette format. The following are comments as expressed by participants.

Charrette Structure and Format:

- It got a little confusing at times, especially in the groups in the afternoon. Better definition of terms and information on what is already available at state level (resources, funding) would help.
- Good – perhaps assigned seating at the beginning would have been good to make sure there was diversity of expertise at each table.
- Excellent – broke the group up multiple times, kept it flowing and generated a lot of good dialogue.
- Open discussion and groups were good.
- Facilitators did a good job. I think the World Café format worked well.
- I wasn't part of Charrette #1 – so I didn't know if I would have anything to offer today. It was well laid out and I was able to contribute.
- Good for facilitating involvement by all in attendance.
- I liked all the interaction with others than sharing a summarized version
- It was facilitated efficiently and effectively
- Perfect
- Excellent

Charrette Content:

- On point
- Good – important topic
- Very informative and thought provoking
- Overall very good
- Excellent

- Significant for many agencies and even for the individual
- Some questions are too broad, or words are used in a manner that leaves us unsure what the question is, e.g., how are organizations going to be "leveraged"?
- Good – brief overview of Charrette #1. Good questions and prompts
- Lots of great ideas, committee was well prepared and time was well used

Lessons Learned:

- Some good ideas came out on public information-branding-marketing. Regional planning/cooperation and dissolving bureaucratic barriers is crucial.
- It takes a while to get in the groove and "speak the language" of resiliency. I didn't attend the first Charrette and didn't have a chance to review the draft report. Committee brought me up to speed quickly.
- I was challenged to think about sectors where I don't have expertise – but we did have people at our table who did have that knowledge.
- Need to keep the focus on the myriad shocks, not just weather events and flood and fires.
- How complicated it can be to establish a unified system with a streamlined process.
- This will take a great deal of time, money and effort, but it is very worth continuing.
- Might want to invite some people from organizations such as water districts not part of municipalities or power or gas providers such as PRPA, Tri-State and Xcel Energy.
- Think outside the box.
- Challenging – still seems some important stakeholders missing.

Suggested Next Steps:

- I think it's a great effort and is well organized for a pilot program.
- Please send revised draft of framework so we can share and get more suggestions.
- Make sure all participants receive a copy of the Larimer County Resiliency Framework.
- Finalize the plan, solicit further input if needed, and keep moving forward.
- Continue to facilitate all organizations as possible to ensure all motivations have a say in the overall process and scope.
- At some point the plan needs to be shared with multiple layers of the organizations that put it together. What good is a plan if only 1-2 people in the organization are aware of it but no one else knows?
- The project list seems to me – it is good – but I feel like there is still much more to identify and pursue for projects. I'd expect more sector identified projects and solutions.

- Reconvene this group for 2 hours to highlight the tenets of the plan when it's finalized. Encourage us to share the results and spread the word.
- I know there is a lot of work to be done, but people tend to run out of gas towards the end. A half day format may be more productive.
- Looking forward to results of process and next action steps.

General Comments

The Charrette also solicited general comments via a form that participants could submit at any time in the process. The following are the comments received.

- Some stresses are listed as categories, not the actual stress (e.g., ecosystem services)
- Projects should be listed by "primary sector" and evaluated for scale (something that should be scaled up/incorporate more stakeholders).
- What is the purpose/goal of this study? To build a framework, yes, but beyond that? Who holds the reins? Without a (non-jurisdictional, non-partisan) committee to oversee this it feels like this will fall back to each agency or municipality to deal with on an individual basis. Wondering where this leads….
- Section 1 ("Resiliency…"). Damage statistics from 2013 floods – is this for Larimer County or Front Range wide? I think the numbers are substantially too high and based on very early data not revised more accurate numbers. Larimer County was one of the hardest hit and losses were hundreds, not thousands. Same issue under flooding page 3.6, where data is off ten-fold.

Next Steps

Information generated at Charrette #2 will be used to revise the Larimer County Local Resiliency Framework. There will be a session to review the revised draft in November. The initial draft will be available for review and comment prior to that session.

Attachments

1 Agenda
2 Sign-In Sheets
3 Shocks and Stresses Worksheets
4 Sector Strategies Worksheets
5 Roadmap to Resiliency Worksheets

Larimer County Charrette #2: Local Planning Process
October 14, 2015

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Larimer County Charrette #2: Local Planning Process
October 14, 2015

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Larimer County Charrette #2: Local Planning Process
October 14, 2015

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Larimer County Local Planning: Public Hearing/Open House October 14, 2015			
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Larimer County Framework Review Session Summary

December 9, 2015

Fort Collins, CO

Introduction

On December 9, 2015, Steering Committee members from Larimer County convened to continue the resiliency planning process begun in August 2015. Ten participants, including representatives from Fort Collins and Larimer OEM, Larimer VOAD, Larimer LTRG, Larimer City Economic Development, CSU, DOLA and the State Resiliency Office met to review the draft Larimer Community Resiliency Framework (Framework) for Larimer County, which was circulated to participants via email the week prior to the Framework Review Session.

Participants in the half-day workshop were asked to focus on four focus areas in particular:

- Where are we now? – Existing Conditions
- What do we do? – Strategies and Projects
- How will we do it? – Roadmap to Resiliency
- What will we need? – Resiliency Planning Toolkit

Overall Charrette Objectives

Objectives of the Framework Review Session included:

- **Objective 1:** Recap the process and status of the Framework.
- **Objective 2:** Provide opportunity for both structured and free-form commentary on draft framework content, particularly strategies, projects, and implementation issues.
- **Objective 3:** Engage stakeholders on the Resiliency Planning Toolkit, and on future needs to maintain ongoing action in service of resiliency.

Results

Participants worked in plenary to discuss questions in each of the focus areas based on their review of the Framework prior to and during the meeting. ISET and E & E facilitators recorded participant feedback during the review session.

Existing Conditions

Participants began the review by focusing on the Existing Conditions section of the Framework and exploring:

a. What are the key strengths and challenges of your community in each resiliency sector?

b. What key topics or issues are missing from the discussion of existing conditions in the framework? Can you suggest good data sources regarding these topics?

These questions were explored by sector and the following feedback was noted:

Community

Additional challenges in the Community sector include differences in culture and priorities between communities, particularly mountain vs. plains and urban vs. rural. As a result, strategies for Framework implementation need to be highly specialized, addressing local culture and priorities.

Economic

Larimer County is home to many small businesses—a clear economic strength. However, several additional challenges were identified in the Economic sector, including: Larimer County communities are net exporters of labor; business continuity and vulnerability is a problem particularly for small businesses that lack the resources of larger businesses, particularly in smaller or more isolated communities; and increasing real-estate pricing and business rents are pushing out small, local businesses.

One of the areas missing in the Economic sector discussion is the impact that floodplain remapping is having or will have on places hard-hit by flooding. If businesses are mapped into the floodplain, flood insurance costs may be too great, forcing them out.

Health and Social

Larimer County has a strong volunteer culture and an already established awareness of environmental challenges, mental health issues, etc. that impact the Health and Social sector. Challenges in the sector include: dependence on volunteerism for essential public services (e.g., emergency fire districts), which is particularly risky given that many county residents work an hour or more from where they live and volunteer; increasing identified mental health demands and homelessness (this may be due to improved tracking); increasing healthcare costs; and poverty rate increasing faster than population growth.

