4 PLANNING TOOLS AND STRATEGIES

Building on the previous Chapter 3, *Hazard Identification and Risk Assessment*, this chapter examines various land use planning tools and strategies that can be used to mitigate hazards. The first section provides general tips for applying the risk assessment results to planning. The remainder of the chapter focuses on specific planning tools and strategies aimed at reducing risk and mitigating hazards.

HOW DO I APPLY RISK ASSESSMENT RESULTS TO PLANNING?

CAPITALIZE ON OPPORTUNITY

There are a range of options to increase the general awareness of hazards in a community. It is important to communicate hazard risk to citizens, elected officials, and other stakeholders, as well as integrate hazard mitigation principles into local plans, policies, and codes. As previously mentioned, Colorado communities are encouraged to be "opportunistic" and proactive by conducting more frequent and routine assessments of local hazards as new information or resources become available. Planners should look for opportunities to better leverage, streamline, and integrate these planning resources.

Opportunities to integrate land use and hazard planning include the development or update of an existing comprehensive plan, zoning ordinance, capital improvements plan, or other relevant processes. This includes but should not be limited to the maintenance of the adopted Local Hazard Mitigation Plan, as communities should constantly be seeking ways to capitalize on establishing synergies between it and other planning processes. Another notable opportunity includes the unique but often unforeseeable period following a damaging hazard event—a time when community stakeholders are typically much more engaged in the dialogue regarding surrounding community recovery and redevelopment decisions regarding infrastructure and other repairs. Colorado planners and local officials should be proactive by preparing plans or frameworks to help prepare for potential disasters and guide the post-disaster process.

Communities should also seek to piggyback on other relevant state, regional, and local efforts to increase hazards awareness and promote risk reduction activities, such as *Colorado Flood Safety and Wildfire Awareness Week*, or perhaps following the release of new scientific data relating to disasters or hazards management. Often during these times, the media, elected

Opportunistic Communities

Communicating risk to the community means developing a proactive strategy to outreach and education, and taking advantage of existing opportunities to "get the word out." To increase the awareness of hazards in a community, consider piggybacking on the following opportunities:

- *Comprehensive Plan Update*
- *Local Hazard Mitigation Plan*
- *Statewide awareness weeks, such as "Colorado Flood Safety and Wildfire Awareness Week"*
- *Regular updates to appointed and elected officials*
- *Redevelopment discussions following a damaging hazard event*

officials, and residents are more engaged and apt to join the conversation.

Another important opportunity is to consider how redevelopment efforts following a hazard event can be implemented to be more resilient, leaving the community better off than it was before the event. This effort requires careful coordination with community leaders, city departments, and other stakeholders through the community such as business owners, residents, and developers. Following an event, the community can begin a dialogue about long-term resilience.

COMMUNICATION TIPS

Once preparation of the Hazard Identification and Risk Assessment (HIRA) is complete, following the procedures outlined earlier in Chapter 3, *Hazard Identification and Risk Assessment*, it is essential to use that information to the fullest extent possible. Begin by communicating the results of the HIRA and opportunities for mitigation extensively both internally and externally to the community. This will allow community members to understand and contribute to the development or refinement of mitigation actions to address identified risks. Although the risk assessment is a key component to any FEMA-approved Local Hazard Mitigation Plan, the use of risk assessment data should not be limited to that effort. From an emergency management and hazard mitigation perspective, the HIRA should be used to formulate specific mitigation actions that respond to the risks identified. While these actions have traditionally focused on education and infrastructure projects, they should be expanded to land use programs, policies, and regulations.

- **Think Comprehensively About Stakeholders**

  Planners and emergency managers should consider any potential impacts to other departments and other stakeholders as a result of the HIRA and start drawing connections to relevant policies, goals, or objectives of a particular audience. Make a point of regularly discussing coordination between emergency management and planning. Never assume that a department, agency, or group of individuals would not be interested in or affected by the results of the HIRA. Rather, communicate compelling synergies with their other projects or concerns. For example, alert the parks and recreation department of any spatial analysis of risk that could impact future acquisitions or trail connections, and engage representatives of potentially vulnerable populations.

- **Communicate Early and Often with Elected and Appointed Officials**

  Making an argument that a development application should be denied based on a particular hazard risk during the final approval hearing could be ineffective if the elected body is just learning of the risk. For communities with hazard risks that could impact major decisions, planners and emergency managers should make a point to regularly discuss the topic with appointed and elected officials. Keep it short, keep it interesting, and continue to ask for their support on hazard mitigation efforts. When decision-makers are well informed, they make decisions with confidence. Community leaders should also adopt policies—especially in the comprehensive plan—and regulations that clearly communicate the risk to the community, including current and future property owners. Planners should use relevant facts from the community and explain why hazard mitigation is important. For example, how does hazard mitigation tie into other policies such as economic development and public safety? Incorporate tours, guest speakers, and best practices whenever possible. Back it up with

relevant facts from the community (such as how damage from hazards could affect local tourism).

- **Don't Forget the Public**

  Hazard mitigation can be a component of any community project. Don't wait to begin engaging the public in a conversation about risk. Proven strategies like press releases, open houses, workshops, and websites can be effective tools for informing the public and initiating community conversations. Informing the community of their risk to hazards does not have to involve scare tactics; rather, ask citizens if they are aware of the various hazards that have impacted the community in the past. Ask them what they think the local government should be doing to mitigate the risk. Strive to make the information personally relevant; ask them if hazard mitigation is important to them. Share examples of how the community is currently addressing hazards, including statistics wherever possible (such as number of properties acquired in the floodplain, or number of homes evacuated during a wildfire). Encourage them to join existing local mitigation initiatives, such as the Firewise Communities Program. Most importantly, start identifying local champions that can advocate on the community's behalf. Building support for hazard mitigation efforts is much easier with the public on your side.

OVERVIEW OF PLANNING TOOLS AND STRATEGIES

The planning tools and strategies highlighted in this guide represent those commonly used in Colorado communities to address hazard mitigation, as well as some newer strategies. The tools are divided into the following seven categories:

- Addressing Hazards in Plans and Policies
- Strengthening Incentives
- Protecting Sensitive Areas
- Improving Site Development Standards
- Improving Buildings and Infrastructure
- Enhancing Administration and Procedures

Each tool profile includes the following components:

- **Hazards Addressed by the Applicable Tool.** Individual tools include icons indicating the applicable hazards. (Keep in mind that tools may be applicable to multiple hazards.)
- **How it Works.** Description of the tool including relevant background information, how it works, and examples for how it is used to reduce risk to hazards.
- **Implementation.** Description of how a community would implement the tool. For example, does a tool require adoption of an ordinance, or a special study?
- **Where it's Been Done.** This section provides examples of Colorado communities that are using the particular tool, highlighting any lessons learned or other specifics.
- **Advantages and Key Talking Points.** A list of the primary benefits associated with the particular tool, as well as suggestions for communicating those benefits to stakeholders.
- **Challenges.** A list of the frequent challenges associated with the particular tool.
- **Key Facts.** The basic requirements and notable facts related to the tool, including:
  - Administrative capacity
  - Mapping requirements

  - Regulatory requirements
  - Maintenance requirements
  - Adoption requirements
  - Applicable statutory requirements
  - Associated costs

- **Model Code Language and Commentary.** For some tools, model language is included to illustrate actual regulatory language that could help implement the tool, along with commentary. While users of the guide are welcome to use the example language, the model codes should be viewed as a starting point. The language is illustrative only; consult local counsel to tailor language for your jurisdiction.
- **Additional Information.** For some of the tools profiled, there are publications or sites where the reader can learn more about the tool. Includes examples where communities have used this tool and contact information where the reader can obtain additional information.

Although the focus of many of the concepts and tools highlighted in this chapter relate to planning, the land use planner will not always take the lead role. For example, changes to building codes will be led by the building official, and may require review by the local planner, emergency manager, and local fire authority. Implementing these planning tools and strategies requires thoughtful coordination with other departments and external stakeholders.

The table on the following pages summarizes the planning tools applicable to each hazard.

