COMMUNITY RESILIENCE THROUGH LAND USE PLANNING

NWCCOG: Disaster Preparedness for Local Officials Workshop
December 7, 2018
OVERVIEW

- Investing in Resilience
  Rob Pressly, Colorado Dept. of Local Affairs - Colorado Resiliency Office

- Planning for Hazards: Land Use Solutions for Colorado
  Logan Sand, Colorado Dept. of Local Affairs - Community Development Office

- Q & A
Resiliency is 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.

— 2018 Update to the Colorado Disaster Emergency Act
WHAT IS A RESILIENT COMMUNITY?

- Makes proactive **policy** and **investment** decisions
- Transparent about **risk** and **vulnerability**
- Strengthens public-private partnerships
- Recovers rapidly after hazard (or other) events
WHY RESILIENCY: POPULATION SHIFTS
## Why Resiliency: Disasters

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

Colorado statewide annual temperatures have warmed by 2°F in past 30 years

Source: Western Water Assessment, updated from Lukas et al 2014
Since 2010, each of Colorado’s 64 counties has experienced drought impacts. The impacts of drought can be felt across a number of sectors, affecting agriculture, water supply, recreation, tourism, and wildfire protection. In 2012, CO’s agricultural sector lost $409 million in revenue due to drought. The 2014 Climate Change in Colorado report shows that increasing temperatures have worsened drought indicators in the past 30 years, and that projected warming will increase drought frequency and intensity. This map shows current drought conditions. With the following categories of drought severity: abnormally dry, moderate drought, severe drought, extreme drought, and exceptional drought.
As development encroaches on the Wildland Urban Interface, more communities, businesses, and homes will be at greater risk from wildfires, particularly as we experience an increasing frequency of increased fire weather conditions.

Wildfires can have broad-ranging impacts on communities, from disrupting local economies if business are closed our tourism and recreational opportunities are affect, to displacing residents who lost their homes, to leading to hazardous geologic conditions that are conducive to mudslides, flash floods, and soil erosion.
Changing Risk Profiles In Action

Half Of All Coloradans Now Live In Wildfire-Prone Areas As City Sprawl Grows

BY THE ASSOCIATED PRESS  NOV 26, 2018

SHARE THIS:

Facebook  Twitter  Reddit  Email  Print

Fire crews in the Silver Creek Fire from the Wyoming Interagency Hotshots work on nighttime operations on Aug. 15, 2018.

