



# *Building A Statewide Resiliency System*

*An Overview of Colorado's Resiliency Efforts*

Together. A stronger Colorado.



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**Resiliency & Recovery Office**

Governor John W. Hickenlooper



# *Colorado Resiliency & Recovery Office*

*Who Are We?*



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# *What is Resiliency?*

*The ability of communities to rebound and positively adapt to or thrive amidst changing conditions or challenges -- including disasters and changes in climate -- and maintain quality of life, healthy growth, economic vitality, durable systems and conservation of resources for present and future generations.*

*- Colorado Resiliency Working Group*



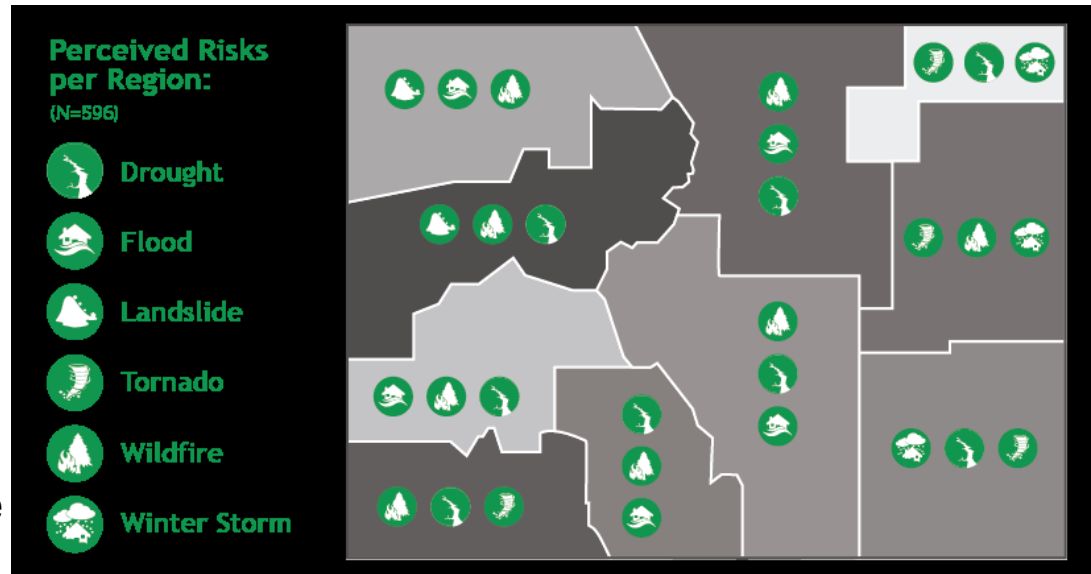
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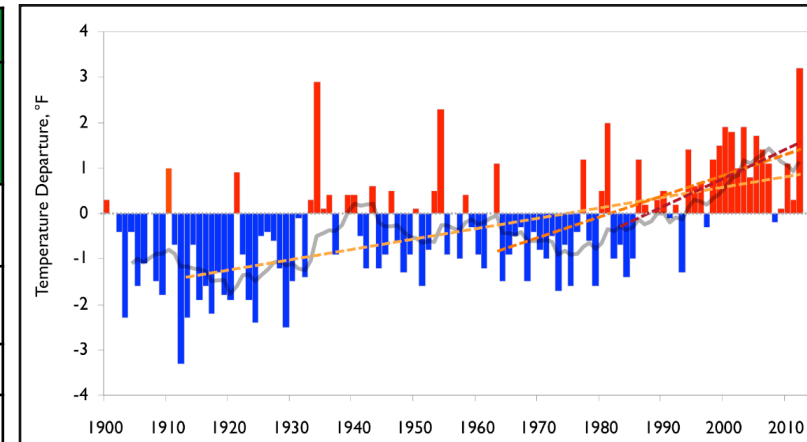
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# Why Prioritize Resiliency?

