



# Measuring Risk and Building Resilience

*Iain Hyde, Deputy Director  
February 8th, 2017*



**COLORADO**

**Resiliency & Recovery Office**

Governor John W. Hickenlooper



# Colorado Resiliency & Recovery Office



## Colorado Resiliency & Recovery Office

*Who Are We?*

RESILIENCE • PERSISTENCE • SUSTAINABILITY • FORTITUDE  
SUPPORT REBUILD **COMMUNITY** FEEL BACK  
RESOURCES • DISASTER • TOUGHNESS • MAKE • ABILITY  
KEEP GRIT **ABILITY** DETERMINATION • PREPARED  
GRIT **ABILITY** UNBREAKABLE • BEING  
KEEP • RECOVER • GIVING • RECOVERY • FACE • EVENT • WORK  
ABLE • OVERCOME • COME **BOUNCE** DRIVE  
OBSTACLES • ADAPTABLE **BOUNCE** HUMBLE  
FORTITUDE • LIFE • OVER • ALWAYS • DEDICATION • POSITIVE  
COMMITTED • BOUNCE-BACK • BRAVERY • TOGETHER • STATE  
WITHSTAND **BACK** MATTER • ONE • HELP • READY  
FORWARD **BACK** CAPACITY • THROUGH • ADVERSITY  
COMING • LASTING • DURABLE • TENACITY • NEIGHBORS  
OTHERS • HARDSHIP • SITUATIONS • IMPROVED • MOVING  
ENDURANCE • TOUGH **STRONG** STEADFAST  
TOGETHER • PERSISTENT **STRONG** KNOCKED  
DETERMINED • PERSISTENCE • WITHSTAND • REBUILDING

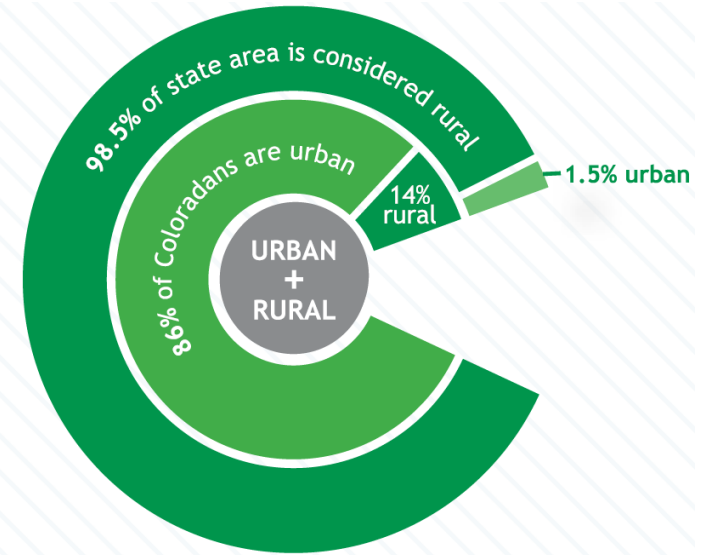
# What This Work Is About





# Colorado Context

- Geographically, economically and culturally diverse
- Steep terrain...and plains
- Big...104,185 square miles
- Home rule
- Strong mitigation track record



# Colorado Disaster History

Disaster	Communities Impacted	Disaster Impacts
1965 Floods	Colorado Front Range (South Platte and Arkansas basins)	21 lives lost; \$540M damages (1965 dollars); 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 Wildfires	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