Housing

The housing market in Larimer County faces multiple challenges, as is true across the Front Range. Primary among those challenges in Larimer County include: wages are being outpaced by housing costs, in part due to speculative appreciation, which is particularly problematic for the affordable, for-sale market; rising costs of construction and development; increasing land costs, which are making it

increasingly difficult to develop affordable housing; and an increasing focus on the student market alone in new apartment construction, particularly in Fort Collins.

Key issues participants noted as missing from the draft Framework include that the county is at capacity in long-term shelters.

There is a clear need for innovative models in housing in Larimer County. One idea floated at the session was supporting models such as nursing students volunteering in retirement homes in exchange for room and board.

Infrastructure

The biggest challenge Larimer County faces in the infrastructure sector is aging infrastructure, particularly in, but not limited to, rural parts of the county. This is coupled with limited funding for upgrading and refurbishing infrastructure, population growth increasing demand on already fragile infrastructure, the high risk environment in which infrastructure needs to function, and a lack of redundancy in core services such as water and power. This combination of challenges clearly requires new ways of thinking about infrastructure that will allow for rapid recovery, islanding, and other strategies to build resiliency in infrastructure systems.

Watersheds and Natural Resources

Larimer County is in the fortunate position of being at the headwaters of the Poudre and Big Thompson Rivers. These watersheds are substantially protected, securing water quality, and the cities of Fort Collins and Greely have senior water rights, securing core supply. However, Larimer County is subject to a legislative environment that limits the county's ability to use local water supply, and is heavily dependent on trans-mountain water diversions, which leave the county dependent on areas outside local control and creates multiple points of potential failure between supply and demand. Additionally, all the watersheds serving the county have either gone through disasters or are at high fire risk. Finally, population growth, increasing development in the wildland-urban interface (WUI), and climate change are exacerbating all the issues above.

Fortunately, Larimer County, and Fort Collins in particular, have been visionary about proactive management. Fort Collins took the lessons learned in the 1997 flooding and acted on them, dramatically reducing flood risk. They are now working to apply lessons from the Hyde Park fire around water quality. Larimer County as a whole has strong vision in watershed management and is taking a proactive approach to these challenges.

Strategies and Projects

Once participants had reviewed existing conditions, they moved to the strategies and projects developed to address those conditions and challenges. Questions participants focused on here included:

- Do the priority and future projects identified in the framework serve the identified strategies?
- If not, should these projects be modified and how? Or should strategies be amended?

Overall, participants felt the priority and future projects listed were on target. It was emphasized that these should all appear in the Framework, and that project ownership identified in Charrette #2 should be included along with the priority projects in Table 5.1 of the Framework. There was discussion but no resolution as to whether the Steering Committee should identify owners for each of the Table 5.2 projects, though it was noted that without such ownership they were unlikely to move forward.

Participants noted that the projects should be reviewed with respect to the hazard mitigation plan actions; places where they align would provide clear opportunity to move forward with resiliency actions. Similarly, many of the watershed projects could come into play if the watershed coalition obtains funding for the lower watershed work.

Discussion then moved to organization and prioritization of the projects. Participants agreed projects, particularly from Table 5.2, should be organized by sector, tied back to individual strategies, and then reviewed to identify whether all strategies are addressed. A table for each sector listing each strategy and all the projects that address it could complement this. These tables would be included as appendices in the framework document.

It was agreed that if projects were sorted by sector, they should not be prioritized within those sectors – that would be the role of the sector leader. However, it was noted that the Solar Tour project (or any similar, small-scale, highly focused project) should not be listed first.

Wording changes to projects included:

- Solar Tour: this should be reframed as an opportunity, particularly in post-disaster rebuilding, to provide examples of what could be done. Replace "solar" with "rebuilding practices, resilient reconstruction…."

- Know Your Housing Rights – expand; "… hazards, risks, access to services, rights and responsibilities as owners or renters", etc.
- Competitive Broadband – "Consider the repeal….."

Participants noted that key project ideas that are missing are primarily focused around the Housing sector. Potential projects could include policy, planning review and strategy development (e.g., building height moratorium, Fort Collins occupancy ordinance), and Net-zero housing strategies.

Finally, it was noted that there are projects in the pipeline, including a NIST resilient infrastructure project that will invest five million dollars over five years and the HUD resilience competition proposed work, both of which could be used to jump-start broader resilience action in the County.

Roadmap to Resiliency

This session focused on what needs to happen to go from a written Framework document to action. Discussion centered on the following questions:

- How will the framework be adopted by jurisdictions and organizations in the community?
- Who will coordinate framework implementation in 6 months, 1 year and 3 years from now?

Participants noted first that, because this is a Framework and not a Plan, the issue of adoption is moot. What is needed is ownership of the Framework by sectors, agencies, and groups. Over the next year, Larimer County OEM will serve as the primary lead for the Framework, playing a facilitation role in getting others to the table. The Steering Committee will need to identify who owns each sector and how they're going to move forward with it.

More broadly, support for the Framework can be generated, for example, by county and city elected officials passing resolutions of support. A road show and public relations effort focused on community outreach could help increase visibility and make the Framework a reality driving actions. A public relations effort to achieve broad outreach should be considered as a project in and of its own right, probably held by the Steering Committee.

Short-term coordination, over the next 6 to 12 months, will probably be via continuation of the existing Steering Committee. To successfully take on this role, the Steering Committee will need to be expanded and/or balanced to assure that all sectors and geographies have representation and that sector leads have access to appropriate agencies and groups.

Long-term, coordination should probably shift to a public board. This is a model already in use in Larimer County; the County Commissioners already have several public boards. However, this needs to be done thoughtfully as it will be most successful if it remains a citizen initiative working in parallel with the various governments in the county rather than county government led.

Resiliency Toolkit

The final formal session of the morning addressed what tools have been most useful to the County in the resiliency planning process and how the State could consider further building out their support for resiliency planning statewide. Discussion was focused around the following two questions:

- What tools, documents, workshops, trainings or other materials would be useful to your community in implementing your framework?
- What tools, processes or materials would be useful to other communities preparing similar frameworks in future?

The Steering Committee found the State Resiliency Framework a useful model. However, they still feel they need a way to engage and make communities care about resiliency that generates both awareness and involvement. Participants noted that the public can very effectively push leaders to focus and act.

Participants felt the resiliency process—in particular the facilitated charrette approach—was a really effective way to move from an initial introduction to resiliency all the way to resiliency project design and implementation in a short period of time. Having the State's backing and support gave the process needed weight and a sense of value. Nonetheless, there are clear opportunities for improvement. In particular, more communication between charrettes would have been helpful. Incorporating the NDRC activities into Charrette #1 led to a lot of confusion and lead to "priority" projects that were less top priority and more shovel ready.

Participants suggested that, moving forward, they would like to see the establishment of a "Governor's Resiliency Award" to recognize local efforts.

Tools and materials participants felt would be helpful for other communities in the future included continued state support to give credibility to local action, and charrettes to support knowledge sharing.

Discussion

In addition to the feedback obtained via the structured work sessions above, participants provided broad feedback on the overall Framework. Several Steering Committee members provided marked-up documents to the facilitation team for incorporation into a revised draft. In addition, participants noted that the

Framework document cover needed different images. The current pictures are all of unincorporated Larimer County, which makes it feel like a County effort. Participants offered to provide alternate imagery to the facilitation team.