OVERVIEW OF PLANNING TOOLS AND STRATEGIES

SUMMARY OF PLANNING TOOLS AND STRATEGIES	Avalanche	Drought	Earthquake
ADDRESSING HAZARDS IN PLANS AND POLICIES			
Comprehensive Plan	✓	✓	✓
Climate Plan	✓	✓	
Community Wildfire Protection Plan (CWPP)			
Hazard Mitigation Plan	✓	✓	✓
Parks and Open Space Plan	✓	✓	
Pre-Disaster Planning	✓	✓	✓
STRENGTHENING INCENTIVES			
Community Rating System			
Density Bonus	✓		
Development Agreement	✓		
Transfer of Development Rights	✓		
PROTECTING SENSITIVE AREAS			
1041 Regulations	✓	✓	✓
Cluster Subdivision	✓		
Conservation Easement	✓		
Land Acquisition	✓		
Overlay Zoning	✓		
Stream Buffers and Setbacks			
IMPROVING SITE DEVELOPMENT STANDARDS			
Stormwater Ordinance		✓	
Site-Specific Assessment	✓		
Subdivision and Site Design Standards	✓	✓	
Use-Specific Standards	✓		
IMPROVING BUILDINGS AND INFRASTRUCTURE			
Building Code	✓	✓	✓
Critical Infrastructure Protection	✓		✓
Wildland-Urban Interface (WUI) Code			
ENHANCING ADMINISTRATION AND PROCEDURES			
Application Submittal Requirements	✓		
Post-Disaster Building Moratorium			✓

Flood	Hazardous Material Release	Extreme Heat	Landslide, Mud/ Debris Flow, and Rockfall	Soil Hazards	Wildfire	Wind Hazards	Severe Winter Storm
✓	✓	✓	✓	✓	✓	✓	✓
✓		✓	✓		✓	✓	✓
					✓		
✓	✓	✓	✓	✓	✓	✓	✓
✓			✓	✓	✓		
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✓	✓		✓	✓	✓		

ADDRESSING HAZARDS IN PLANS AND POLICIES

There are numerous opportunities to effectively integrate and address the mitigation of known hazards in local plans and policies.

The comprehensive plan is a community's most important and potentially effective tool for consolidating and articulating various policies that relate to planning, land use, and development. Hazard-related issues arise in a range of planning contexts, and there are different approaches for integrating hazards into comprehensive plans, discussed below. Beyond the comprehensive plan, the Local Hazard Mitigation Plan is an obvious and important place to address local hazard policy.

In addition, communities should utilize other supporting plans, policies, and programs to demonstrate clear linkages and potential synergies between hazard risk reduction and other important community goals. Each supporting plan typically should include a background study or assessment of existing and future conditions, as well as goals, strategies, and policies that can contribute to the implementation of multi-objective solutions.

Safe Growth Audits – An Effective Tool for Planners and Hazard Practitioners

As first shared by the American Planning Association's "Practice Safe Growth Audits" publication, the purpose of a safe growth audit is to "analyze the impacts of current policies, ordinances, and plans on community safety from hazard risks due to growth." The audit enables a community to evaluate the positive and negative effects of its guidance on existing and future growth on hazard vulnerability by reviewing the comprehensive plan, zoning ordinance, subdivision regulations, capital improvement plan/program, and infrastructure policies. In many ways, a safe growth audit provides a "checks and balances" approach for communities that are interested in future development but not at the expense of public safety or vulnerability to hazards.

For example, a safe growth audit asks questions such as:

- *Does the future land-use map clearly identify natural hazard areas?*
- *Are transportation policies used to guide growth to safe locations?*
- *Do environmental policies provide incentives to development that is located outside of protective ecosystems?*
- *Are the goals and policies of the comprehensive plan related to those of the FEMA Local Hazard Mitigation Plan?*
- *Does the zoning ordinance conform to the comprehensive plan in terms of discouraging development or redevelopment within natural hazard areas?*
- *Do subdivision regulations allow density transfers where hazard areas exist?*
- *Does the capital improvement plan/program provide funding for hazard mitigation projects identified in the FEMA Mitigation Plan?*

These and similar questions can naturally be tailored when looking at a specific hazard. As a holistic approach, however, the safe growth audit provides a comprehensive yet succinct look at a community's future based on a critique of existing plans, policies, and tools that direct new development. It also equips practitioners with the ability to zero in on the most relevant questions, gaps, or conflicts related to planning strategies that may warrant further consideration.

Additional Resources:

- *American Planning Association's Practice Safe Growth Audits (Zoning Practice Issue Number 10, 2009): planning.org/zoningpractice/open/pdf/oct09.pdf*
- *Safe Growth Audit Worksheet (excerpt from FEMA Local Mitigation Planning Handbook, 2013): mitigationguide.org/wp-content/uploads/2013/05/Worksheet-4.2.pdf*
- *American Planning Association. Hazard Mitigation: Integrating Best Practices into Planning, pp. 54-58 ("Testing Implementation with a Safe Growth Audit"). Planning Advisory Service Report 560. May 2010. fema.gov/media-library/assets/documents/19261*

Several examples of supporting plans are discussed below, including community wildfire protection plans, climate plans, and parks and open space plans. Beyond this guidebook, other important supporting plans and programs deal with issues such as transportation, economic development, public facilities, housing, and redevelopment. In particular, it is also important for communities to address risk and factor the cost of mitigation programs into local capital improvement plans.

This section explores tools that communities can use to integrate hazard mitigation into their long-range plans and policies. Tools profiled in this section include:

- Comprehensive Plan
- Climate Plan
- Community Wildfire Protection Plan (CWPP)
- Hazard Mitigation Plan
- Parks and Open Space Plan
- Pre-Disaster Planning

Interdepartmental Coordination – Getting Them Involved; Keeping Them Involved

Coordination is essential to achieving a more sustainable, resilient, and safe community. Management by silos has traditionally been the norm, and promoting integration among departments can be a challenge due to limited resources and over-burdened staff. This is particularly the case in communities that have endured recent significant hazard events.

Yet the key to a successful hazard mitigation program is having departments working in an integrated fashion, routinely sharing information and ideas and avoiding policies or actions that are in conflict with each other. The following are a few tips to achieve effective, sustainable interdepartmental coordination.

***Leadership.** Achieving and maintaining effective interdepartmental coordination first requires commitment from the elected governing body and the chief executive official. They should consider creating an interdepartmental committee to promote coordination across all local efforts. To be effective, such a committee should be chaired by someone with leadership qualities. An effective leader is able to persuade his or her superiors, peers, and subordinates to adopt a common vision and strategy for how to achieve it. From a hazards perspective, they should be able to help reconcile competing objectives between departments that want to execute recovery and mitigation projects and also future planning projects.*

***Clearly Defined Roles and Responsibilities.** Effective interdepartmental cooperation and coordination requires all parties to clearly understand their role and how their job or their office contributes to the overall vision, goals, and objectives of the committee. Before any coordination effort is initiated, it is important for leadership to describe the mission of the interdepartmental committee and how it will function as an organization.*

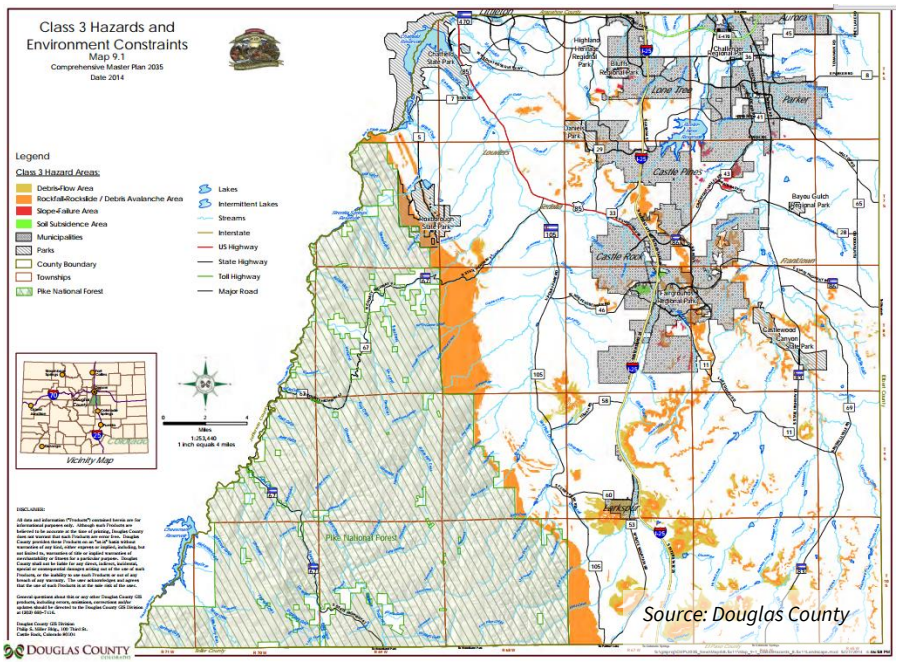
For those on the interdepartmental committee to be effective, it is important not only for the individual to understand their role, but to understand the other agencies' roles. They must be able to put themselves in another agency's shoes to understand where they are coming from and what they want to achieve.