- History tells us Colorado is not immune to disasters
- Conditions are changing
- Population is growing
- We have a unique way of life we want to preserve and enhance



Population Current and Projected –Statewide and Select Counties				
Jurisdiction	2010 Census	Estimated 2013	Estimated 2020	Estimated 2040
State of Colorado	5,029,196	5,264,890	5,924,692	7,752,887
City and County of Denver	604,879	648,978	734,079	867,545
Boulder County	294,567	309,874	335,076	396,163
Larimer County	299,630	315,728	356,900	471,612
El Paso County	622,263	655,812	728,610	955,871



\*Source: Colorado Department of Local Affairs Demography Office

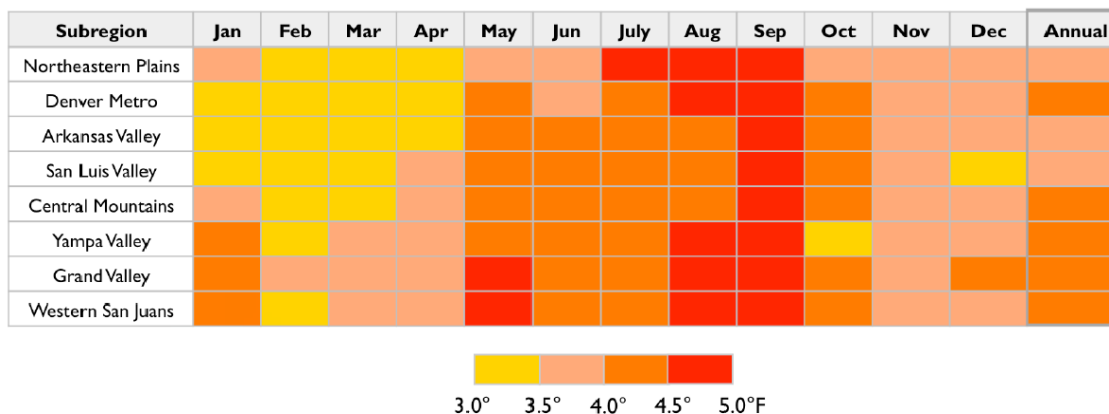
# Colorado Disaster History

Disaster	Communities Impacted	Disaster Impacts
1965 Floods	Colorado Front Range (South Platte and Arkansas basins)	21 lives lost; \$540M damages (1965 \$\$); resulted in construction of Chatfield and Bear Creek reservoirs
Big Thompson Flood (1976)	Primarily Larimer County between Estes Park and Loveland	8 inches of rain in a one hour period; 145 lives lost; 418 houses destroyed
2002 Drought and Wildfires	Statewide. Major fires included Hayman, Coal Seam, Missionary Ridge and others	Hayman fire burned 137k acres; Missionary Ridge 70k acres
2012-2013 Fires	Statewide. Large fires in Larimer, El Paso, Fremont counties and the San Luis Valley	More than 1100 homes destroyed, \$1.2B in insurance claims
2013 Floods	24 counties impacted	10 lives lost; 1800 homes destroyed, \$3.9B in damages

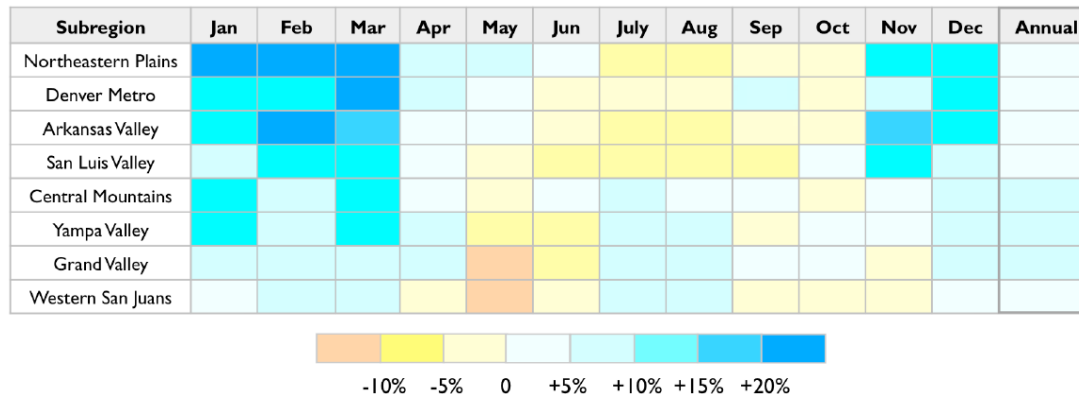
# Changing Climate Conditions and Resiliency