# 2012-2015 Colorado Disasters by the Numbers

**\$5 billion**...Housing, infrastructure, economic and watershed impact from floods and wildfires

**\$1.7 billion**...federal, state, local, private resources to support flood recovery

**\$1.2 billion**...wildfire insurance claims paid in 2012 and 2013

**\$66.7 million**...flood insurance claims paid after the 2013 floods

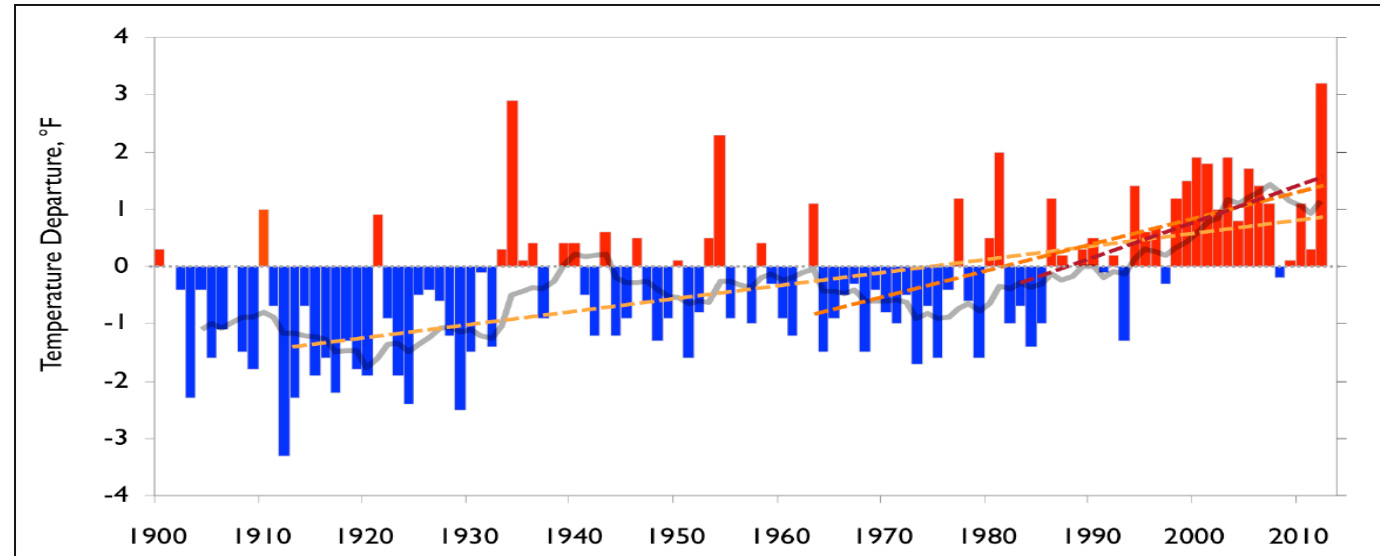
**3,000**...homes destroyed by floods and wildfires

**100+**...property acquisitions for flood and landslide mitigation since 2013

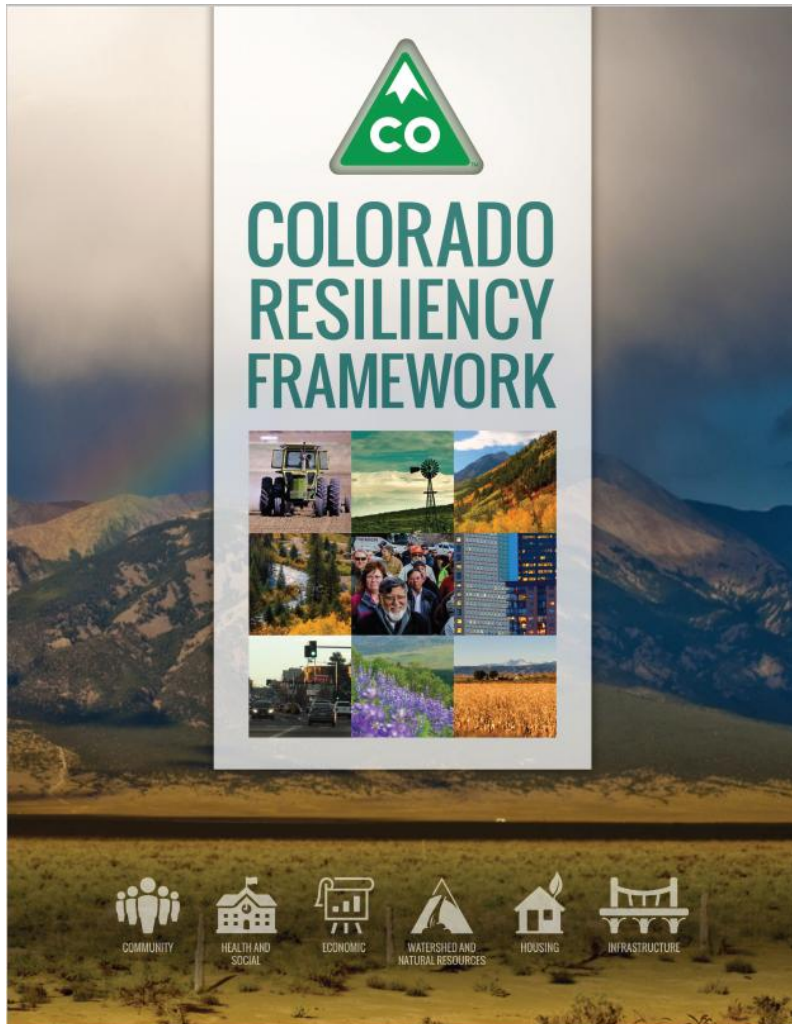
# Why Resiliency?