Next Steps

Information from the Framework Review Session will be used to refine the Larimer Community Resiliency Framework. The resulting draft will be circulated for review and comment by the full Steering Committee, and then distributed for public comment.

Timeline for framework roll-out/public comment

The Steering Committee participants at the Framework Review Session wanted to make sure that people who appear in the Framework feel like they were part of writing it. They also wanted to make sure that the ~300 people on the Charrette invitee list have a chance to review the Framework.

The next steps and proposed timeline for those steps is:

- Edit the existing document, including changing cover – Rename to "Larimer Community Resiliency Framework" or "Communities of Larimer Resiliency Framework" and change pictures
- Today's participants to get line edits to Lori/Laura by Dec 18
- Edits done, draft document back to Steering Committee week of Jan 11, 2016
- Framework circulated to full Steering Committee and Charrette invitee list for 2 weeks for review/comment
- Consolidated comments returned to E&E and ISET by January 22
- Final draft prepared
- Final draft out to public for 2 week review period
- Final document prepared for County Board to sign off on

Attachments

1 Agenda
2 Sign-In Sheet
3 Worksheets

Attachment 1 Agenda

9:00 – 9:10	Welcome and Opening Remarks
9:10 – 9:30	Overview of the Framework
9:30 – 10:00	Existing Conditions
10:00 – 10:30	Strategies and Projects
10:30 – 10:45	*Break*
10:45 – 11:15	Roadmap to Resiliency
11:15 – 11:45	Resiliency Toolkit
11:45 – 11:55	Discussion
11:55 – 12:00	Wrap Up and Next Steps

Attachment 2 Sign-In Sheets

LOCAL RESILIENCY PLAN
PLAN REVIEW SESSION
SIGN-IN SHEET

Name	Organization	Phone Number	E-mail
Daniel Costantino	Ecology and Environment, Inc. (E & E)	(503) 248-5600 x.4605	dcostantino@ene.com
Chris Wolf	Ft. Collins OEM	970-416-2859	cwolf@poudrefire.org
Mike Gavin	Ft. Collins. OEM	970 416 2878	MIGavin@poudre-fire.org
Rob Pressly	CRRO		rob.pressly@state.co.us
Karen MacClure	ISET		Karen@I-S-E-T.ORG
Jen Kovecses	CPRW	970·222·5754	jenk@poudrewatershed·org
Lori Hodges	Larimer OEM	303-656-3214	hodgeslr@co.larimer.co.us
Joel Max	Larimer OEM	970-556-1279	maxjc@co.larimer.co.us
Laura Levy	Larimer LTRG / VOAD	303-931-8080	laura@larimerltrg.org
Waverly Klaw	DOLA	303-864-7756	waverly.klaw@state.co.us
Jacob Castillo	Larimer City Econ. Dev.	970-498-6605	jcastillo@larimer.org
Gen Pace-Pare	CSU	4916148	gen.pace-pare@colostate.edu

Attachment 3 Worksheets

LOCAL RESILIENCY PLAN
PLAN REVIEW SESSION
EXISTING CONDITIONS WORKSHEET

Date:
Group Members:

A. Are the key strengths and challenges listed in each resiliency sector accurate? If not, what needs to be changed?	*B. What key topics or issues are missing from the discussion of existing conditions? Can you suggest good data sources for these topics?*
Community: challenges: differences in culture & priorities b/w different communities (Cmty. differences vs planning, cities vs. rural)	**Community:**
Economic: challenges: 1. Larimer Co. communities are net ~~importer~~ exporters of labor 2. business continuity vulnerability for small businesses, esp. in smaller & more isolated communities 3. increasing ~~local~~ commercial vacts	**Economic:** areas hit hard by flood at risk of flood remapping ↳ increasing flood insurance rates & commercial / residential development post-flood proper use?
Health and Social: strength: → strong volunteer culture (good for disasters) → dependence on volunteerism (used for everyday functions & sustainability of programs) challenges: homelessness, mental health, costs of healthcare ? real increases or better tracking? greater awareness of environmental challenges	**Health and Social:**
Housing: challenges: plenty of student housing construction, not a lot of family; real estate appreciation faster than population growth (beyond supply issues e.g. speculative); problems in affordable for-sale housing; rising costs of construction + development	**Housing:** lack of capacity in long-term shelters; innovative models in housing (e.g. students volunteering in retirement homes in exchange for room & board)
Infrastructure: 1. lack of redundancy → water supplies e.g. two electric circuits in the county 2. aging, failing infrastructure; limited funding for upgrading, replacing infra 3. issues not just rural 4. Creating new ways of thinking	**Infrastructure:**
Watersheds and Natural Resources: 1. need to define water security: is it security or access? ↳ also, this may belong in infrastructure 2. not just dependence on CBT, but general issue of snowpack 3. strength: protected headwaters on Poudre River + Little Thompson + high water quality 4. all watersheds have same main challenges or are subject to them 5. strength: strong vision in watershed management & proactive approach	**Watersheds and Natural Resources:**

population growth cross-cutting challenge | 1. secure sources 2. towns "out-bound" needing "upstream" communities

LOCAL RESILIENCY PLAN
PLAN REVIEW SESSION
STRATEGIES AND PROJECTS WORKSHEET

Date: Dec 9 2015
Group Members: Plenary

Consider the Resiliency Vision developed by your community through the planning process.

A. Do the priority and future projects listed in the plan/framework serve this vision? If not, what needs to change?

Priority Projects:

Add to Table 5-1 the project ownership. This is in the Charette 2 rpt.

Solar tour – particularly as rebuilding post-disaster, to provide examples of what could be done.
- Don't list first!
- Learning/capturing that learning about resilient reconstruction ← replace solar with ...
Rebuilding practices, resilient reconstruction . . .

Know Your Housing Rights – Expand
→ ~~"hazards, risk, available services, pitfalls, etc."~~
– "hazards, risks, access to services rights & responsibilities as owners or renters, etc."

Competitive Broadband – "Consider the repeal . . ."

Future Projects:

Perhaps break out by sector, but don't prioritize w/in sectors, leave that to sector leader

Want to keep all these in plan!

Will want to review wrt. hazard mitigation plan actions, etc.
– this is part of how to move forward.

A lot of things on watershed side will come into play if watershed coalition gets funding for lower watershed work.

→ Does Steering Committee want to find owners for each of the T5.2 projects so its clear how they might move forward?

Organize by sector & tie back to individual strategies.
Then, are all strategies addressed?
In an appendix, list each strategy & all the projects that address it (or spreadsheet)

B. Are any key project ideas missing?

Missing Project Ideas:

Note: is NIST resilient infrastructure project starting – 5 million, 5 years
HUD resilience competition & what is funded

Housing: Policy, & Planning and Strategy development review around, e.g. Building Height Moratorium, Ft. Collins occupancy ordinance; include net-zero housing to this

LOCAL RESILIENCY PLAN
PLAN REVIEW SESSION
ROADMAP TO RESILIENCY WORKSHEET

Date:
Group Members:

A. How will the local resiliency plan/framework become an effective driver of actions taken by local organizations and jurisdictions?