***Effective Communication.** Open and regular communication is key to interdepartmental coordination. Effective interchange of opinions and information helps in resolving differences and in creating mutual understanding. Thus, defining protocols for both formal and informal communication between committee members and entire agencies is critical.*

***Personal Contact.** Personal or face-to-face contact is the most effective means of communication and coordination. Intragovernmental decisions are collective decisions and should reflect the engagement, coordination, and general consensus among different departments or functions in the enterprise.*

***The Heads-Up.** Finally, hold meetings only when you have something important to discuss. Prepare an agenda and distribute it to the committee members prior to the meeting so when they walk into the meeting they have a clear understanding of the purpose of the meeting.*

COMPREHENSIVE PLAN



HAZARDS ADDRESSED

HOW IT WORKS

Integrating hazard mitigation and risk reduction into comprehensive plans is a key approach that provides an umbrella, or overarching policy framework, for various other planning tools. The comprehensive plan is a policy document, making it fundamentally different from many of the other planning tools profiled in this chapter. General considerations for integrating hazards into comprehensive plans include:

- Hazard mitigation measures are not only infrastructure-related. They can include community level communication, preparedness planning, and other non-structural measures.
- Whenever possible, mitigation measures should work to mimic natural processes rather than engineered solutions, such as reconnecting a creek to its floodplain for natural flood control rather than channelizing it.
- The safety of vulnerable communities related to natural hazard risks and other stressors should receive particular attention in the comprehensive plan.

WHAT IS A COMPREHENSIVE PLAN?

A comprehensive plan (often called “master plan,” “general plan,” or “community plan”) expresses a community’s overarching vision, goals, objectives, policies, and strategies for the future growth, development, and preservation of the community, protection of community assets, and provision of services.

Colorado statutes authorize local governments to prepare master plans to serve as guiding documents. In some cases, local governments are required to prepare master plans. C.R.S. § 30-28-

106(4)(a) requires counties with more than 10,000 in population and meeting defined growth percentages to adopt a master plan. Similarly, C.R.S. § 31-23-206(4)(a) requires municipalities with a population of 2,000 people or greater in a qualifying county to prepare and adopt a master plan (*House Bill 01S2-1006*, 2011).

Comprehensive plans also vary in terms of the overall organizational structure, the number and types of elements addressed, and the degree to which specific action items are threaded throughout the guiding policies. A traditional comprehensive plan is organized by element, with each element given a unique chapter or section of the plan. Common elements included in comprehensive plans include:

- Land use
- Transportation
- Housing
- Economy
- Environment
- Governance
- Parks and open space
- Recreation and tourism (only required element per state statutes)
- Community design and character

Within each of these elements, most comprehensive plans contain the following components, or some variation:

- **Vision**. What is the community's underlying vision for the future?
- **Goals**. Within each element, what are the goals the community seeks to achieve?
- **Policies**. Within each goal, how can the community address the issue to achieve desired results?
- **Strategies or actions**. What are the specific steps a community can take to address a stated issue?
- **Mapping**. What are the desired future land use scenarios, and how do existing and future conditions change based on the other elements addressed in the plan?

As planners increasingly focus on the interrelatedness of plan elements, organizing the comprehensive plan by themes is more common. For example, a community may opt to include a sustainability section within each plan element, rather than dedicating a single element to sustainability. Fort Collins' recent plan update called "City Plan" has a unique organizational framework. The plan illustrates the interconnectedness of each of the other plan elements, explores the "triple bottom line" of sustainability throughout, and is tied to the city's "budgeting for outcomes" process.

APPROACHES FOR INTEGRATING HAZARDS INTO COMPREHENSIVE PLANS

Communities increasingly address sustainability, energy, climate, and resilience in their comprehensive plans. Home rule communities have broad authority to address these and many other subjects in their plans and regulations. Statutory communities also have authority to address hazard areas in master plans. Specifically, C.R.S. § 30-28-106 (for counties) and § 31-23-206 (for municipalities) requires planning commissions to consider "the areas containing steep slopes, geological hazards, endangered or threatened species, wetlands, floodplains, floodways, and flood

risk zones, highly erodible land or unstable soils, and wildfire hazards" (*House Bill 12-1317*, 2012). Because the comprehensive planning process typically involves a robust public engagement component, it is an excellent opportunity to educate the community on the importance of planning for hazards.

Both the American Planning Association and FEMA have provided helpful guidance for integrating hazard issues into the comprehensive planning process; the respective resources are cited at the conclusion of this section.

There are several approaches to addressing hazard elements in a comprehensive plan, as discussed in the subsections below.

Include a Dedicated Hazard Mitigation Element

One effective way to focus attention on the importance of hazard mitigation and avoidance in a comprehensive plan is to give the subject its own dedicated section, either as a stand-alone plan element or a subsection of another element (such as land use or environmental protection). Most Colorado communities to date have addressed hazard mitigation as a sub-section of the land use element, though this is changing as communities like Manitou Springs are exploring new plan organizations that give increased prominence to hazard mitigation.

The hazards element should include a description of known hazards to the community. For example, "the community's primary natural hazard threats are from floods, wildfires, and hazardous materials transport." These statements can be supported by maps of hazard areas and more detailed descriptions of the risk.

Following the description of the hazards and risk, the hazards element should identify a hierarchy of goals, policies, strategies, and actions tailored to the specific hazard risks in the jurisdiction. While these will vary by community, a range of sample language is included below representing common approaches seen throughout Colorado.

- **Example Goals**
    - Reduce the impacts from [insert hazards] on [insert community] residents.
    - Reduce the risk of natural hazards on people, property, and the environment.

Hazard Mitigation: Integrating Best Practices into Planning

American Planning Association – Planning Advisory Service (PAS) Report 560

This report was the result of lengthy dialogue with APA and FEMA about the increased awareness of the linkages between planning and hazard mitigation principles. The primary author, James C. Schwab, AICP, walks through the various approaches to incorporate hazard mitigation into planning and policy mechanisms, provides background on the planner's role in hazard mitigation, and discusses how to integrate hazards into several planning implementation tools. This valuable resource guide also explores several case studies throughout the country that are illustrative of the report's recommendations.

Chapter 3 of the report is dedicated to integrating hazard mitigation throughout the comprehensive plan. In that chapter, Schwab articulates the importance of not only including a hazard element in the plan, but to identify throughout other elements how hazards are interrelated. The report makes recommendations for integrating hazard mitigation into the specific elements, including: future land use, conservation, public facilities and services, transportation, capital improvements, housing, historic preservation, economic development, recreation and open space, environment/natural resources, and implementation.

PAS 560 can be accessed here: fema.gov/media-library/assets/documents/19261

  - Increase public awareness of hazard risks.

- **Example Policies**
  - Limit building in high-risk areas.
  - Direct future growth to low-risk areas.
  - Improve public education and awareness campaigns as well as proactive warnings for natural hazards.
  - Review and designate appropriate uses and intensities of land uses within known hazard areas.
  - Improve mapping of hazard risk.
  - Planning staff should coordinate regularly with emergency management staff to identify cross-beneficial projects and avoid any potentially conflicting goals or strategies.

- **Example Strategies and Actions**
  - Expand mapping, regulations, and loss-prevention for areas with high risk to hazards.
  - Update subdivision regulations to include criteria for potential hazard areas.
  - Identify data needs to effectively identify high-risk areas and better manage development and activities within the community.
  - Update zoning code to reflect appropriate land uses and intensities within known hazard areas.
  - Update development application submittal requirements to address hazard-related technical reports and mapping analysis.
  - Prevent development on geologically unstable areas or steep slopes.
  - Update subdivision regulations to require defensible space when developing near the wildland-urban interface.
  - Adopt a local wetland ordinance that provides an appropriate buffer distance from water bodies.
  - Revise development regulations to prevent development on slopes greater than 30 percent.
  - Revise development regulations to require adequate mitigation prior to approval of development applications.
  - Require new development to be within a fire district with adequate fire protection facilities, equipment, and service capabilities.
  - Discourage development within areas of high potential for heaving bedrock, as identified on the steeply dipping/heaving bedrock map.
  - Require engineering designs for improvements to roads and utilities to address mitigation of geologic hazards during the subdivision review process.

Adams County is an example of a community that incorporated a specific hazard mitigation section in its comprehensive plan, *Imagine Adams County* (2012). In that section, the county identifies three primary policies:

- Reduce risk and effects of natural and industrial hazards;
- Increase public awareness of hazard risks; and
- Limit building in high-risk areas and improve disaster prevention.

The county also integrated their Hazard Identification and Risk Assessment (HIRA) into the plan, as an appendix. That HIRA includes an in-depth analysis of land uses and their relation to hazards. With a particular focus on hazardous materials, the HIRA appendix compares future land use designations to the number of hazardous materials facilities (*Imagine Adams County*, 2012).