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
Eagle County	52,057	52,360	57,226	94,085
San Miguel County	7,356	8,063	9,408	15,523

Source: Colorado Department of Local Affairs Demography Office



# The Colorado Resiliency Framework



## Resiliency:

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

-Colorado Resiliency Working Group





# Integrated and Interdisciplinary



**COLORADO**  
Department of Transportation  
Region 4



**COLORADO**  
Resiliency & Recovery Office  
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**COLORADO**  
Department of Local Affairs



**FEMA**



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



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



**COLORADO**  
Department of Natural Resources



**COLORADO**  
Department of Human Services



**COLORADO**  
Energy Office

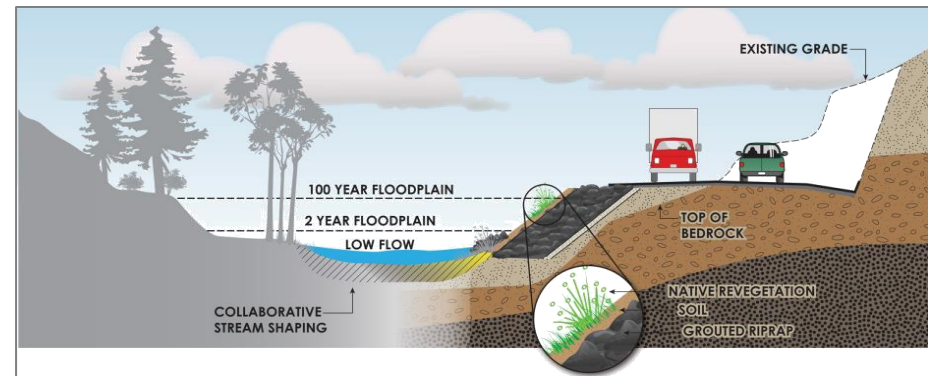
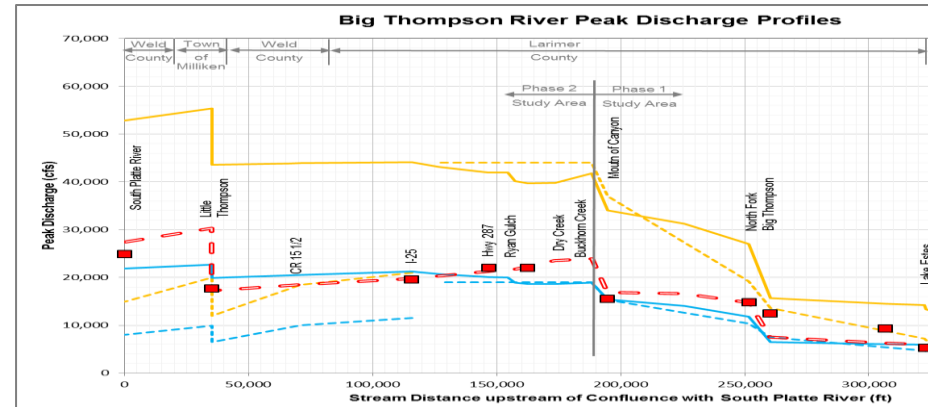