This is a framework, not a plan, so this is not a Sat adoption.
Ownership of the plan by sectors/agencies/groups. Larimer OEM as a global lead (facilitator)
County + City councils may be able to pass resolutions of support. Road show + PR effort to different communities could help increase visibility / reality of the framework driving actions.
PR efforts to broaden outreach → this might be a project

B. Who will coordinate plan implementation in 6 months, 1 year, and 3 years from now?

6 months:	1 year:	3 years:
possibly continuation + expansion / balancing of Local Steering Committee (make sure all sectors are represented; all sector leads have access to appropriate agencies + groups)	→	citizen boards? (although need to be careful not to have this under County gov't. only)

C. Optional Follow-Up: Use the template Annual Operating Plan (see Appendix C in the draft) to start discussing Implementation Actions for 2016.

→ also, represent all places

continued outreach to all communities

LOCAL RESILIENCY PLAN
PLAN REVIEW SESSION
RESILIENCY TOOLKIT WORKSHEET

Date:
Group Members:

The Colorado Resiliency and Recovery Office is developing a Resiliency Toolkit to help communities throughout the state build disaster resiliency into their policies, plans and actions. This may include materials to support the development and implementation of resiliency plans, as well as educational materials, and a forum for sharing knowledge and best practices.

A. What tools, documents, workshops, trainings or other materials or events would be useful to your community to implement your resiliency plan or framework?

Materials (documents, tools, resources…):	Events (workshops, trainings, charrettes…):
• State framework as a model was useful • need a way to communicate to communities to care about resiliency - both awareness & involvement; public can push leaders to focus/act	• facilitation team ↳ explain resilience, move to design projects • could be more communication between charrettes/meetings • confusion w/ NDRC vs. local framework • Governor's Resiliency Award to recognize local efforts?

B. What tools, processes or materials would be useful to other communities preparing similar plans in future? How do you envision sharing your community's experience with others?

Tools/Processes/Materials:	Knowledge Sharing:
• state support gives credibility to local action	• Charrettes

Appendix C
Template Annual Operating Plan

Larimer County Community Resiliency Steering Committee 20XX Annual Operating Plan								
Item #	**Action or Project**	**Related Goals & Strategies**	**Desired Outcome**	**Challenges**	**Lead Stakeholder**	**Supporting Stakeholders**	**Priority Level**	**Milestones & Timeline**
1	*[Describe the action item (or project w/ multiple actions coordinated by the same stakeholder)]*	*[List the plan goals and strategies served by the action or project]*	*[Describe the outcome the action seeks to achieve]*	*[Identify likely challenges to be overcome to complete action(s)]*	*[Identify the lead stakeholder, i.e. the party responsible for completing action(s)]*	*[Identify other potentially involved stakeholders]*	*[High, Medium, or Low]*	*[Target dates to complete action(s)]*
2								
3								
4								
5								

Larimer County Community Resiliency Steering Committee 20XX Annual Operating Plan								
Item #	Action or Project	Related Goals & Strategies	Desired Outcome	Challenges	Lead Stakeholder	Supporting Stakeholders	Priority Level	Milestones & Timeline
6								
7								
8								
9								
10								

Larimer County Community Resiliency Steering Committee 20XX Annual Operating Plan								
Item #	**Action or Project**	**Related Goals & Strategies**	**Desired Outcome**	**Challenges**	**Lead Stakeholder**	**Supporting Stakeholders**	**Priority Level**	**Milestones & Timeline**
11								
12								
13								
14								
15								

Appendix D
Project Scoping Tools

Local Resiliency Planning Projects

Cover Sheet

The project worksheet is intended to capture in a concise but thorough manner the scope and intent of proposed resiliency projects. Resiliency projects can take many shapes and forms, ranging from relatively low-cost planning, education, and program development activities to multi-million dollar infrastructure projects. Hence, the worksheet asks for a great detail of information, not all of which will apply to every project.

The project worksheet is accompanied by a set of instructions which provide further clarity regarding the type of information solicited in each section of the worksheet and the types of material that may be useful in supporting claims made about a proposed project.

The goal of the project worksheet is to help foster "a deeper cultural shift in decision-making" by asking project proponents to assess their projects through multiple lenses. In undertaking to complete a project worksheet, it is anticipated that project proponents will form a richer picture of what makes a project worthwhile by describing and evaluating multiple attributes of a project.

The information requested in the worksheet is derived from multiple sources, including the Colorado Comprehensive Risk Analysis Tool, and attempts to capture the multiple dimensions of a resiliency project as well as the material typically requested in most funding applications.

It is expected that many projects, especially those in an early planning phase, will be unable to complete every field in the project worksheet to the extent implied in the worksheet instructions. Projects that are able to provide more complete and better information are those most likely to be implemented in the short-term.

Most importantly, and even in the absence of detailed quantitative information, project proponents should aim to justify in descriptive terms how their project will contribute to community resiliency by reducing risk and vulnerability and providing multiple benefits to the community and region.

<table>
<tr><td colspan="2">1. Project Name:</td><td>2. Date:</td></tr>
<tr><td>3. County:</td><td colspan="2">4. City/Town:</td></tr>
<tr><td>5. Neighborhood/Street:</td><td colspan="2">6. Census Tract(s):</td></tr>
<tr><td colspan="3">7. Project Owner:</td></tr>
<tr><td colspan="3">8. Brief Description:</td></tr>
<tr><td rowspan="7">9. Unmet Need:</td><td colspan="2">10. Project Timeframe:</td></tr>
<tr><td colspan="2">11. Total Project Cost:</td></tr>
<tr><td colspan="2">12. Funding In Place:</td></tr>
<tr><td>Source</td><td>Amount ($)</td></tr>
<tr><td colspan="2">13. Funding Needed:</td></tr>
<tr><td colspan="2">14. Estimated O & M Cost:</td></tr>
<tr><td>Bearer</td><td>$/year or $ in NPV</td></tr>
</table>

15. Map Attachments:
*Attach all maps listed below or provide digital copies. Check box to confirm map is attached.
☐Flood Insurance Rate Map (FIRM) or, if unavailable, Flood Hazard Boundary Map (FHBM) ☐City or county scale map
☐USGS 1:24,000 topographic map ☐Parcel map ☐Overview photographs representative of project area

Project Worksheet

16. Primary and Co-Benefits:			
Please check the sector that is the project's primary focus.		Please check all other sectors benefited by the project.	
☐ Health and Social	☐ Economic	☐ Health and Social	☐ Economic
☐ Housing	☐ Infrastructure	☐ Housing	☐ Infrastructure
☐ Watersheds and Natural Resources	☐ Community	☐ Watersheds and Natural Resources	☐ Community
Describe:		Describe:	

17. Regional Benefits:

18. Economic Benefit-Cost:

Cost Category	*Benefits*	*Costs*	*Notes*
[forthcoming]			
PROJECT NET:			Discount Rate:

Will project impact NFIP Community Rating System score? ☐ Yes ☐ No
If yes, describe:
Source for all non-market valuations included in calculations:

19. Social Equity:		
Will the project benefit vulnerable communities?	☐ Yes	☐ No
If yes, describe:		
Will the project create temporary or permanent jobs?	☐ Yes	☐ No
If yes, describe:		
If construction activities will be undertaken, will workers be paid the prevailing wage?	☐ Yes	☐ No
20. Innovation:		

21. High Risk and Vulnerability:
Does the project community have a FEMA-approved multi-hazard mitigation plan? ☐ Yes ☐ No
Is the project or strategy listed in the plan? ☐ Yes ☐ No
If yes, please indicate the page _____ and section _____where project can be found.