Address Hazard Mitigation throughout the Plan

Often, however, hazard mitigation is not given individual emphasis in a comprehensive plan, but is integrated throughout the plan elements. If a separate hazards element is not included in the plan, the model goals, policies, and strategies from the previous section could be tailored to support other plan elements. Sample considerations and questions to ask for various plan elements are provided below, based in part on issues noted in the FEMA and APA references cited at the conclusion of this section.

- **Land Use.** Establish land-use policies that discourage development or redevelopment within natural hazard areas. Provide adequate space for expected future growth in areas located outside natural hazard areas. Ensure that safety is explicitly included in the plan's growth and development policies.
- **Transportation.** Provide adequate primary, secondary, and emergency connections within and between subdivisions. Ensure road layouts and connections support response requirements for emergency services. Consider whether transportation policy is used to guide growth to safe locations.
- **Conservation/Resource Protection.** Identify areas that are community and natural assets and also that, when protected or restricted to development, would reduce risk to natural hazards. For example, avoiding development in forested areas provides a tangible resource to the community while also reducing exposure of people and structures to wildfires.
- **Economic Development.** Communicate the short- and long-term economic benefits of planning for hazards and developing resilient communities (e.g., lower long-term infrastructure repair costs). Evaluate whether economic development policies promote commercial or industrial expansion in areas vulnerable to hazards. Make community resilience a key feature in attracting, expanding, and retaining businesses and industry.
- **Public Facilities.** Identify appropriate locations for all public facilities, but especially critical facilities whose continued operation is essential during or following a major hazard event. For example, police and fire stations, water treatment plants, and community centers are important facilities that should not be located in hazardous areas.
- **Housing.** Ensuring that the location and design of new or improved housing complies not only with existing building codes, but with potential hazards in mind. Identify opportunities to strengthen or replace structures identified as vulnerable to hazards. Consider whether a disproportionate amount of affordable housing is located within known hazard areas. Address the challenges communities face in locating dense residential areas away from hazards. One particular challenge to consider is that some of the most desirable places to live can often be within hazard areas (forests, oceans, slopes, and rivers).
- **Recreation and Tourism.** Areas that serve as recreation opportunities (such as trails and bike paths) can also serve hazard mitigation purposes by limiting development. This element could also include recommendations for land acquisition. Recreation and tourism, especially as it relates to hazard mitigation, can also be addressed in parks and open space or natural resources elements depending on the plan organization.

Douglas County is an example of a community that has taken this approach. The *Douglas County 2035 Comprehensive Master Plan* (2014) addresses geologic hazards, flooding, and wildfire. There are a series of goals and policies related to hazards in the environmental quality sections, and additional relevant policies scattered throughout the plan. For example, wildfire is addressed in the urban land use section of the plan, the non-urban section of the plan, and in the environmental quality section of the plan (where an entire subsection is dedicated to wildfire) (*Douglas County 2035 Comprehensive Master Plan*, 2014). As with Adams County, the hazard components of the plan are accompanied by a map, providing additional justification for future land use decisions.

Based on current research, more Colorado communities emphasize hazard mitigation as a discrete section in their comprehensive plans than choose to weave hazard mitigation through various plan elements. However, new plans are always underway. As of August 2015, the City of Longmont and the Town of Milliken were both in the process of developing comprehensive plans with a resilience component. The City of Manitou Springs is embarking on an integrated planning process for a hazard mitigation plan and a comprehensive plan that will weave hazard-related issues into all plan elements. Users of this guide should check back with those communities to review the method in which hazards are addressed in those plans.

Identify Hazards on the Future Land Use Map

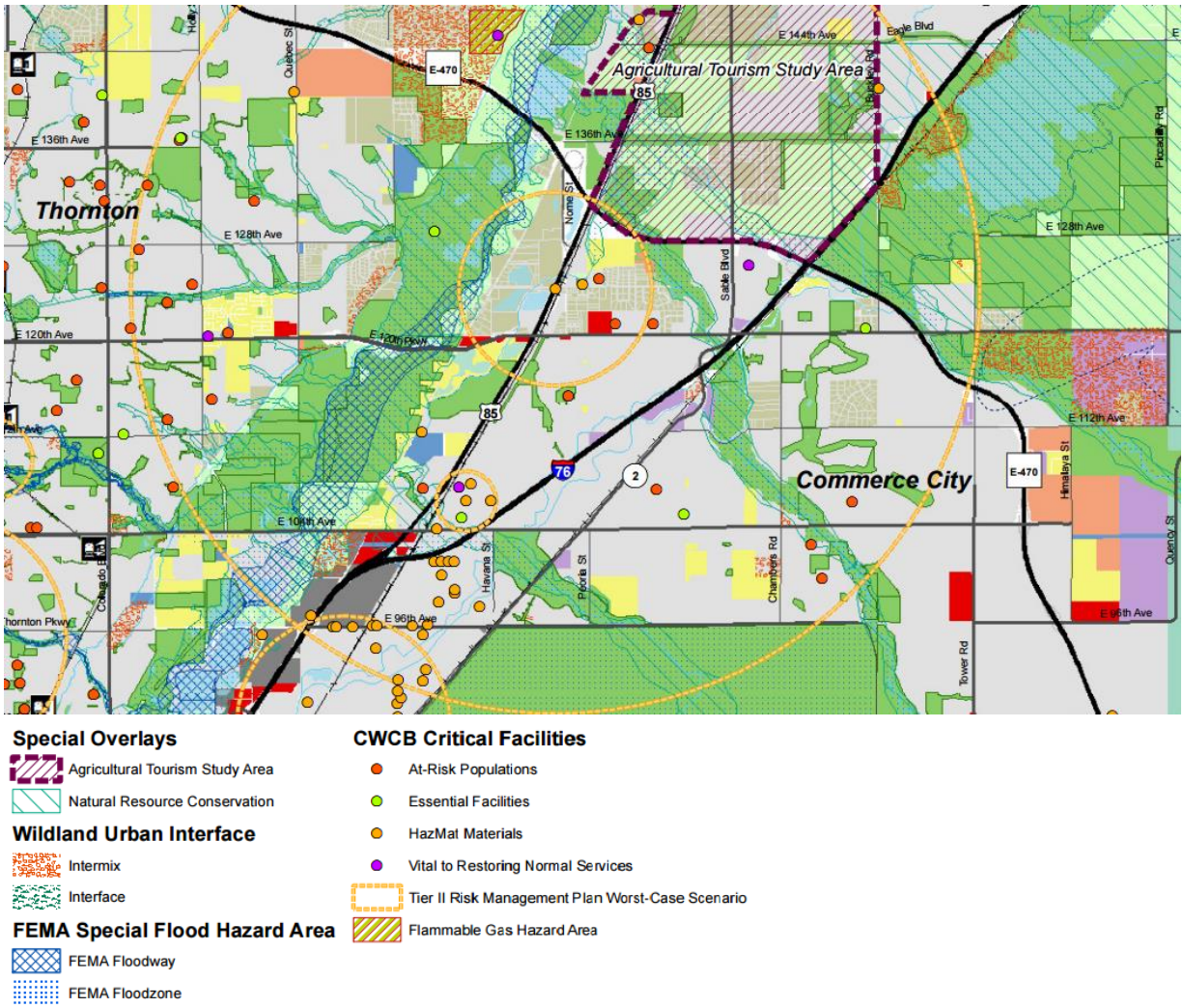
The future land use map illustrates how the community intends to grow over time. It identifies appropriate areas for growth and development, often accompanied by supporting details such as types of land uses and appropriate densities. Future land use maps can be helpful tools to guide community officials when making decisions about development proposals. A clear future land use map can also set the stage for regulatory changes that support the stated policies of the comprehensive plan. Showing known hazard areas on the future land use map provides maximum transparency to a community's citizens and decision-makers.

Future land use maps are typically either **parcel-specific** or **character-based**. Parcel-specific land use maps show the desirable types of land uses for specific detailed sites. These can be helpful for making future zoning and planning decisions, but they require upfront evaluation of specific areas that may not be possible as part of a broad, community-wide planning process. Character-based maps show conceptually which general areas, nodes, or corridors within a community are appropriate for various types of uses. They are less detailed than parcel-specific maps in describing specific uses and parcels; that allows for more flexibility to evaluate specific development proposals, but also provides less predictability.

It is important to ensure that future development patterns are consistent with known hazard areas. For example, areas marked for "higher density residential development" should not overlap with floodplains, the wildland-urban interface, or areas with steep slopes. The future land use map can work in concert with an adopted hazard mitigation plan to ensure that the map promotes safe growth and reconciles any conflicts between development strategies and mitigation strategies.