**COLORADO**  
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Health & Environment



# Priorities for Action

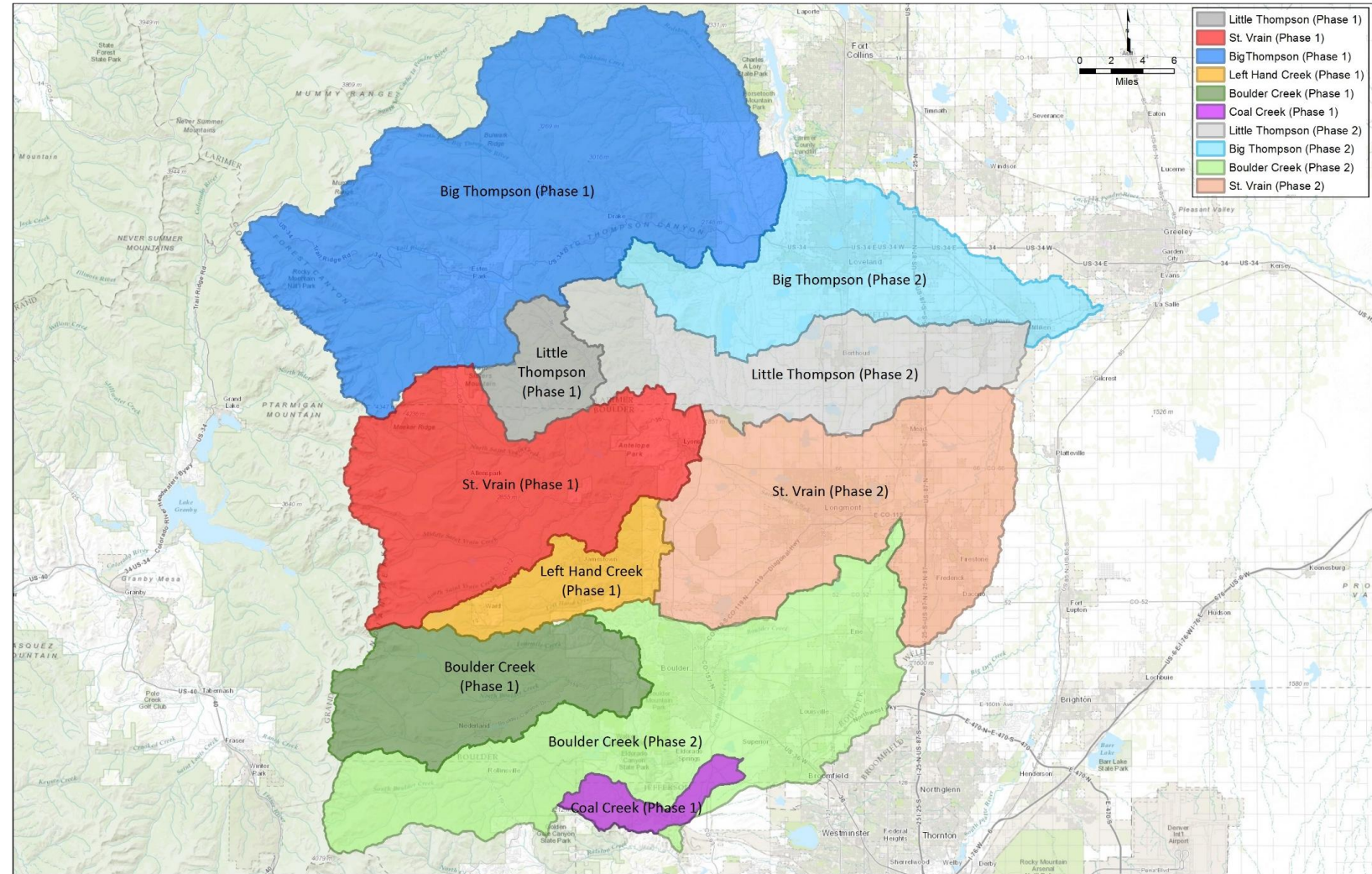
- Build capacity and empower a culture of resilience
- Leverage data to manage risk
- Integrate resilience into capital investments