- All models show that on average, Colorado will be warmer by + 2.5 °F to + 6.5 °F by 2050
- Extreme heat events may become more frequent
- Models show increase in winter precipitation, but shift to earlier runoff; Overall precipitation models unclear
- Colorado's climate is already variable and extreme events are possible
- Need to plan for both intense drought and extreme precipitation scenarios

**Projected Monthly Temperature Change for Eight Subregions  
Under RCP 4.5 for 2035-2064**



**Projected Monthly Precipitation Change for Eight Subregions  
Under RCP 4.5 for 2035-2064**





# Colorado Resiliency Framework

- Result of 2-year partnership across state, federal government and local government and non-governmental organizations
- Governor adopted the Colorado Resiliency Framework on May 28th
- Establishes a vision and definition of resilience for the State of Colorado
- Seeks to empower a culture of resilience in Colorado communities
- Identifies guiding principles
- Outlines specific strategies across sectors that the State commits to implement



# Resiliency Sectors and Partners



**COLORADO**  
Department of Transportation  
Region 4



**COLORADO**  
Department of Local Affairs



**FEMA**



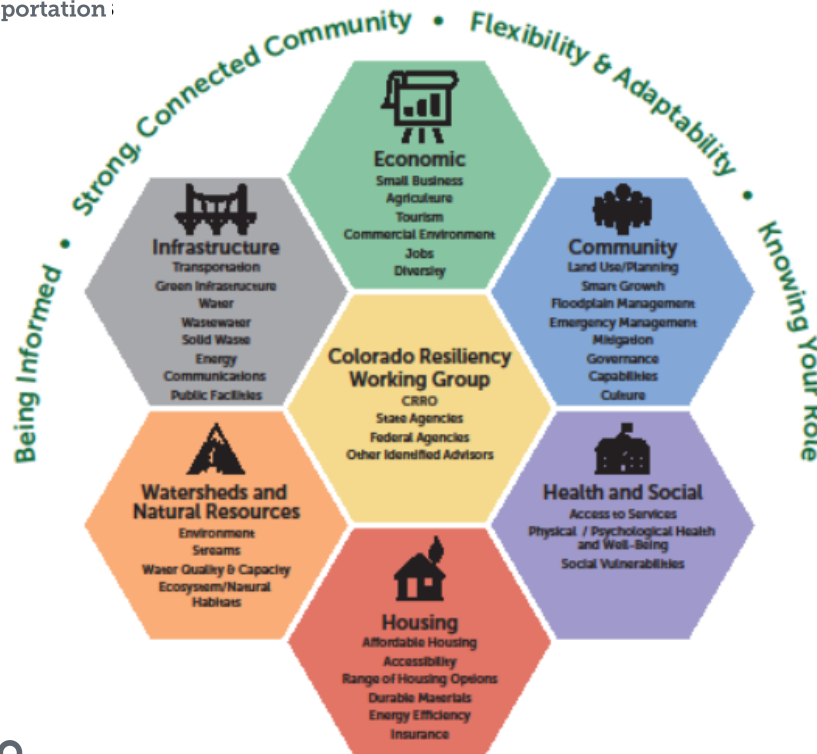
**EDA**  
U.S. ECONOMIC DEVELOPMENT ADMINISTRATION



**COLORADO**  
Division of Homeland Security  
& Emergency Management  
Department of Public Safety



**COLORADO**  
Office of Economic Development  
& International Trade



NATIONAL RENEWABLE ENERGY LABORATORY



**COLORADO**  
Department of Natural Resources



**COLORADO**  
Department of Human Services



**COLORADO**  
Energy Office



U.S. Department of Transportation  
Federal Highway Administration



**COLORADO**  
Department of Public  
Health & Environment



# *Shocks and Stresses*

**Vulnerability = Shocks + Stresses**

# Colorado Resiliency Framework - Example Sector Overview

## Shocks

- Damaged or destroyed homes
- Lack of short to mid-term housing
- Displacement

## Stresses

- Inadequate supply of affordable housing
- Housing design standards
- Land-use patterns