22. Technical Soundness:
23. Adaptive Capacity:

24. Harmonize with Existing Activity
Is project implementation dependent on seasonal timing? ☐ Yes ☐ No
If yes, describe:
25. Long-Term and Lasting Impact:

Will future response or recovery costs be reduced due to project implementation? ☐ Yes ☐ No
If yes, describe:

Consideration of climate change impacts:	
26. Project Readiness:	
Jurisdictions involved:	Permits required:

Local Resiliency Planning Projects

Instructions for Simplified Worksheet

These instructions provide clarification regarding intent, desired content, and methods for supporting descriptive and quantitative declarations used to describe a proposed resiliency project.

1. – 3. Complete as indicated.

4. Identify the project owner or proponent. Include the name, phone number, and email address for a point of contact as well as the owner/proponent's organization name.

- A proponent must be an individual or entity that will take a lead role in developing/implementing a project or owning and operating a project.

5. Identify all jurisdictions that will be implicated in the project.

6. Describe the proposed project. Include in the description the project scope and partners. Describe how the project contributes to your community's resilience.

- The description should be clear, concise, and should make the case for why the project is worthwhile in terms of enhancing the community's resiliency.
- If relevant, describe the community process that will be undertaken as part of project design and implementation**.**
- Describe if and how this project will address unmet needs from previous disasters.

7. Indicate the proposed start and end date for the project including, if relevant, commissioning and post-project evaluation.

- Where possible, provide a timeline by phase (e.g., pre-planning, planning/design, construction/implementation, commissioning/start-up, etc.).

8. Indicate the estimated total project cost (capital, labor, overhead, profit) using approved methods. If project is divided into multiple phases/tranches, specify this.

- Do not include operations and maintenance costs (O & M).

9. Specify the total amount of project funding in place by source.

10. Specify the total amount of funding needed to enable project implementation.

11. The Colorado Resiliency Framework identifies six resiliency sectors. Indicate which is the primary resiliency sector impacted by the project. Provide a narrative that describes the impacts of the project on that sector.

- Where possible, provide detailed description or quantification of the anticipated benefits and the timeframe in which these benefits will occur.

Indicate all other resiliency sectors impacted by the project. Provide a narrative that describes the impacts of the project on each sector that experiences co-benefits.

- Where possible, provide detailed description or quantification of the anticipated benefits and the timeframe in which these benefits will occur.

12. Describe how the project will impact the region.

- Specify whether or not benefits will accrue to adjacent or nearby communities due to project implementation (for example flood mitigation that benefits downstream communities)
- Specify if and how regional resources have been considered in the design of the project.
- Describe how knowledge generated through the project's implementation will be shared.

13. Provide a narrative summarizing the anticipated benefits and costs of the project. Where possible, provide quantitative estimates of the benefits and the costs broken down by cost category. Quantitative estimates should be made using an accepted, cited methodology. Non-market valuation is acceptable for valuing market externalities (e.g. health and environmental impacts).

14. Indicate whether or not the project will impact vulnerable communities, which vulnerable communities, and describe the nature and extent of the impact.

15. Describe the impact of the project on hazards and vulnerabilities affecting the community. Describe in detail the hazards and/or vulnerabilities that the project will mitigate, the extent of mitigation, and the means by which mitigation will occur.

- Provide evidence to support the hazard and vulnerability narrative by explicitly referencing FEMA Flood Insurance Rate Maps, Hazard Mitigation Plans, Watershed Master Plans, Geotechnical Risk Assessments, Climate Risk Assessments, and other studies and plans.
- For projects that aim to mitigate site-specific flood risks, specify the approved tool (e.g. HEC RAS) that will be used to demonstrate risk reduction.
- For transportation projects, confirm whether or not the Colorado Department of Transportation's Risk and Resiliency Analysis process has been or will be followed.

If the project is identified in a FEMA-approved multi-hazard mitigation plan, provide an appropriate reference.

Specify whether or not the project will NFIP CRS scores.

Define whether or not future response or recovery costs will be avoided.

- Support the statement with evidence such as previous repetitive losses that will be addressed.

16. Provide a narrative describing if and how the project will employ technical practices or criteria that go beyond regulatory compliance. It is assumed that all proposed projects will comply with applicable codes and regulations.

- Summarize key design criteria that demonstrate the use of best-practice performance standards.
- Explain how the use of these standards will contribute to resilience.
- Provide case studies or references demonstrating that the proposed approach has been employed successfully elsewhere or is advocated for by recognized authorities within the field.
- Are major one-time or recurring maintenance needs anticipated (replacing motors, painting, regular inspection, etc.)? If so, describe.
- Identify who will be responsible for undertaking/bearing the costs of these O & M requirements.

17. Provide a narrative describing the project's adaptive management strategy.

- Describe any efforts that will be taken to do post-project monitoring and evaluation (M & E).
- Identify who will be responsible for adapting project or management based on post-project lessons learned.
- For infrastructure projects, define whether the system/project is modular/scalable to adapt to demand and whether or not it can be recycled/repurposed.
- Describe alternative design approaches and how proposed design is adaptive with comparison to standard practice.

18. Provide a narrative describing how the project aligns with other planned or recommended activity.

- Make reference to any plans or other resources that support the project's alignment with community goals and initiatives.
- Specify whether the project is recommended in other planning resources.
- Explain if and how the project's implementation will harmonize with other efforts to minimize disruption to business/daily life and make efficient use of public resources (e.g. through blocking off roads/excavating at same time as other planned work).
- Describe whether or not the project's implementation is seasonally-dependent (e.g. due to low-flow periods in a river, snow cover/weather, etc.). Explain how this has been considered in the project timeline.

19. Describe how the project addresses climate change impacts.

- Make reference to reports and assessments developed for Colorado and other western states.

20. Provide a narrative describing if and how the project can be considered innovative.

- The narrative should reference standard practice in Colorado to make the case that the project is making a novel contribution and/or going beyond business-as-usual.

Appendix E
Resources

Government Agencies

Government agencies can provide funding, research, and support for resilience planning. Serving as the administrative authorities of disaster preparedness, mitigation, response and recovery operations, they also provide an understanding of policies that dictate current resilience planning.

Federal Agencies

- **Federal Emergency Management Agency (FEMA).** FEMA supports residents to prepare for, protect against, respond to, recover from, and mitigate all hazards. Further information on FEMA can be found at: http://www.fema.gov/
- **National Oceanic and Atmospheric Administration (NOAA).** NOAA studies climate trends, and projects potential future impacts. Further information on NOAA can be found at: http://oceanservice.noaa.gov/
- **National Renewable Energy Laboratory (NREL).** Located in Golden, CO, NREL researches innovating energy solutions. Further information on NREL can be found at: http://www.nrel.gov/
- **U.S. Army Corps of Engineers.** The United States Army Corps of Engineers is working to build resilience in their infrastructure to better serve and support the Nation. Further information on the U.S. Army Corps of Engineers and its resiliency programs can be found at: http://www.usace.army.mil/Missions/Sustainability/BuildingClimateResilience.aspx
- **U.S. Department of Housing and Urban Development (HUD).** The administrator of the National Disaster Resilience Competition (NDRC), HUD seeks to help communities produce more resilient systems. Further information on HUD and its resiliency programs can be found at: http://portal.hud.gov/hudportal/HUD, further information on NDRC can be found at: https://www.hudexchange.info/programs/cdbg-dr/resilient-recovery/
- **U.S. Environmental Protection Agency (EPA).** The EPA works closely with communities to reduce risks to health hand the environment due to natural disasters. Further information on the EPA can be found at: http://www3.epa.gov/, further information on EPA's emergency-specific tools can be found at: http://www2.epa.gov/learn-issues/emergencies-resources#natural-disasters