# Resiliency in Action: Post-Flood Hydrology

- Partnership between Colorado Water Conservation Board and Colorado Department of Transportation
- Uses
  - Risk education
  - Floodplain re-mapping
  - Best available data - design and engineering
  - Regulation
- Data sources
  - Rainfall intensity
  - Stream gauges
  - Post-flood high water marks





# Resiliency in Action: Hazard Mapping Program



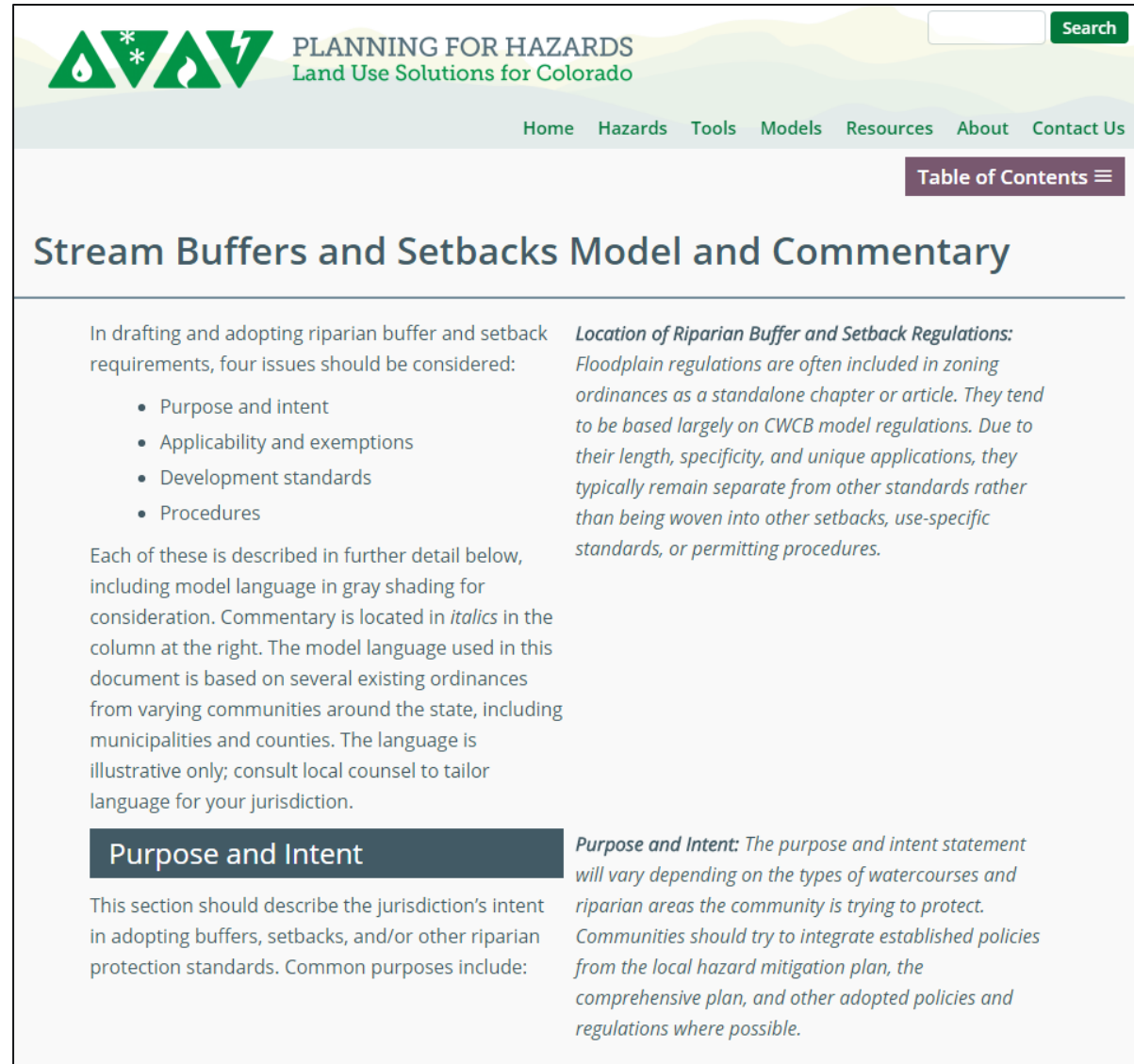
*Rivers flow downhill...and side to side*