## Example Strategies

- Conduct an inventory of housing that is currently located in hazardous zones
- Develop a resiliency and housing codes toolkit
- Incorporate resiliency design requirements into all affordable housing projects that receive public funding



# Colorado Resiliency Framework - Example Sector Overview

## Shocks

- Damaged or destroyed infrastructure
- Inaccessible infrastructure

## Stresses

- Increased demand
- Long term wear and tear on infrastructure
- Changing climate conditions

## Example Strategies

- Evaluate infrastructure risks to determine comprehensive approach to hazards
- Create consistency and incorporate resiliency within design standards for use in all state-funded investments in infrastructure



# Colorado Resiliency Framework

## Call to Action

Expand Knowledge • Build Community • Be an Advocate • Provide Flexibility

### Actions

The State of Colorado will initiate the following in the first year:

Educate and Engage

Develop Risk and Vulnerability Assessment Tools

Advance Local Resiliency Strategies

Establish the Colorado Community Resiliency Partnership Fund

Create Mapping and Land Use Tools

Develop Statewide Resiliency Indicators

Prepare an Annual Operating Plan and Resiliency Report

Develop and Refine Resiliency Metrics

#### Resiliency Prioritization Criteria

State resiliency strategies and projects will be prioritized using the following criteria to ensure limited resources are leveraged for multiple, triple-bottom-line returns.

##### Co-Benefits

Address problems across multiple sectors to create maximum benefit.

##### High Risk and Vulnerability

Reduce risk to human well-being, physical infrastructure, and natural systems.

##### Economic Benefit-Cost:

Make good financial investments for both the investors and the broader community.

##### Social Equity

Include populations that are often most fragile and vulnerable to sudden impact.

##### Technical Soundness

Apply best practices that have been tested and proven to work in a similar regional context.

##### Innovation

Advance new approaches and techniques that maximize efforts and resources and serve as models for others in Colorado and beyond.

##### Adaptive Capacity

Consider future unknowns of changing climate, economic, and social conditions.

##### Harmonize with Existing Activity

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

##### Long-Term and Lasting Impact

Create solutions that are replicable and sustainable, creating benefit for present and future generations.

#### Community Actions

Actions that communities can take to expand the impact of the Framework include:

- Plan and coordinate regionally
- Dedicate staff to resiliency
- Engage leadership
- Develop local resiliency strategies
- Prioritize and implement projects
- Invest in resiliency
- Evaluate and update local land use practices and codes
- Educate and engage community organizations and members
- Establish new or support existing networks
- Establish peer to peer relationships



#### Looking Forward - A Resilient Colorado in 5 years

- Model projects are built and replicated by others.
- Resiliency is incorporated into local plans and resiliency officers are staff positions within local government.
- Long-term local and state budgets incorporate resiliency investments.
- Colorado Resiliency Partnership Fund is established and financing resiliency projects.
- Neighborhoods and networks utilize resiliency practices.
- Regional economic blueprints include a hazard and vulnerability assessment.
- Risk and vulnerability mapping, community inclusion mapping, and model land use codes are adopted and utilized by communities.
- Transportation and watersheds plan and design together, and repair jointly.
- Design and implementation of natural and built systems is integrated.
- Impacted residents and businesses are able to continue to live and operate in their communities after a disaster event.
- Colorado is a national model for statewide resiliency.