However, including hazard areas on a future land use map can be challenging, both technically and practically. There are multiple variables and criteria typically reviewed to determine land development suitability. The goal usually is not to restrict all development opportunity in hazard areas, but rather to use the best available data to determine the severity of the risk, mitigation requirements for development, and appropriate use of land within or near different hazard areas.

Adams County is an example of a community that has prepared a future land use map that explicitly addresses hazard risks. The Imagine Adams County Plan future land use overlays floodplains, the wildland-urban interface, and flammable gas hazard areas with future land use. An excerpt of the map is below:



A portion of the Adams County future land use map in their 2012 Comprehensive Plan includes floodplains, wildland-urban interface, and other resource protection areas. The map also shows critical facilities.

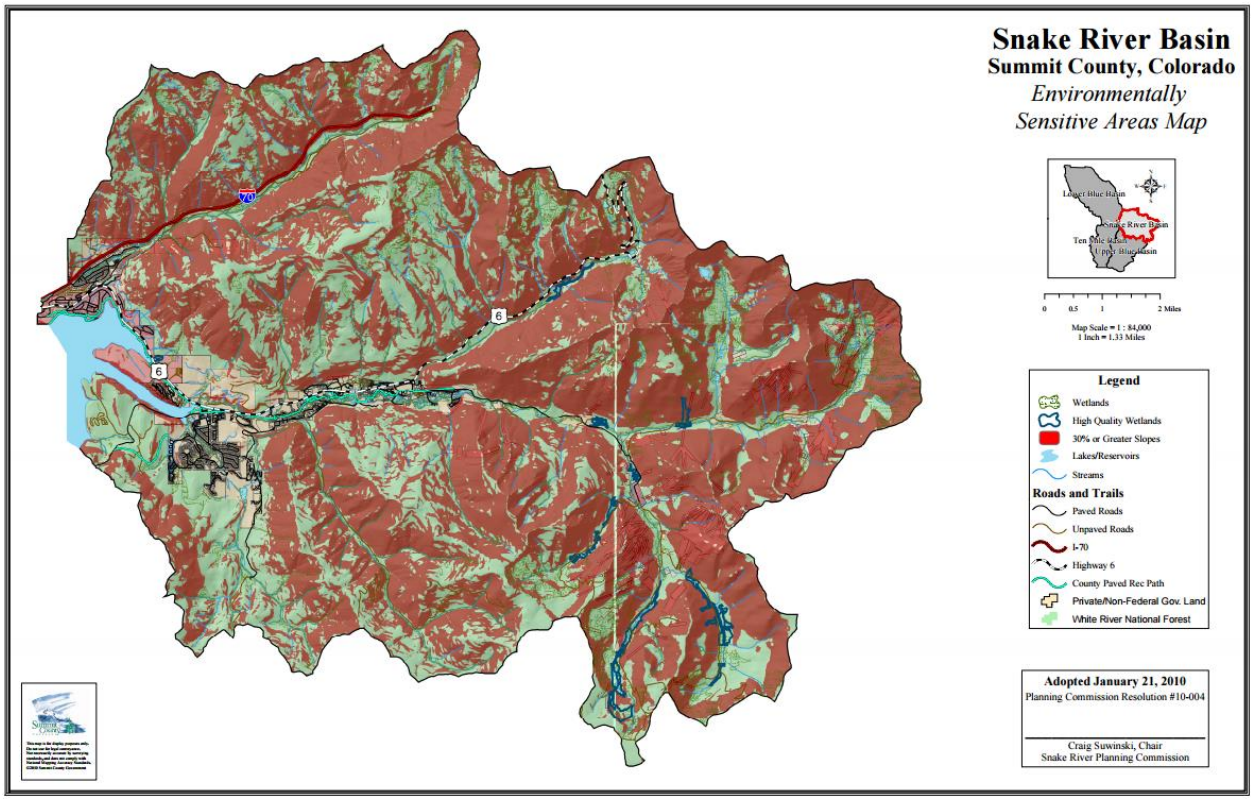
Source: Imagine Adams County (2012)

Address Hazards in Subarea Plans

Many communities prepare area-specific plans as a supplement to their jurisdiction-wide comprehensive plans. These subarea plans can be at various scales and are prepared for a variety of reasons. For example, a neighborhood plan might address housing issues, whereas a corridor plan might address mobility and economic development. Some area plans are created with the primary purpose of protecting environmentally-sensitive areas or to ensure appropriate hazard mitigation.

One such example is the *Snake River Master Plan* in **Summit County**. Adopted in 2010, the plan addresses flooding, avalanche hazards, steep slopes and other geologic hazards, wildfire, and hazardous materials transport in various sections. Even the affordable workforce housing element addresses wildfire hazard by stating that "development [in Keystone Gulch] should occur in a manner that to the extent reasonable: mitigates wildfire hazard…" (p. 36).

Appendix C in the Snake River Master Plan includes architectural and environmental design standards for the basin. The first goal in that appendix includes a policy that development shall generally seek to avoid slopes over 30 percent and 100-year floodplains. Maps that accompany the Snake River Master Plan also identify hazardous areas. The map below illustrates environmentally sensitive areas in the Snake River Basin, including 30 percent or greater slopes (shaded in red).



The Snake River Master Plan includes this map showing environmentally sensitive areas in the basin. Slopes greater than 30 percent are shaded in red on this map.

Source: Snake River Master Plan (2010)

Several other examples of subarea plans addressing hazards exist in Colorado, including in Pitkin and El Paso Counties, and the Town of Gypsum.

Link the Comprehensive Plan and Local Hazard Mitigation Plan

Another way to effectively integrate hazard mitigation into the comprehensive plan is to incorporate language directly from the local hazard mitigation plan, if one exists. This means incorporating information from the HIRA, such as the description of hazards that could impact the community, identifying specific geographic areas with higher risk, and discussing how vulnerable populations

should be addressed. Communities can also incorporate specific mitigation actions from the local hazard mitigation plan by aligning them with related plan policies and actions.

The comprehensive planning process should include subject matter experts that can help strengthen the plan as it relates to hazard mitigation. Conversely, the local hazard mitigation planning process should include land use planners that can evaluate and develop feasible mitigation solutions as they relate to land use planning.

Attach the Hazard Identification and Risk Assessment (HIRA) to the Comprehensive Plan

Another approach to ensure direct coordination between the local hazard mitigation plan and the comprehensive plan is to directly attach the HIRA portion of the hazard mitigation plan to the comprehensive plan as an appendix. This ensures that both documents are aligned and elevates the importance of hazard mitigation in the community's overall planning policy document.

However, there are some unique challenges associated with this approach:

- The local hazard mitigation plan is on a five-year time horizon, so updates are typically done at regular intervals. The comprehensive plan may have shorter or longer timeframes, so the hazard identification and risk assessment may have to be adopted as a separate amendment to the comprehensive plan upon FEMA approval of the updated local hazard mitigation plan.
- The hazard identification and risk assessment can be lengthy. It is common for the HIRA to exceed 200 pages. A comprehensive plan is typically a much shorter document, often under 100 pages total.

Cross-Reference Other Hazard Plans in the Comprehensive Plan

Incorporating the HIRA or other hazard plans through cross references allows such documents to be identified in key sections of the plan but avoids overwhelming the comprehensive plan with the entirety of hazards information.

For example, the **Glenwood Springs** Comprehensive Plan, adopted in 2011, includes several linkages to relevant hazard mitigation information in the appendices. For example, Appendix 7, Public Utilities and Services, describes the city's Community Wildfire Prevention Plan and also discusses the hillside overlay protection ordinance as a relevant hazard mitigation tool for the city.

ADVANTAGES AND KEY TALKING POINTS

Because the comprehensive plan serves as the overarching policy guidance document for the community, there are several advantages for developing a plan that integrates hazard mitigation:

- The planning process typically involves a large audience, including the general citizenry, interdepartmental staff, and other stakeholders from the community, allowing for increased public outreach and engagement on hazards.
- The process typically looks at future land uses to determine what is best for the community.
- Compliance with the comprehensive plan is often tied to approval criteria for development applications.
- Allows for integration of other policy documents that address hazards into one unified location.

CHALLENGES

The comprehensive planning process is an all-encompassing document; therefore, communities have to strike a balance between including policies related to every topic, and maintaining a user-friendly and concise document. This means that the comprehensive plan may not always be the only place to look for policy direction on any one given issue. In the case of hazard mitigation, the comprehensive plan must be used in concert with the Local Hazard Mitigation Plan (if such plan exists). Other challenges include:

- Developing a comprehensive plan, or comprehensive plan update, can be time intensive.
- Comprehensive plans must be updated periodically to match shifts in policy direction related to specific elements.