## Senate Bill 15-245

- Three-year program
- Floodplains re-mapping and modernization
- Debris flow mapping in high risk, high consequence areas
- Erosion zones methodology and pilot mapping

# Resiliency in Action: Planning for Hazards

- Project through Colorado Department of Local Affairs and Colorado Resiliency Working Group's *Community Sector*
- Guidance on hazard identification and risk assessment
- Flexible set of land use tools to enhance mitigation
- Adaptable to different Colorado community contexts
- [www.planningforhazards.com](http://www.planningforhazards.com)



The screenshot shows the website for "PLANNING FOR HAZARDS Land Use Solutions for Colorado". The page title is "Stream Buffers and Setbacks Model and Commentary". The content is organized into two columns. The left column discusses the issues to consider in drafting riparian buffer and setback requirements, listing Purpose and intent, Applicability and exemptions, Development standards, and Procedures. The right column discusses the location of riparian buffer and setback regulations, noting that floodplain regulations are often included in zoning ordinances as standalone chapters or articles. A section titled "Purpose and Intent" is highlighted in a dark blue box, stating that the purpose and intent statement will vary depending on the types of watercourses and riparian areas the community is trying to protect, and that communities should try to integrate established policies from the local hazard mitigation plan, the comprehensive plan, and other adopted policies and regulations where possible.

**PLANNING FOR HAZARDS**  
Land Use Solutions for Colorado

Home Hazards Tools Models Resources About Contact Us

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## Stream Buffers and Setbacks Model and Commentary

In drafting and adopting riparian buffer and setback requirements, four issues should be considered:

- Purpose and intent
- Applicability and exemptions
- Development standards
- Procedures

Each of these is described in further detail below, including model language in gray shading for consideration. Commentary is located in *italics* in the column at the right. The model language used in this document is based on several existing ordinances from varying communities around the state, including municipalities and counties. The language is illustrative only; consult local counsel to tailor language for your jurisdiction.

**Purpose and Intent**

This section should describe the jurisdiction's intent in adopting buffers, setbacks, and/or other riparian protection standards. Common purposes include:

**Location of Riparian Buffer and Setback Regulations:**  
*Floodplain regulations are often included in zoning ordinances as a standalone chapter or article. They tend to be based largely on CWCB model regulations. Due to their length, specificity, and unique applications, they typically remain separate from other standards rather than being woven into other setbacks, use-specific standards, or permitting procedures.*

**Purpose and Intent:** *The purpose and intent statement will vary depending on the types of watercourses and riparian areas the community is trying to protect. Communities should try to integrate established policies from the local hazard mitigation plan, the comprehensive plan, and other adopted policies and regulations where possible.*

# Local and Public Engagement

- **Framework:** Focus groups, interviews, peer review, Resiliency Heroes nominations
- **Hydrology:** meetings with individual communities to review draft results, gather input, refine results
- **Floodplain Mapping:** Quarterly stakeholder updates, Flood Risk Review meetings, public meetings, newsletter and website
- **Planning for Hazards:** State, local, non-government advisory committee, interactive website







*Iain Hyde, CFM*

*Deputy Director*

*Colorado Resiliency and Recovery Office*

*[iain.hyde@state.co.us](mailto:iain.hyde@state.co.us)*

*[ColoradoUnited.com](http://ColoradoUnited.com)*

*@COunited*

*Thank you!*



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