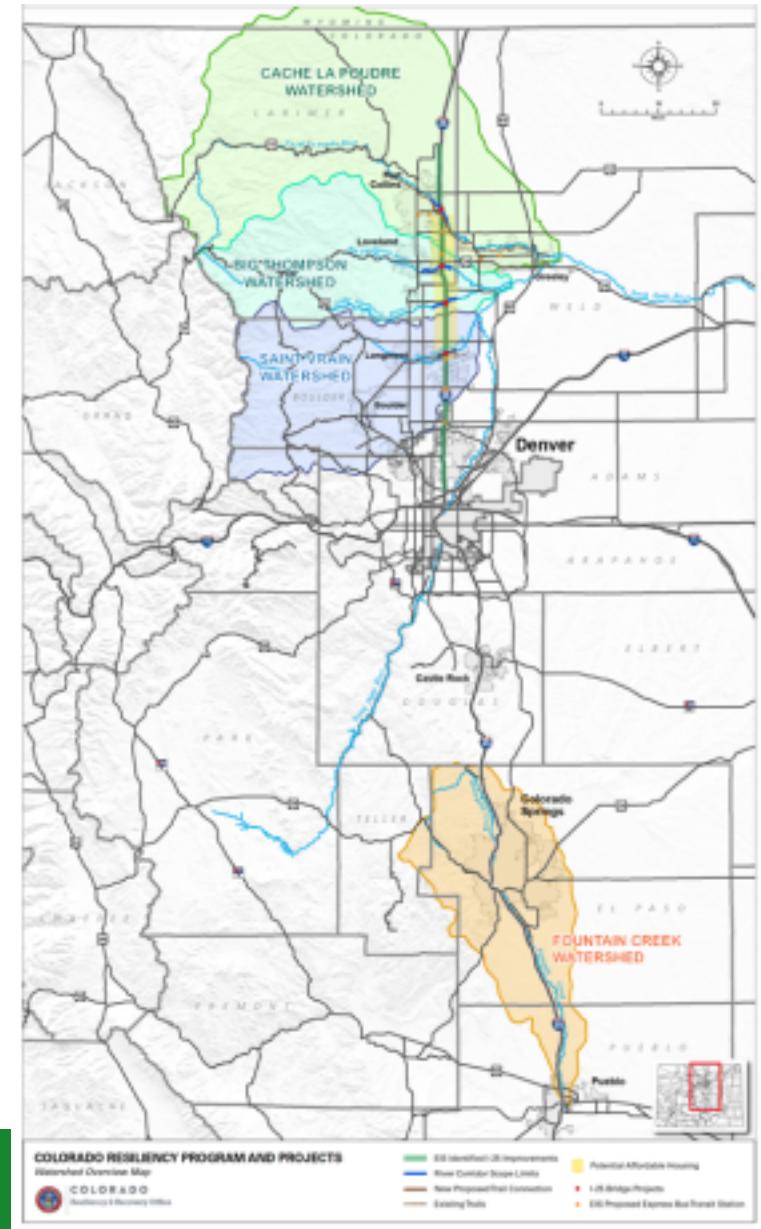
Photo credit:  
Denver Housing Authority



Photo credit:  
Colorado Department of Transportation

# Local Resiliency Strategy Plans

- Three pilot communities - Boulder, Larimer and El Paso Counties
- Evaluate existing conditions, shocks and stresses and identifies strategies
- Framework a model for local plans
- Each community – and accompanying priorities are different
- Local plans will be complete by January 2016