KEY FACTS

Administrative capacity	Planner lead, with support from other departments such as public works, parks, engineering, finance, and others
Mapping	Some technical mapping and GIS analysis may be required for integrating hazard areas into the future land use map
Regulatory requirements	None required, but can support plan implementation
Maintenance	Should be updated at a regular time interval, or sooner if conditions in the community warrant a change; if a hazard mitigation plan is submitted for FEMA approval, five-year updates are required
Adoption required	Yes, typically adopted by the planning commission, and ratified by the elected body
Statutory reference	C.R.S. § 30-28-106 (counties) C.R.S. § 31-23-206 (municipalities)
Associated costs	Staff time, plus potential costs for mapping or other technical work, public outreach activities, and consultant services

EXAMPLES

Adams County Comprehensive Plan	adcogov.org/DocumentCenter/View/2785
Town of Bennett Comprehensive Plan	plan-tools.com/PDFs/20111020-Bennett-Plan-Doc.pdf
Town of Crested Butte Community Plan	crestedbutte-co.gov/vertical/Sites/%7B6058FFBB-CB06-4864-B42F-B476F794BE07%7D/uploads/PartIII-p60-93.pdf
Douglas County Comprehensive Master Plan 2035	douglas.co.us/documents/full-cmp.pdf

Glenwood Springs Comprehensive Plan	gwsco.gov/DocumentCenter/View/133
Logan County Master Plan	colorado.gov/pacific/sites/default/files/Master%20Plan%202011.pdf
City of Steamboat Springs Area Community Plan	steamboatsprings.net/DocumentCenter/View/1797

FOR MORE INFORMATION

American Planning Association: Hazard Mitigation: Integrating Best Practices into Planning (PAS 560)

fema.gov/media-library/assets/documents/19261

FEMA: *Integrating Hazard Mitigation into Local Planning: Case Studies and Tools for Community Officials* (March 2013)

fema.gov/media-library-data/20130726-1908-25045-0016/integrating_hazmit.pdf

CLIMATE PLAN

Source: Clarion Associates

HAZARDS ADDRESSED

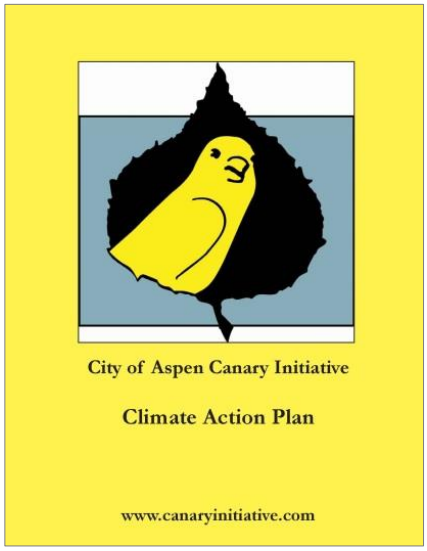
HOW IT WORKS

Climate plans, also referred to as "climate action plans," are an increasingly common type of specialized plan developed by local governments to address the challenges of a changing climate. They are designed to provide a strategic framework for driving local actions to assess, understand, and reduce greenhouse gas emissions, identified as a root cause of climate change. Plans increasingly also include strategies to prevent or minimize the anticipated adverse effects of climate change.

One distinction in climate planning terminology is important: "mitigation" refers to the practice of reducing greenhouse gases, while "adaptation" refers to anticipating and taking action to reduce the adverse consequences of climate change, including those relating to natural hazards risks. An example of a mitigation strategy might be converting public buses to biodiesel or other alternative fuels, while an example of an adaptation strategy would be adopting a larger setback from flood-prone areas.

At a minimum, climate plans include:

- An inventory of existing emissions;



The City of Aspen adopted its Climate Action Plan in 2007, one of the earliest plans adopted in the state, as part of the Canary Initiative, a community effort to reduce the threat of climate change.

Source:
aspenpitkin.com/Portals/0/docs/City/GreenInitiatives/Canary/CAP-final%20without%20dates.pdf

- The identification of reduction goals or targets; and
- The evaluation and prioritization of local actions to achieve those emission goals or targets.

Ideally, they also include:

- An assessment of current and projected climatic conditions (based on data that is downscaled for local applicability);
- A strategy for preparing and adapting to the negative effects or consequences; and
- The identification of resources or funding sources required to implement the overall plan.

While local climate plans largely serve as a blueprint for emission reduction efforts, many communities find it advantageous to address climate preparedness and adaptation efforts in the same document. In these cases **the development and implementation of the climate plan should be integrated with the local hazard mitigation plan** to eliminate duplication of effort but also to ensure that the assessment and understanding of climate-related vulnerabilities and community risk reduction strategies are consistent and closely coordinated. Community goals and policies for climate change mitigation and adaptation should also be incorporated into the local comprehensive plan, as many strategies will likely overlap with policies across multiple elements. Colorado communities should be prepared for an increased threat from natural hazards such as drought, extreme heat, wildfire, or severe storms based on climate change projections.

IMPLEMENTATION

Similar to many other plans, the long-term effectiveness of climate plans requires the local adoption and execution of policies, actions, and programs identified in the plan, as well as measuring their success over time. Unique to climate plans, however, is the need to quantify, measure, and report progress on the reduction of greenhouse gases over a given time period as prescribed in the plan. Therefore, communities must be prepared to develop and maintain a greenhouse gas inventory or identify a source for this scientific data (such as the Colorado Climate Center, cited below).

Climate action plans also typically differentiate between community-wide actions and those assigned to specific local agencies or departments, each of which should be held accountable for managing certain sources of emissions. The implementation of climate plans also relies heavily on the completion of specific actions designed to mitigate or adapt to the effects of climate change. For purposes of natural hazard mitigation, this requires the routine tracking, evaluation, and reporting of risk reduction strategies that may also be referred to separately as climate adaptation or climate preparedness actions. Effective intergovernmental coordination on these parallel or overlapping efforts is paramount for success.

WHERE IT'S BEEN DONE

Plaza near Union Station, Denver, CO.

Source: Arina P. Habich

In 2007, **Denver** unveiled its *Climate Action Plan* and set a greenhouse gas reduction goal to reduce emissions by 10 percent per capita below 1990 levels by 2020. Denver is on track to meet this goal and continues to be proactive in reducing city-wide per capita emissions. In 2014, in recognition that the climate is already changing with the potential to harm the city's social, economic, and environmental sectors, Denver adopted a separate and supplemental *Climate Adaptation Plan*. The objectives of the *Climate Adaptation Plan* are to prepare for and mitigate the risks associated with potential climate impacts to Denver, including higher temperatures and increases in the urban heat island effect, more extreme weather events, reduced annual snowpack, earlier snowmelt, and the resultant change to downstream flows.

Beginning in the spring of 2012, in response to the need for long-term planning and a coordinated response to the consequences of climate change in Denver, the City convened a working group made up of department representatives to begin identifying the top vulnerabilities to climate change and assess the impacts. The group established a framework of short, medium, and long-term climate adaptation activities to allow Denver to reach its long-term vision to be one of the most innovative and resilient cities in the face of climate change. The short, medium, and long-term activities are categorized by the following six broad planning areas that will be affected by different impacts from climate change and can thereby adapt in different ways:

- Buildings and Energy
- Health and Human Services
- Land Use and Transportation
- Urban Natural Resources
- Water Consumption
- Food and Agriculture

According to Mayor Michael Hancock, Denver's *Climate Adaptation Plan* (2014) "provides a collaborative path forward to protect what we cherish so that future generations will enjoy economic opportunity, effective and efficient infrastructure, parks and open spaces, and an environment conducive to supporting resident health and well-being."

In November 2015, **King County, Washington,** approved a comprehensive update to its *Strategic Climate Action Plan* (SCAP) which serves as a national best practice for a plan that actively addresses both climate change mitigation and adaptation. The plan includes two clear and distinct sections: one focused on reducing greenhouse gas emissions and the other on preparing for climate change impacts, with the latter recognizing that many impacts are now inevitable. The SCAP effectively serves as King County's blueprint for climate action with a paramount goal to integrate mitigation and adaptation tactics into all areas of local government operations, plans, policies, and procedures –

including the County's Comprehensive Plan, which began including climate resiliency recommendations in 2008.