Department of Local Affairs
## 2018 Wildfire Season

<table>
<thead>
<tr>
<th># of Incidents</th>
<th>Fire Name</th>
<th>Total Acres</th>
<th>ESTIMATED Total Suppression Costs</th>
<th>ESTIMATED CO State Suppression Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stateline</td>
<td>28,105</td>
<td>$2,300,000</td>
<td>$175,000</td>
</tr>
<tr>
<td>2</td>
<td>MM 117</td>
<td>42,795</td>
<td>$900,000</td>
<td>$900,000</td>
</tr>
<tr>
<td>3</td>
<td>Badger Hole</td>
<td>50,671</td>
<td>$166,000</td>
<td>$133,000</td>
</tr>
<tr>
<td>4</td>
<td>Emery Gap</td>
<td>1,135</td>
<td>$700,000</td>
<td>$350,000</td>
</tr>
<tr>
<td>5</td>
<td>Upper Mailbox</td>
<td>474</td>
<td>$750,000</td>
<td>$150,000</td>
</tr>
<tr>
<td>6</td>
<td>Buffalo Mountain</td>
<td>91</td>
<td>$2,451,000</td>
<td>$200,000</td>
</tr>
<tr>
<td>7</td>
<td>Spring Creek</td>
<td>108,045</td>
<td>$31,980,000</td>
<td>$25,584,000</td>
</tr>
<tr>
<td>8</td>
<td>Chateau</td>
<td>1,423</td>
<td>$2,780,000</td>
<td>$2,780,000</td>
</tr>
<tr>
<td>9</td>
<td>Weston Pass</td>
<td>13,023</td>
<td>$9,650,000</td>
<td>$1,900,000</td>
</tr>
<tr>
<td>10</td>
<td>Lake Christine</td>
<td>12,588</td>
<td>$17,413,000</td>
<td>$3,776,000</td>
</tr>
<tr>
<td>11</td>
<td>Divide</td>
<td>19,955</td>
<td>$820,000</td>
<td>$570,000</td>
</tr>
<tr>
<td>12</td>
<td>2018 RBC Complex (Fawn, Smith, Sprague, Ridgetop, Winter)</td>
<td>1,438</td>
<td>$3,160,000</td>
<td>$1,580,000</td>
</tr>
<tr>
<td>13</td>
<td>Skunk Creek</td>
<td>620</td>
<td>$800,000</td>
<td>$120,000</td>
</tr>
<tr>
<td>14</td>
<td>Sulphur</td>
<td>977</td>
<td>$1,394,000</td>
<td>$460,000</td>
</tr>
<tr>
<td>15</td>
<td>Red Canyon</td>
<td>5,722</td>
<td>$4,481,000</td>
<td>$500,000</td>
</tr>
<tr>
<td>16</td>
<td>Bull Draw</td>
<td>36,549</td>
<td>$12,100,000</td>
<td>$200,000</td>
</tr>
<tr>
<td>17</td>
<td>Cabin Lake</td>
<td>5,975</td>
<td>$13,150,000</td>
<td>$350,000</td>
</tr>
<tr>
<td>18</td>
<td>Silver Creek</td>
<td>20,120</td>
<td>$25,230,000</td>
<td>$350,000</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td></td>
<td><strong>349,706</strong></td>
<td><strong>$130,225,000</strong></td>
<td><strong>$40,078,000</strong></td>
</tr>
</tbody>
</table>
COST BURDEN TO LOCAL COMMUNITIES

Fueling resilience
Climate and Wildfire Risk in the United States

Figure 1
Summary of total costs

<table>
<thead>
<tr>
<th>Event</th>
<th>Costs (in USD millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO Hayman Fire 2002</td>
<td>42,459,614</td>
</tr>
<tr>
<td>MT Canyon Ferry Complex 2000</td>
<td>8,131,231</td>
</tr>
<tr>
<td>NM Cerro Grande Fire 2000</td>
<td>970,000,000</td>
</tr>
<tr>
<td>CA, OR Biscuit Fire 2002</td>
<td>325,000,000</td>
</tr>
<tr>
<td>CO Missionary Ridge Fire 2002</td>
<td>59,123,052</td>
</tr>
<tr>
<td>CA Old Grand Prix 2003</td>
<td>1,215,597,539</td>
</tr>
</tbody>
</table>

in USD
- Recovery and Indirect Costs
- Suppression

Source: Western Forestry Leadership Coalition (2009)
Proportional costs of wildfire impacts, as short-term expenses and long-term damages

- Tax, Business, Natural Resource Loss: 2%
- Other: 0.1%
- Long-term Landscape Rehabilitation: 16%
- Human Casualties: 1%
- Energy and Infrastructure: 4%
- Degraded Ecosystem Services: 34%
- Aid Relief & Evacuation: 2%
- Immediate Road & Landscape Stabilization: 3%
- Suppression Costs (Federal): 8%
- Suppression Costs (State/Local): 1%
- Depreciated Property Values: 8%
- Home and Property Loss: 21%
**Cost Burden To Local Communities**

Proportion of wildfire costs paid for at the local, state, and federal level:

- **Local**: 46%
- **State/Local**: 17%
- **Federal**: 12%
- **State**: 1%
- **Other**: 24%

A Research Report by

The Full Community Costs of Wildfire

May 2018

COLORADO Department of Local Affairs
## Resiliency ROI

<table>
<thead>
<tr>
<th>National Benefit-Cost Ratio (BCR) Per Peril</th>
<th>Beyond Code Requirements</th>
<th>Federally Funded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Hazard Benefit-Cost Ratio</td>
<td>$4:1</td>
<td>$6:1</td>
</tr>
<tr>
<td>Riverine Flood</td>
<td>$5:1</td>
<td>$7:1</td>
</tr>
<tr>
<td>Hurricane Surge</td>
<td>$7:1</td>
<td>Too few grants</td>
</tr>
<tr>
<td>Wind</td>
<td>$5:1</td>
<td>$5:1</td>
</tr>
<tr>
<td>Earthquake</td>
<td>$4:1</td>
<td>$3:1</td>
</tr>
<tr>
<td>Wildland-Urban Interface Fire</td>
<td>$4:1</td>
<td>$3:1</td>
</tr>
</tbody>
</table>