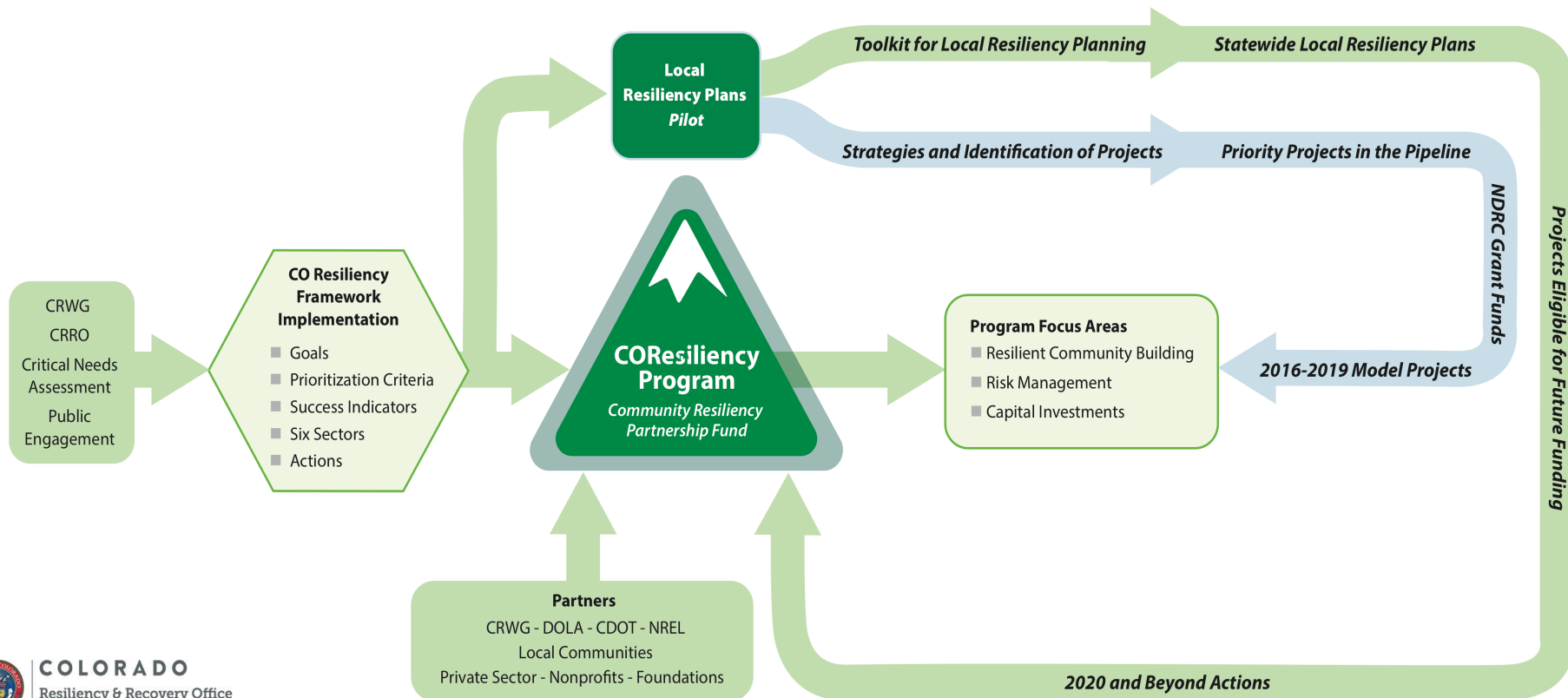




# COResiliency Program

## COResiliency

Expand Knowledge • Build Community • Be an Advocate • Provide Flexibility



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# COResiliency Program Areas

- **Resiliency Community Building**

- *Investing in and empowering Coloradans through grassroots engagement and education.*

- **Risk Management**

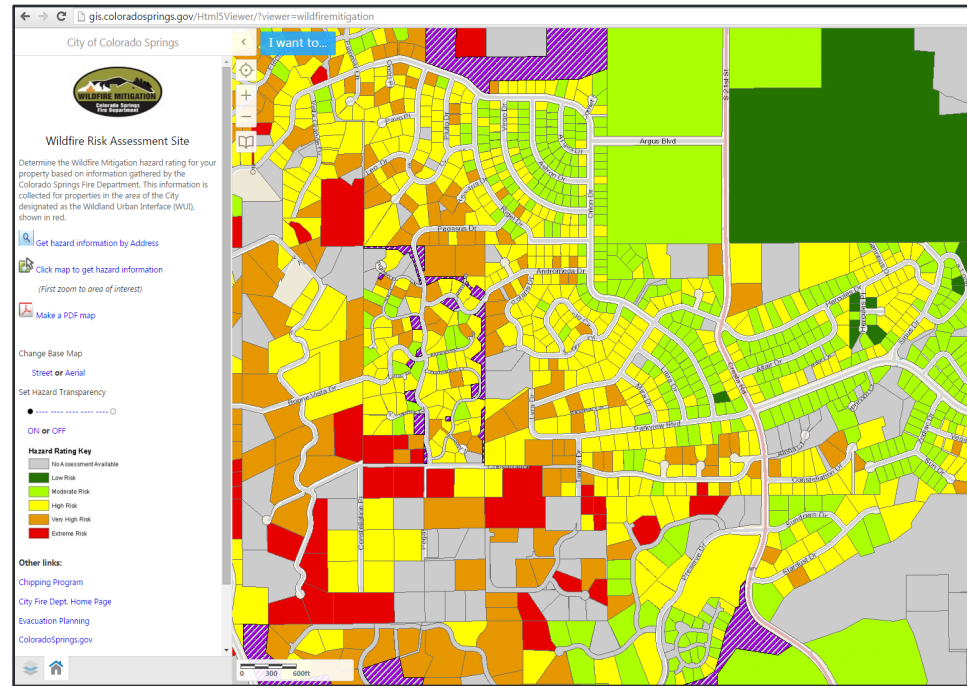
- *Interactive risk analysis, mapping and land use tools build resilience into the community development process at the local level.*