ADVANTAGES AND KEY TALKING POINTS

Climate plans establish the roadmap for how a community will address climate change through mitigation and adaptation activities. Climate plans can help assess and communicate how projected changes in climate may impact the community in social, economic, and environmental terms, and identify actionable and measureable strategies for minimizing those impacts. Other benefits include:

- Affirms that the community is locally engaged in the issue of global climate change.
- Describes how climate change is expected to affect future economic and environmental conditions, including natural hazards.
- Establishes clear goals and targets to evaluate progress over time.
- Includes a variety of no-cost or low-cost investment opportunities along with "no regret" policy options that elected leaders can more readily support.
- Provides an additional mechanism for implementing or advancing hazard risk reduction strategies (climate adaptation). For example, climate plans may support and/or be directly linked to actions identified in the local hazard mitigation plan, such as the replacement of aging stormwater infrastructure to better accommodate increased flows resulting from more intense rainfall events and earlier spring runoff.
- Can complement a community's hazard mitigation plan by helping to inform the risk assessment and mitigation strategy.

"No Regret" Policy Options

Due to the uncertainties associated with future climate change, many communities are seeking to identify and prioritize "no-regrets" approaches to their decision-making process. These include actions that can be easily justified from social, economic, and/or environmental perspectives based on current conditions and whether the impacts of climate change and natural hazard events actually occur or not. In other words, no-regrets actions are considered cost-effective now under a range of future scenarios and do not involve hard trade-offs with other policy or funding alternatives.

CHALLENGES

Climate plans often require technical and scientific expertise to prepare, particularly in downscaling global or regional climate model data and developing a local baseline inventory of greenhouse gas emissions. Such expertise may not be available locally and can be expensive to obtain. Other related challenges include:

- Climate change remains a potentially divisive issue for some stakeholders, including elected officials.
- Uncertainty and wide ranges of potential future scenarios are inherent to any long-term climate model projections.
- Can be challenging to implement specific actions and achieve goals without adequate funding or resources, particularly for emissions reduction.

KEY FACTS

Administrative capacity	Community planner supported by experts in climate science
Mapping	Not typically required
Regulatory requirements	None required, but can support plan implementation
Maintenance	Should be updated at a regular time interval (every three to five years minimum)
Adoption required	Yes
Statutory reference	N/A
Associated costs	Staff time, plus potential costs for quantifying greenhouse gas emissions, downscaling climate models or other technical work, public outreach activities, and/or consultant services

EXAMPLES

City of Aspen Canary Initiative	aspenpitkin.com/Living-in-the-Valley/Green-Initiatives/Canary-Initiative
City of Boulder Climate Action Plan	bouldercolorado.gov/climate
Town of Carbondale Energy and Climate Protection Plan	coloadaptationprofile.org
City and County of Denver Climate Action and Adaptation Plans	denvergov.org/environmentalhealth/EnvironmentalHealth/EnvironmentalQuality/Climate/tabid/444803/Default.aspx
City of Fort Collins Climate Action Plan Framework	fcgov.com/climateprotection
City of Glenwood Springs Energy and Climate Action Plan	garfieldcleanenergy.org/pdf/government/climate-plans/Glenwood-Springs-ECAP.pdf
Town of Newcastle Climate Action and Environmental Initiatives	newcastlecolorado.org/business/green-business
King County, WA Strategic Climate Action Plan	kingcounty.gov/environment/climate/king-county/climate-action-plan.aspx

State of Colorado Climate Plan and Water Plan	cwcbweblink.state.co.us/WebLink/ElectronicFile.aspx?docid=196541&searchid=243b8969-739b-448c-bd2d-699af9b7aea0&dbid=0 (Climate Plan) colorado.gov/cowaterplan (Water Plan)

FOR MORE INFORMATION

Colorado Department of Public Health and Environment Climate Change Website
colorado.gov/pacific/cdphe/categories/services-and-information/environment/air-quality/climate-change

Colorado Water Conservation Board Climate Change Website
cwcb.state.co.us/environment/climate-change/Pages/main.aspx

Colorado Climate Network
coclimatenetwork.org

Colorado Climate Change Vulnerability Study
wwa.colorado.edu/climate/co2015vulnerability

Colorado Climate Center
ccc.atmos.colostate.edu

The Colorado Climate Preparedness Project
coloadaptationprofile.org

Rocky Mountain Climate Organization
rockymountainclimate.org

COMMUNITY WILDFIRE PROTECTION PLAN (CWPP)

Source: Boulder County

HAZARDS ADDRESSED

HOW IT WORKS

Title I of the Healthy Forest Restoration Act (HFRA) of 2003 authorizes communities to draft and implement **Community Wildfire Protection Plans (CWPPs)**. CWPPs are local plans that are designed to specifically address a community's unique conditions, values, and priorities related to wildfire risk reduction and resilience. Communities with CWPPs in place are given priority for funding of hazardous fuels reduction projects carried out under the HFRA.

CWPPs can vary in scope, scale, and detail, but if prepared they must meet minimum requirements for their contents and adoption in Colorado as described by HFRA and the Colorado State Forest Service (CSFS), per Colorado Senate Bill 09-001. These requirements include:

- A collaborative process including the local government, local fire authority, local CSFS representatives, representatives of relevant federal land management agencies, and other relevant non-governmental partners.
- A description of the community's wildland-urban interface (WUI) outlined on a map with an accompanying narrative.
- A community risk analysis that considers fuel hazards, risk of wildfire occurrence, and community values to be protected.
- Recommendations and an implementation plan to identify fuels treatment projects, methods to reduce structural ignitability, and project priorities.

In practice, many CWPPs go beyond these requirements by engaging additional stakeholders (e.g., non-governmental organizations, community groups, and residents) to provide input and increase local buy-in for future projects. Many plans also include a narrative on local fire history, community demographic information that may affect the future WUI, and any linkages with other local plans.

To maximize synergy between wildfire risk reduction and community land use planning activities, CWPPs should reference comprehensive plan policies, consider and inform the future land use map as part of wildland-urban interface planning, and look for opportunities to implement wildfire risk reduction activities (e.g., defensible space) through the land development code.

Many communities also include CWPP actions to support their efforts in becoming a "fire adapted community" by participating in national wildfire mitigation programs such as Firewise Communities/USA and "Ready, Set, Go!" Firewise Communities/USA (commonly referred to as "Firewise") is a national recognition program administered by the National Fire Protection Association that provides guidance and steps for homeowners and neighbors to voluntarily engage in wildfire risk reduction activities at a local scale. "Ready, Set, Go!" is a national program administered by the International Association of Fire Chiefs that provides guidance to homeowners and fire departments on wildfire preparedness, evacuation planning, and other emergency response issues associated with wildfire planning.

Further detail on plan components and guidance is available through the Colorado State Forest Service website: csfs.colostate.edu/wildfire-mitigation/community-wildfire-protection-plans.

IMPLEMENTATION

A CWPP's scale will determine the level of detail required for effective implementation. CWPPs can be developed for any type of community, such as neighborhoods, towns, fire protection districts, and counties. Information and level of specificity should match the plan's scale. For example, county-level CWPPs are excellent "umbrella" plans for guiding priorities in smaller communities or county subareas, but typically do not provide the level of detail needed for reducing risk at a site-specific scale.

CWPPs must be approved and signed by a representative from the three primary entities engaged in the development process—local government, local fire authority, and the Colorado State Forest Service. CWPPs can be adopted as a freestanding document or be attached to other plans. For example, some jurisdictions have included their CWPP as an appendix to the local hazard mitigation plan. A CWPP typically requires a major update every five years due to potential changes in the community, available data, and stakeholders. The CWPP should be regularly consulted to track project implementation and progress.

Different aspects of the CWPP process and outcomes can be seen as a best practice, including:

- **Collaboration.** Did the process for preparing it include genuine stakeholder engagement and public input?
- **Plan Implementation.** Does the final product reflect stakeholder input and will there be buy-in from the community? Does it capture an organized set of actions for the community to follow during implementation?

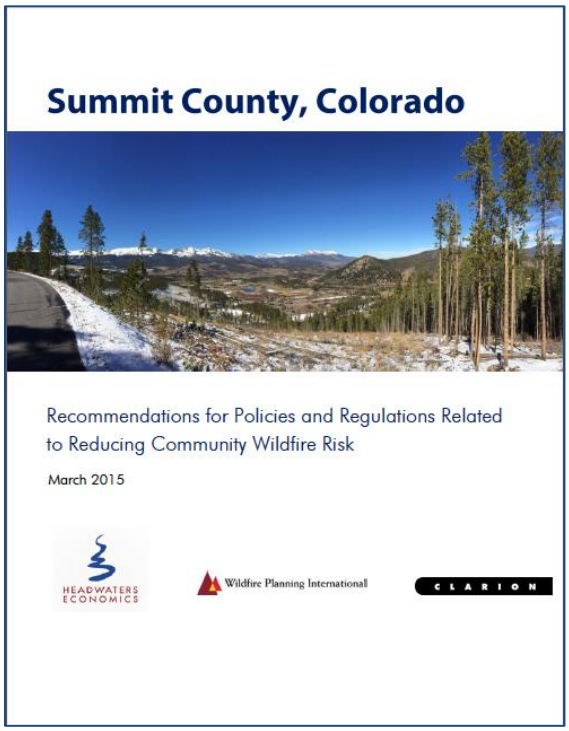
Tip:
The most successful CWPPs are those that are accessible to a wide variety of audiences, accurately reflect public and stakeholder input, provide specific actions, and can be tracked over time.