*BCR numbers in this study have been rounded*
FEMA Details Disaster “Deductible” Plan for States, Insurers See an Opportunity

JANUARY 18, 2017
How the CRO Can Help

We are the designated State lead for resilience.

a) Provide State and local technical assistance to implement resiliency planning.

b) Operate the State’s resiliency and community recovery program

c) Build resiliency into State investments and grants programs

d) Develop metrics and targets for measuring success of resiliency efforts

e) Support long-term recovery efforts after a disaster
Tools

**COResiliency Resource Center**
www.coresiliency.com

**Colorado Resiliency Story Map**
www.coresiliency.com/storymap
LOCAL/REGIONAL RESILIENCY FRAMEWORKS

• Provides a community a path to address shocks and stresses

• A framework for building resiliency into policies, actions, and investments across multiple sectors.

• NOT a hazard mitigation plan or exhaustive review of shocks and stresses; rather identifies key interdependencies and potential consequences of shocks and stresses across sectors
Key Components

• A common understanding of resiliency and how it relates to community values;

• An analysis of baseline existing conditions in the community and the shocks and stresses that the community faces;

• An inclusive engagement process that informs the public about the importance of resiliency, and informs the planning team as it develops a Framework;

• A vision for the community that is supported by forward-looking goals, actionable strategies, and projects for action; and

• An articulated roadmap for ongoing coordination and action.
Technical Assistance and Training

• CRO is available to provide TA to communities around resiliency

• Guidance on developing resiliency frameworks

• Communities can apply for DOLA’s Energy/Mineral Impact Assistance Fund Grant for resiliency planning
Resiliency and Community Recovery Program

Forthcoming Resiliency and Community Recovery Program components:

• Resiliency 101 workshops
• Survey to identify:
  - resilience-related needs of local governments;
  - what resources the CRO can provide for advancing resiliency planning;
  - the most useful programs we can provide to local communities
Thank You!

rob.pressly@state.co.us
THE LAND USE PLANNING FRAMEWORK (Simplified)

1. Assess conditions
2. Establish policy
3. Develop regulations
4. Implement
ASSESS CONDITIONS & UNDERSTAND RISK

- What hazards affect the community?
- What are our community assets?
- Where are our vulnerable populations?
- What are the impacts hazard events could have on our community?
- Where are the most hazardous areas?
- What are our capabilities?

What can we do to reduce risk?
EStABLISH POLICY

- **Avoid** development in hazardous areas
- **Direct** future growth to safer areas
- **Strengthen** existing development in hazardous areas
ESTABLISH POLICY

- Comprehensive Plan
- Hazard Mitigation Plan
- Resolution
- Neighborhood program
- Capital improvement plan
- Local Resiliency plan
- Parks and open space plan
CONTENT:

- Introduction and Summary
- Planning Framework
- Hazard Identification and Risk Assessment
- Planning Tools and Strategies
  - Model Code Language
- Moving Forward
- Appendix - Hazards in Colorado
### Summary of Planning Tools and Strategies

<table>
<thead>
<tr>
<th>Addressing Hazards in Plans and Policies</th>
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<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Comprehensive Plan</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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</tbody>
</table>

### Strengthening Incentives

| Development Agreement                  | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

### Protecting Sensitive Areas

| 1041 Regulations                       | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

### Improving Site Development Standards

| Subdivision and Site Design Standards  | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

### Improving Buildings and Infrastructure

| Building Code                          | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

### Enhancing Administration and Procedures

| Application Submittal Requirements    | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
Description

A wildfire is an unplanned, unwanted wildland fire. Wildfires include unauthorized human-caused fires, escaped wildland fire use events (where appropriate management response to naturally-ignited wildland fires escape), escaped prescribed fire projects, and all other wildland fires where the objective is to put the fire out (Botts et al., 2015). While this section’s emphasis is on wildfires as an unwanted hazard, it also discusses wildfire in the context of how and why wildland fires occur.