State Agencies

- **Colorado Department of Local Affairs (DOLA).** DOLA administers HUD funds and assists communities in disaster recovery and resilience efforts. Further information on DOLA and its resilience programs can be found at: https://www.colorado.gov/dola
- **Colorado Department of Public Health & Environment (CDPHE).** CDPHE provides vital services to preparedness, response, and recovery functions. Further information on CDPHE can be found at: https://www.colorado.gov/pacific/cdphe
- **Colorado Department of Transportation (CDOT).** CDOT ensures that Colorado has a safe and efficient highway system. Further information on CDOT can be found at: https://www.codot.gov/
- **Colorado Division of Homeland Security & Emergency Management (DHSEM).** The Division is responsible for comprehensive emergency planning within the state. Further information on DHSEM can be found at: http://dhsem.state.co.us/emergency-management/emergency-management

- **Colorado Legislative Council Committee on Emergency Preparedness, Response, and Recovery.** The Committee provides research to state legislative bodies on issues pertaining to emergency activities. Further information on the Committee can be found at: https://www.colorado.gov/pacific/cga-legislativecouncil/legislative-emergency-preparedness-response-and-recovery-committee
- **Colorado Resilience and Recovery Office (CRRO).** CRRO works closely with communities to develop and coordinate resilience plans. Further information on CRRO can be found at: https://sites.google.com/a/state.co.us/coloradounited/
- **Colorado Water Conservation Board.** The Water Conservation Board addresses water supply concerns, and addresses potential impacts of climate change and watershed restoration. Further information on the Water Conservation Board can be found at: http://cwcb.state.co.us/Pages/CWCBHome.aspx

Local Agencies

- **Fort Collins Office of Emergency Management (OEM).** Fort Collins OEM provides disaster planning and mitigation, as well as planning programs. Further information on Fort Collins OEM can be found at: http://www.poudre-fire.org/emergency-preparedness
- **Larimer County Community Development Division.** The Community Development Division is responsible for business development, community involvement and coordination of transportation planning. Further information on the Division can be found at: http://www.larimer.org/planning/
- **Larimer County Department of Health and Environment.** The department provides health education, and advocates for community-based services. Further information on the department can be found at: http://www.larimer.org/health/
- **Larimer County Department of Human Services (DHS).** DHS assists individuals to achieve self-sufficiency and social well-being. Further information on DHS can be found at: http://www.larimer.org/humanservices/
- **Loveland Office of Emergency Management (OEM).** Loveland OEM coordinates activities to mitigate against, prepare for, respond to, and recover from disasters. Further information on Loveland OEM can be found at: http://www.cityofloveland.org/index.aspx?page=762

Other Organizations

Foundations, academic institutions, and service providers can help bring resources toward resiliency programs. Both locally, and nationally, the following organizations offer potential assistance with future planning.

Foundations and Academic Institutions

- **Estes Park Economic Development Corporation (EDC).** EDC advises and assists local businesses, and attracts new businesses to come to Larimer County. Further information on EDC can be found at: http://estesparkedc.com/
- **Rockefeller Foundation**. The Rockefeller Foundation has played a leading national and international role in the promotion of local resiliency planning and implementation, through programs such as 100 Resilient Cities, the Global Resilience Partnership, and extensive assistance to the HUD Rebuild by Design competition and the National Disaster Resilience Competition (NDRC). Further information on the Rockefeller foundation and its resiliency programs and initiatives can be found at: https://www.rockefellerfoundation.org/our-work/topics/resilience/
- **Colorado Climate Network (CCN):** CCN has played a leading role in the Colorado Local Resilience Project. Further information on CCN can be found at: http://www.coclimatenetwork.org/resilience2.htm

- **Office of Engagement at Colorado State University.** The Office of Engagement supports the community through outreach and volunteering. Further information on the Office of Engagement can be found at: http://outreach.colostate.edu/index.html
- **Center for Disaster and Risk Analysis (CDRA) at Colorado State University:** CDRA reduces the harm and losses caused by disaster through research of risks and impacts. Further information on CDRA and its research can be found at: http://disaster.colostate.edu/about-cdra.aspx
- **Big Thompson River Coalition (BTRRC).** BTRRC works to restore and maintain the resilience and ecological health of the Big Thompson River for the benefit of economic, agricultural, private lands, recreation, and water resources. Further information on BTRRC can be found at: http://www.bigthompson.co/
- **Little Thompson Watershed Restoration Coalition (LWTRC).** Following disastrous floods in 2013, the LWTRC formed to restore and maintain the resiliency, ecological integrity and agricultural heritage of the Little Thompson River watershed. Further information on LWTRC can be found at: http://www.ltwrc.org/

Service Providers

- **American Red Cross.** The American Red Cross prevents and alleviates the impacts of emergencies by mobilizing volunteers and funds. Further information on the American Red Cross can be found at: http://www.redcross.org/
- **Colorado Municipal League (CML)**. CML provides nonpartisan services and resources to assist municipal officials in managing their governments. Further information on CML can be found at: http://www.cml.org/
- **Estes Park Housing Authority**. The housing authority provides housing options to low-moderate income households within Estes Park. Further information on the housing authority can be found at: https://www.colorado.gov/esteshousing
- **Fort Collins Habitat for Humanity.** Habitat for Humanity seeks to construct, rehabilitate, and preserve homes. Further information on Habitat for Humanity can be found at: http://www.fortcollinshabitat.org/
- **Fort Collins Housing Authority (FCHA).** FCHA provides affordable housing and supportive services to the City of Fort Collins and manages programs for Larimer County, and Wellington. Further information on FCHA can be found at: http://fchousing.com/
- **House of Neighborly Services (HNS).** HNS provides assistance to low-income individuals and families. Further information on HNS can be found at: http://honservice.org/
- **Larimer Small Business Development Center (SBDC).** SBDC provides workshops to help small businesses improve their reach. Further information on SBDC can be found at: http://www.larimersbdc.org/
- **Loveland Housing Authority (LHA).** LHA provides affordable housing options to low income individuals within Loveland. Further information on LHA can be found at: http://lovelandhousing.org/
- **United Way of Larimer County.** United Way seeks to achieve long-term, lasting solutions within the community. Further information on United Way of Larimer County can be found at: http://uwaylc.org/

Publications

- **Achieving Disaster Resilience in U.S. Communities.** Executive, Congressional, and private-sector publication to address resilience strategies. Read full text at: http://csis.org/files/publication/141016_Kostro_DisasterResilience_Web.pdf
- **Colorado Resiliency Framework (CRF).** CRF has been adopted by the state, and represents the state's long-term investment and commitment to a more resilient future. Read full text at: https://sites.google.com/a/state.co.us/coloradounited/resiliency-framework