- **Capital Investments**

- *Fund innovative capital projects that address critical shocks and stresses, reduce risk, and build and enhance long-term regional resilience.*

# Risk Analysis Tool - Preliminary Vision

- Open source geospatial risk management interface
- Enable communities to evaluate growth pressures and climate risks
- Scenario planning to inform resiliency actions, including development decisions
- Layers could include:
  - *Existing development*
  - *Growth patterns*
  - *Hazards overlays*
  - *Land use regulations, codes and standards*
  - *Natural resources*
  - *Social vulnerability and socio-economic data*

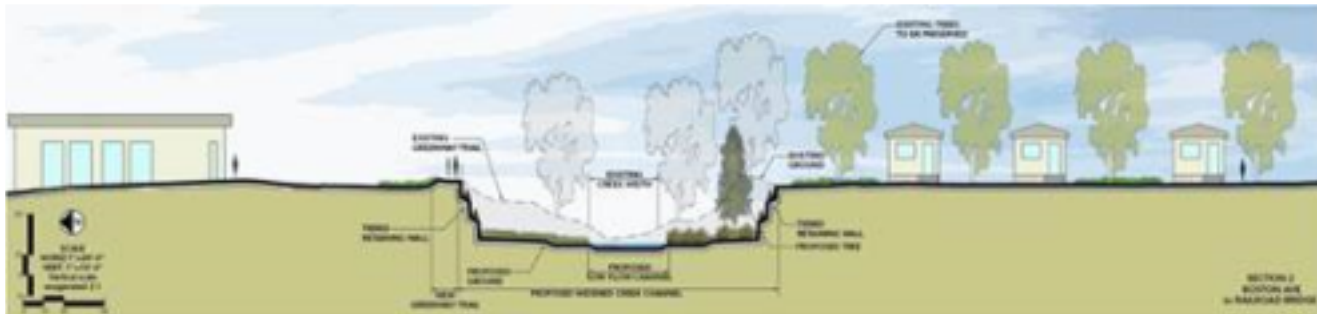


\*Colorado Springs Wildfire Risk Map

## Example Resiliency Projects

**Resilient St. Vrain (Boulder):** A watershed scale effort to protect more than 53,000 Coloradans' homes and businesses from flooding, cultivate harmony between the watershed and built environment, connect communities through the enhancement and extension of a regional greenway, and enhance Boulder County residents' relationship with the St. Vrain River through innovative education and engagement.

**Northern Colorado Connectivity Project (Larimer):** Spanning four watersheds, resiliency will be strengthened through innovative watershed restoration practices, protection of the region’s most critical and at-risk arterial transportation route, and the development of resilient affordable housing solutions within strategic locations in the transit corridor.





# *Colorado Community Resiliency Partnership Fund*

- Combination of grants and loans*

- Partnership with private sector*

- Possible Community Reinvestment Act interface*

- Creation of a statewide resource*



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# What's Next?

- Adoption of Framework formalized CRWG
- Currently developing Annual Operating Plan ~12 total projects across the 6 sectors
- Local Resiliency Toolkit - Capturing best practices, guidance on collaborative resiliency planning, project identification, benefit cost analysis; identifying measures of success

***In the past 3 years, we may have set the record for most disasters, and most destructive disasters. In the next 3 years, we will set the standard for risk reduction and setting communities up to thrive in the face of future threats.***



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