A wildland fire is any non-structure fire that occurs in areas of vegetation or natural fuels, and can be either prescribed fire or wildfire. Wildland fire occurs when vegetation, or “fuel,” such as grass, leaf litter, trees, or shrubs, is exposed to an ignition source and the conditions for combustion are met, resulting in fire growth and spread through adjacent combustible material. Wildland fires are either ignited by lightning or by some consequence of human activity. In Colorado, lightning accounts for only 17 percent of wildfires, with human ignitions accounting for the remainder (Colorado Natural Hazards Mitigation Plan, 2013). Human causes vary and can include escaped debris pile burning, campfires, fireworks, construction sparks, downed transmission lines, and arson.

Wildfires and Human Behavior

Wildfires are distinct from other natural hazards in two ways:

1. Wildfire activity is not limited to natural environmental causes (such as earthquakes, tornados, or hurricanes) because ignition can also result from human activity.
2. Humans have the ability to significantly reduce wildfire threat by altering, redirecting, or (in some cases) extinguishing a wildfire.

Wildfires in Colorado

Between 2010 and 2014, an average of 1,192 wildland fires, excluding prescribed fires, occurred annually in Colorado. The number of acres can vary greatly; for example, in 2014, a reported 24,949 acres burned throughout the state, while...
How it Works

A post-disaster moratorium on repairing or rebuilding structures temporarily prohibits building activity following a major disaster. Communities have the authority to enact such restrictions post-event. The authorization to enact a moratorium can be found within a comprehensive recovery ordinance that is adopted prior to a disaster. Moratorium ordinances typically establish the framework for a variety of post-disaster recovery activities, including debris management, stabilization of damaged buildings, identification of safety risks, repair of damaged infrastructure, and mitigation options and funding mechanisms. Different standards may apply, or relocation may be required (Boyd, Hokanson-Schwab, & Topping, 2014). A sample model ordinance can be found in the additional resources below.
INTEGRATE HAZARDS INTO THE COMPREHENSIVE PLAN

- Integrating hazard mitigation and risk reduction into comprehensive plans is a key approach
  - Include a Dedicated Hazard Mitigation Element
  - Address Hazard Mitigation throughout the Plan
  - Identify Hazards on the Future Land Use Map
  - Link to the Local Hazard Mitigation Plan
  - Attach a HIRA to the Comprehensive Plan
  - Address Hazards in Subarea Plans
**Pre-Disaster Recovery Planning**

- The post-disaster environment should not be the first time a community begins identifying and managing critically important issues.

- Three tools available to local governments:
  - Continuity of Operations Plans (COOP)
  - Continuity of Government (COG) Plan
  - Recovery Plans

*Douglas County adopted the County’s first Disaster Recovery Plan in 2015.*
Post-Disaster Building Moratorium

- Restricts building activity following a major disaster

- Establish restrictions for repairing and rebuilding structures that are based on damage thresholds

- Distinguish between permits needed (and associated procedures) for rebuilding and repairing vs. permits for new development

- Allow the community more time to assess conditions in more severely damaged areas

Aftermath of 2013 flood in Jamestown, CO. Source - Michael Rieger, FEMA
PLANNING TOOLS TO REDUCE RISK

- Comprehensive Plan
- Climate Plan
- Community Wildfire Protection Plan
- Hazard Mitigation Plan
- Parks and Open Space Plan
- Pre-Disaster Planning
- Community Rating System
- Density Bonus
- Development Agreement
- Transfer of Development Rights
- 1041 Regulations
- Cluster Subdivision
- Conservation Easement
- Land Acquisition
- Landscape Ordinance
- Stream Buffers and Setbacks
- Low-Impact Development and Stormwater Management BMPs
- Site-Specific Assessment
- Subdivision and Site Design Standards
- Use-Specific Standards
- Building Code
- Critical Infrastructure Protection
- Wildland-Urban Interface (WUI) Code
- Application Submittal Requirements
- Post-Disaster Building Moratorium
- Resilience Planning
- Capital Improvement Plan

Model Code Available
Planning for Hazards
Hands-On Planning Process

- Uses the framework and tools developed in the Planning for Hazards: Land Use Solutions for Colorado guide and website

- Creates succinct, easy to use materials for carrying out a six-session process to identify a community’s risk to hazards and select, develop, and implement land use strategies to make the community safer
Intro
This guide provides a comprehensive, detailed, Colorado-specific set of resources, information, and tools to help local communities assess a community’s vulnerabilities and develop plans to implement solutions. This Workbook is intended for use in planning teams, planning offices, and local communities.