- **Enhancing the Climate Resilience of America's Natural Resources.** Produced by the Council on Climate Preparedness and Resilience, agenda identifies strategies to make natural resources more resilient. Read full text at: https://www.whitehouse.gov/sites/default/files/docs/enhancing_climate_resilience_of_americas_natural_resources.pdf
- **Incorporating Disaster Resilience into Disaster Recovery.** Produced by the Natural Hazards Center, publication proposes more well-rounded recovery efforts. Read full text at: http://www.colorado.edu/hazards/publications/holistic/ch8_disaster_resilience.pdf
- **Moving Towards Sustainable and Resilient Smart Water Grids.** A concept paper that identifies weaknesses in current urban water systems, and provides resiliency solutions to these problems. Read full text at: http://repository.asu.edu/items/15928
- **Planning Fire-Resilient Counties in the Wildland-Urban Interface.** Produced by the National Association of Counties, this document provides case studies to guide future resilience from wildfires. Read full text at: http://www.naco.org/sites/default/files/documents/GuidetoWildfireRiskandMitigation-NACo2010%20(2).pdf

Relevant Laws

- **Executive Order 13514- Federal Leadership in Environmental, Energy and Economic Performance.** EO 13514 establishes the Task Force on Climate Preparedness and Resilience, and, makes reduction of greenhouse gas emissions a priority for Federal agencies. Read full order at: http://www.gpo.gov/fdsys/pkg/FR-2009-10-08/pdf/E9-24518.pdf. Further information on the Task Force can be found at: https://www.whitehouse.gov/administration/eop/ceq/initiatives/resilience/taskforce
- **Executive Order 13653- Preparing the United States for the Impacts of Climate Change.** EO 13653 establishes actions to enhance climate preparedness and resilience. Read full order at: https://sftool.gov/learn/annotation/427/executive-order-13653-preparing-united-states-impacts-climate-change#note_119_2
- **Executive Order 13677- Climate-Resilient International Development.** EO 13677 is intended to improve resilience considerations within the Federal Government's international development programs. Read full order at: https://www.whitehouse.gov/the-press-office/2014/09/23/executive-order-climate-resilient-international-development

Appendix F
Strategies and Project Matrix

Sector	Priority Resiliency Projects				
	Larimer Connects-Community Conversations	Mobile Resource Van	Regional Affordable Housing and Transportation Assessment and Strategy	Northern Colorado Community Connectivity Project	Resilient Natural and Built Infrastructure
Community					
C1. Shift cultural norms toward increased social and physical connection, interdependence, and risk awareness and preparedness.	●	●			
C2. Create innovative development that integrates housing, transportation, and employment to create a diversity of options.			●		
C3. Scale emergency management both up and down to integrate responses from the individual, household, community, municipal, county, and regional level.	●				
C4. Provide more support to formal and informal community leaders (e.g., emergency services, fire departments, faith-based organizations).	●				
C5. Continue work toward the development of an integrated multi-jurisdictional emergency management program and Emergency Operations Center to respond to and recover from large-scale emergencies and disasters					
C6. Develop a county master plan tailored around community needs that proactively places development where the community desires it and limits development in high-risk, hazardous areas.			●		
C7. Incentivize sustainable development.			●		
C8. Strengthen and maintain relationships among multi-sector teams.					
Economic					
E1. Diversify the economy beyond a few large employers such as the university and government.					

Sector	Priority Resiliency Projects				
	Larimer Connects-Community Conversations	Mobile Resource Van	Regional Affordable Housing and Transportation Assessment and Strategy	Northern Colorado Community Connectivity Project	Resilient Natural and Built Infrastructure
E2. Develop alternative career paths that build on different work and education experiences, and the policy initiatives to support them. Change cultural perceptions around jobs, debt, and the idea that "good" jobs require a college education.					
E3. Foster development of communities with a work, life, and play balance for a variety of economic classes.					
E4. Foster communication and collaboration between groups already focused on economic issues in the county.					
E5. Promote local production and storage of energy to enhance source diversity, create jobs, increase energy redundancy and modularity, and protect against the potential economic impacts of grid failure.					
E6. Improve economic stability of vulnerable populations.				●	●
Health and Social					
HS1. Increase individual and community preparedness by enhancing training and education opportunities for emergency preparedness and resilience education, identifying vulnerable populations, empowering local leaders, and promoting resiliency conversations with the public.	●	●			
HS2. Achieve equitable distribution of social service facilities and resources around the county to maximize redundancy and decentralization and to develop sustainable social safety nets.		●		●	
HS3. Develop an understanding of how small plans and organizations fit into emergency master planning at the municipal and county level.					
HS4. Ensure Larimer County residents have access to healthcare and mental health services.		●		●	
HS5. Foster collaborative planning across agencies and sectors, including understanding how small organizations and plans fit into emergency master planning at the municipal and county level.		●			
HS6. Incentivize connection to basic health and social services through outreach.		●			
Housing					
H1. Integrate region wide and community level housing strategies into long-range, comprehensive planning, including encouraging housing development out of high hazard zones			●		

Sector	Priority Resiliency Projects				
	Larimer Connects-Community Conversations	Mobile Resource Van	Regional Affordable Housing and Transportation Assessment and Strategy	Northern Colorado Community Connectivity Project	Resilient Natural and Built Infrastructure
H2. Increase transitional housing available for different populations and needs.			●		
H3. Educate new homeowners, particularly in rural or remote areas, about location-specific risks and preparedness best practices.	●	●			
H4. Develop the services and policies needed to support diverse options for our aging population.			●		
H5. Diversify housing options by reviewing and changing codes and scaling the development fee system to allow co-housing, smaller green-spaces, mixed housing, and other new, innovative housing options.			●		
Infrastructure					
I1. Develop emergency action plans for infrastructure failure, including security procedures/systems for critical infrastructure.					●
I2. Utilize technology/innovation in infrastructure projects to increase robustness, modularity, and diversity.			●	●	●
I3. Develop a clear hierarchy of needs in infrastructure repair/upgrade/installation.			●		
I4. Decrease risk in hazardous areas through land-use planning.			●	●	●
I5. Identify and address key system vulnerabilities.			●		●
I6. Incentivize backup systems that support sheltering in place.					
I7. Educate the public proactively before disaster about potential infrastructure response and implications.	●	●	●		●
Watersheds & Natural Resources					
W1. “Design with nature”, incorporating natural processes such as flood, fire, and drought into land use planning and project design, while balancing inherent and acceptable levels of risk.			●	●	●
W2. Update floodplain maps and integrate these maps into zoning and planning			●		●

Sector	Priority Resiliency Projects				
	Larimer Connects-Community Conversations	Mobile Resource Van	Regional Affordable Housing and Transportation Assessment and Strategy	Northern Colorado Community Connectivity Project	Resilient Natural and Built Infrastructure
W3. Build relationships and increase collaboration across jurisdictions for watershed and natural resource planning and management.				●	●
W4. Develop better flood warning systems, including applications of strategically placed real-time rain and stream gauge monitoring systems.					
W5. Collaborate and support integrated multi-jurisdictional forest management to include a multi-pronged approach, including reduced fuel loads, natural fire breaks, soil mitigation, zoning, etc. to achieve improved forest health					●
W6. Increase public education around natural resource interactions and hazard mitigation.	●	●			●