About This Workbook...
Materials Available to Communities

- Suggested timeline of work sessions and periods of ongoing work
Detailed descriptions for each work session, tailored to facilitators and participants.
**MATERIALS AVAILABLE TO COMMUNITIES**

- Draft agendas, including action items for next work session, available in Microsoft Word for easy modification.
Draft handouts that correspond to objectives to be achieved during the work session, also available in Microsoft Word for easy modification.
START BY FORMING A WORKING GROUP

- Identify subject matter experts
- Harness political leadership
- Recruit local champions
- Use the Planning for Hazards Facilitator’s workbook and materials to customize a planning process that makes sense for your community
Choosing Appropriate Planning Tools

- Some of the following questions are posed when selecting tools and strategies:

- What hazards are you trying to mitigate and where are they located?

- Do you have policies in place already?

- Do you have capacity to implement?

- Do you have community buy-in, or how can you achieve buy-in?

- Could you accomplish multiple goals with one tool?
PROGRESS THROUGH THE WORK SESSIONS

- **Session 1 - Provide Intro and Framework**
  - Identify community issues and projects underway
  - Frame the risk assessment process and ID hazards
  - Collect and review background info and data
  - Develop a stakeholder engagement strategy

- **Session 2 - Assess Community Vulnerability**
  - Assess community vulnerability
  - Develop problem statements

- **Session 3 - Assess Capabilities and Develop Planning Strategies**
  - Discuss draft HIRA or local risk assessment
  - Review community capabilities
  - Discuss initial planning implementation strategies
PROGRESS THROUGH THE WORK SESSIONS

- **Session 4 - Identify Specific Planning Implementation Tools**
  - Planning implementation tools prioritization exercise

- **Session 5 - Refine Draft Planning Implementation Tools**
  - Review draft implementation tools
  - Identify outstanding tasks
  - Develop process for approval and/or adoption

- **Session 6 - Establish Implementation and Maintenance Procedures**
  - Discuss final draft implementation tools
  - Establish protocols for ongoing administration
  - Identify future risk reduction projects
PUTTING THE GUIDE INTO ACTION

- Two pilot communities participating in program
  - City of Manitou Springs
  - Town of Milliken

- Will benefit from:
  - Professionally facilitated work sessions to determine appropriate actions to take to reduce hazard risk
  - Hazard Identification and Risk Assessment (HIRA) report/update
  - Code language for locally selected land use strategies to reduce hazard risk
WHAT ARE WE LEARNING? BIG PICTURE

- Strategy and tool development and adoption take time
- Need the right people (and expertise) at the table
- Data mapping can be key in understanding risk areas and applicability
- Political or fiscal changes in the community require increased engagement strategies, sometimes getting creative on approaches
WHAT ARE WE LEARNING? WILDFIRE-SPECIFIC

- Sometimes there is no delineation between WUI and non-WUI in town, and that can simplify the approaches

- Coordinate strategies with landscape requirements

- Site-specific hazard assessment can provide tailored approach to wildfire mitigation

- Fire Department participation is critical
DISCUSSION: KNOWLEDGE TO ACTION

- Is your community involved in collaborative processes to address hazards in your land use policies?

- Have you already used any planning or land use strategies to aid in hazard risk reduction?

- What barriers or challenges make engaging on land use or planning tools difficult in your community?

- Would you be interested in using the Planning for Hazards facilitator’s workbook and work session templates to plan for hazards in your community?
Thank You

Logan Sand
Colorado Department of Local Affairs
Logan.Sand@state.co.us

www.PlanningforHazards.com
THANK YOU!

QUESTIONS?