SECTOR	Sustainable/Solar Tour of Homes	Regional Governance Project	Re-educating the Businesses and Workforce of Tomorrow	Complete the North Front Range Workforce Development Plan	Know Your Housing Rights	Regional Economic Development Plan	Building Out Economic Sector Partnerships	Disaster Response Bike Competition	Front-Range Food System Study	Emergency Action Plans for Dams	Critical Infrastructure Choke Point Identification	Affordable Housing Through Use of High Rises in Designated Areas	Increase Frequency of Community Emergency Response Team Training	Landowner Watershed Restoration Support	Connecting Wildfire Restoration/ Mitigation to Energy Development	The Poudre Runs Through It	Innovative Land-Use Planning	Address vulnerabilities across the integrated water production/ distribution system	Resilient Power for Critical Facilities	Community Access Improvement	Competitive Broadband	US34 Permanent Repairs between Estes Park and Loveland	Little Thompson and Big Thompson Floodplain Rehabilitation	Net Zero Energy Housing Program
Community																								
C1. Shift cultural norms toward increased social and physical connection, interdependence, and risk awareness and preparedness.	●	●	●					●	●				●				●		●					●
C2. Create innovative development that integrates housing, transportation, and employment to create a diversity of options.		●						●	●								●		●					●
C3. Scale emergency management both up and down to integrate responses from the individual, household, community, municipal, county, and regional level.		●						●		●	●		●				●		●					●
C4. Provide more support to formal and informal community leaders (e.g., emergency services, fire departments, faith-based organizations).		●	●					●	●	●	●		●				●							●
C5. Continue work toward the development of an integrated multi-jurisdictional emergency management program and Emergency Operations Center to respond to and recover from large-scale emergencies and disasters		●								●	●		●				●							
C6. Develop a county master plan tailored around community needs that proactively places development where the community desires it and limits development in high-risk, hazardous areas.		●								●	●						●							
C7. Incentivize sustainable development.		●							●								●							●
C8. Strengthen and maintain relationships among multi-sector teams.		●	●					●	●	●	●		●				●							●
Economic																								
E1. Diversify the economy beyond a few large employers such as the university and government.	●		●	●		●	●										●			●	●	●		
E2. Develop alternative career paths that build on different work and education experiences, and the policy initiatives to support them. Change cultural perceptions around jobs, debt, and the idea that "good" jobs require a college education.			●	●		●	●																	
E3. Foster development of communities with a work, life, and play balance for a variety of economic classes.		●	●	●		●	●		●			●			●			●		●	●	●		
E4. Foster communication and collaboration between groups already focused on economic issues in the county.		●	●	●		●	●		●			●					●	●		●	●			
E5. Promote local production and storage of energy to enhance source diversity, create jobs, increase energy redundancy and modularity, and protect against the potential economic impacts of grid failure.	●	●				●	●								●		●	●						
E6. Improve economic stability of vulnerable populations.	●		●	●		●	●		●			●			●		●	●		●	●	●		

SECTOR	Sustainable/Solar Tour of Homes	Regional Governance Project	Re-educating the Businesses and Workforce of Tomorrow	Complete the North Front Range Workforce Development Plan	Know Your Housing Rights	Regional Economic Development Plan	Building Out Economic Sector Partnerships	Disaster Response Bike Competition	Front-Range Food System Study	Emergency Action Plans for Dams	Critical Infrastructure Choke Point Identification	Affordable Housing Through Use of High Rises in Designated Areas	Increase Frequency of Community Emergency Response Team Training	Landowner Watershed Restoration Support	Connecting Wildfire Restoration/ Mitigation to Energy Development	The Poudre Runs Through It	Innovative Land-Use Planning	Address vulnerabilities across the integrated water production/ distribution system	Resilient Power for Critical Facilities	Community Access Improvement	Competitive Broadband	US34 Permanent Repairs between Estes Park and Loveland	Little Thompson and Big Thompson Floodplain Rehabilitation	Net Zero Energy Housing Program
Health and Social																								
HS1. Increase individual and community preparedness by enhancing training and education opportunities for emergency preparedness and resilience education, identifying vulnerable populations, empowering local leaders, and promoting resiliency conversations with the public.					●				●										●					
HS2. Achieve equitable distribution of social service facilities and resources around the county to maximize redundancy and decentralization and to develop sustainable social safety nets.		●			●				●										●					
HS3. Develop an understanding of how small plans and organizations fit into emergency master planning at the municipal and county level.		●	●						●															
HS4. Ensure Larimer County residents have access to healthcare and mental health services.									●									●	●					
HS5. Foster collaborative planning across agencies and sectors, including understanding how small organizations and plans fit into emergency master planning at the municipal and county level.		●							●									●	●					
HS6. Incentivize connection to basic health and social services through outreach.					●				●									●	●					
Housing																								
H1. Integrate region wide and community level housing strategies into long-range, comprehensive planning, including encouraging housing development out of high hazard zones		●										●		●										●
H2. Increase transitional housing available for different populations and needs.																								
H3. Educate new homeowners, particularly in rural or remote areas, about location-specific risks and preparedness best practices.	●				●									●										●
H4. Develop the services and policies needed to support diverse options for our aging population.		●										●												●
H5. Diversify housing options by reviewing and changing codes and scaling the development fee system to allow co-housing, smaller green-spaces, mixed housing, and other new, innovative housing options.	●											●		●										●
Infrastructure																								
I1. Develop emergency action plans for infrastructure failure, including security procedures/systems for critical infrastructure.										●	●							●	●	●				●
I2. Utilize technology/innovation in infrastructure projects to increase robustness, modularity, and diversity.											●	●							●		●		●	●

SECTOR	Sustainable/Solar Tour of Homes	Regional Governance Project	Re-educating the Businesses and Workforce of Tomorrow	Complete the North Front Range Workforce Development Plan	Know Your Housing Rights	Regional Economic Development Plan	Building Out Economic Sector Partnerships	Disaster Response Bike Competition	Front-Range Food System Study	Emergency Action Plans for Dams	Critical Infrastructure Choke Point Identification	Affordable Housing Through Use of High Rises in Designated Areas	Increase Frequency of Community Emergency Response Team Training	Landowner Watershed Restoration Support	Connecting Wildfire Restoration/ Mitigation to Energy Development	The Poudre Runs Through It	Innovative Land-Use Planning	Address vulnerabilities across the integrated water production/ distribution system	Resilient Power for Critical Facilities	Community Access Improvement	Competitive Broadband	US34 Permanent Repairs between Estes Park and Loveland	Little Thompson and Big Thompson Floodplain Rehabilitation	Net Zero Energy Housing Program
I3. Develop a clear hierarchy of needs in infrastructure repair/upgrade/installation.										●	●									●		●	●	
I4. Decrease risk in hazardous areas through land-use planning.										●		●								●		●	●	●
I5. Identify and address key system vulnerabilities.		●								●	●							●	●	●	●	●	●	●
I6. Incentivize backup systems that support sheltering in place.		●								●	●							●	●					●
I7. Educate the public proactively before disaster about potential infrastructure response and implications.										●		●									●		●	●
Watersheds and Natural Resources																								
W1. "Design with nature", incorporating natural processes such as flood, fire, and drought into land use planning and project design, while balancing inherent and acceptable levels of risk.														●	●	●							●	
W2. Update floodplain maps and integrate these maps into zoning and planning																●								
W3. Build relationships and increase collaboration across jurisdictions for watershed and natural resource planning and management.		●												●	●	●							●	
W4. Develop better flood warning systems, including applications of strategically placed real-time rain and stream gauge monitoring systems.		●																						
W5. Collaborate and support integrated multi-jurisdictional forest management to include a multi-pronged approach, including reduced fuel loads, natural fire breaks, soil mitigation, zoning, etc. to achieve improved forest health		●													●	●								
W6. Increase public education around natural resource interactions and hazard mitigation.														●		●							●	

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