WHERE IT'S BEEN DONE

The **Colorado State Forest Service (CSFS)** works closely with communities across the state to support them in the development of their CWPP. CSFS also maintains a database of those

communities with an approved CWPP and the year it was adopted or last revised. These CWPPs are available for download and planners are encouraged to view these examples to determine which CWPPs are in place within their local jurisdiction or county: csfs.colostate.edu/wildfire-mitigation/colorado-community-wildfire-protection-plans

Boulder County demonstrates a highly collaborative best practice for completing a CWPP. The *Boulder County Community Wildfire Protection Plan*, completed in 2011, was the result of the hard work of hundreds of residents, stakeholders, and agency staff, including members of the plan's Core Team, Citizen Advisory Team, Foresters Work Group, and Risk Assessment Work Group. The Core Team included several staff members from the Boulder County Land Use Department.



Summit County's planning department worked with technical experts to review their CWPP and implement recommendations that would improve the integration between the CWPP, Land Use and Development Code, and other planning documents.

Source: headwaterseconomics.org

This level of collaboration is evident in the CWPP's end result: the plan is user-friendly and accessible to a wide range of audiences. Technical information is easily digestible and free of acronyms, and the plan reflects a truly local approach by sharing personal stories from homeowners affected by different fires. Boulder County's CWPP was recently used as a model by other communities such as the Lake Tahoe Basin CWPP, which designed a similarly user-friendly layout full of explanatory images and illustrations.

The **East Canyon CWPP (Montezuma County)** (2014) is a good example of two separate communities that came together to increase the safety of their community as a whole. East Canyon includes the Elk Springs Ranch and Elk Stream Ranch neighborhoods, two separate gated communities that share the same entrance road. The East Canyon community experienced the Weber Fire in 2012, and includes both primary residences and vacation homes. This CWPP outlines the community characteristics and history that led to the desire for the two communities to combine into a single CWPP. The community assessment is well thought out and provides supplementary images of hazards and community risks. The CWPP also contains a "Desired Conditions and Recommendations for Action" table that identifies roles and allows the community to easily prioritize and track steps for reducing wildfire risk. Finally, the CWPP shows how CWPPs can effectively operate on a variety of scales. This plan tiers to county and regional land management plans as well as Montezuma and La Plata County CWPPs.

In 2012, the **West Region Wildfire Council (WRWC)**, which is based in Montrose and supports several western Colorado counties, began integrating wildfire risk assessments into their community-level CWPPs. WRWC assesses homes based on 11 wildfire risk elements on properties that have a primary home. Each wildfire risk element is weighted based on how much that element effects home vulnerability from a wildfire (e.g., wood roof results in higher points than missing address signage).

The end result is a community map indicating Extreme to Low wildfire risk parcels, which can then enable each CWPP to provide community and individualized risk reduction recommendations.

This information makes the CWPP implementable and accessible because homeowners can look up their risk rating by address. In addition, this information provides a tool for targeting specific audiences. For example, as part of the annual National Community Wildfire Preparedness Day, WRWC sent postcards to all "Extreme", "Very High" and "High" rated homes within one of the local fire protection districts. The postcards informed homeowners that a recent wildfire risk assessment was completed along with their corresponding rating and invited them to attend the local community preparedness event to learn more. This outreach resulted in record turnout, with homeowners signing up for follow up professional assessments and completing additional mitigation projects.

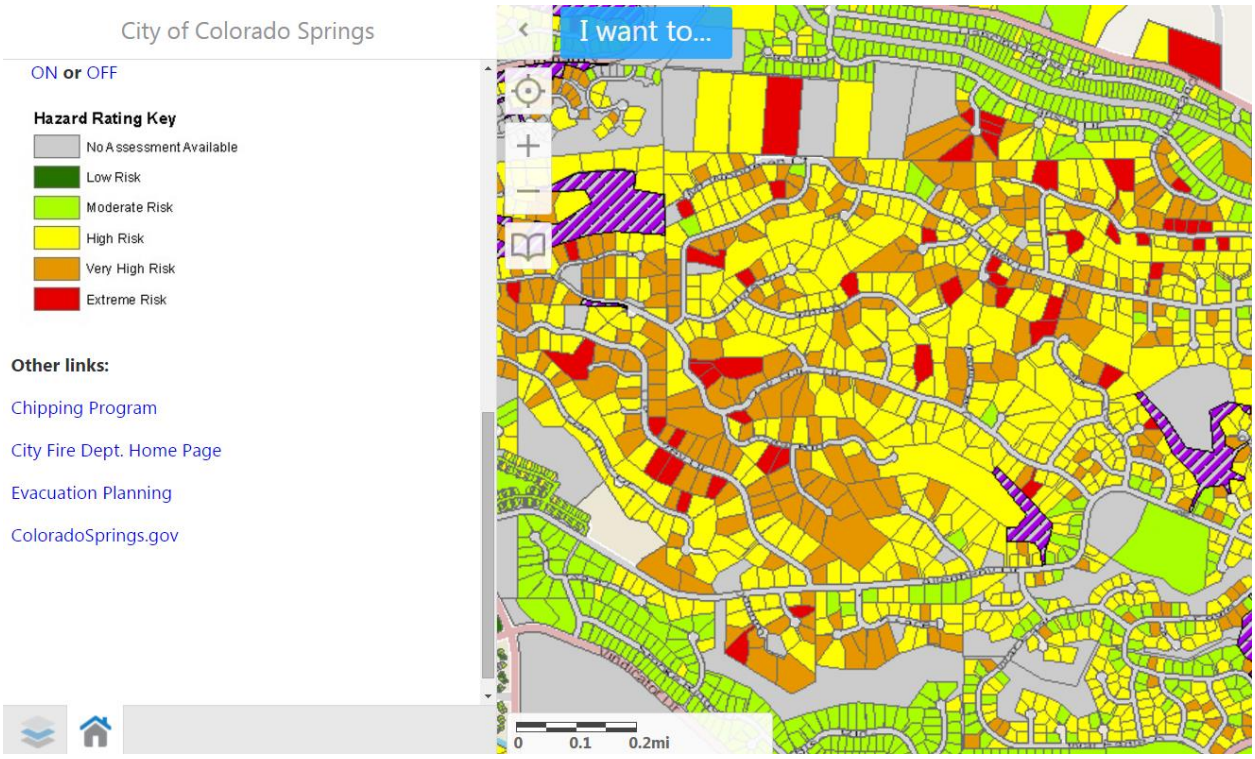
The 2012 Waldo Canyon Fire – Colorado Springs, Colorado

Understanding a community's wildfire risk prior to an event not only guides appropriate action but also provides valuable information during and after a wildfire. On June 23, 2012, the Waldo Canyon Fire started approximately four miles northwest of Colorado Springs, Colorado. The fire grew quickly and within days thousands of residents were evacuated. Several neighborhoods within city limits were severely affected – in total over 346 homes were destroyed. The often untold story, however, is that many positive mitigation efforts were in place prior to the wildfire event, enabling more effective wildfire response and contributing to over 80% of potentially at-risk homes being saved during the Waldo Canyon Fire.

The Colorado Springs Fire Department had been working on wildfire risk assessment and mitigation efforts for years prior to the Waldo Canyon Fire. As early as 1993, the City passed an ordinance on vegetation management, roadway width, and sprinkler installation (applicable to development occurring after April 1993), and has subsequently adopted additional ordinances to strengthen building and construction occurring in the wildland-urban interface. The City's first Wildfire Mitigation Plan was completed in 2001; meanwhile the Colorado Springs Fire Department Wildfire Mitigation Section began using the ***Wildfire Hazard Risk Assessment (WHINFOE****) tool to determine risk ratings from low to extreme. Nearly 36,000 homes in 63 neighborhoods were identified as at-risk in the wildland-urban interface. An online public mapping tool was developed to display fire hazard ratings and a risk category for each property, with additional details such as distance between structures, predominant roofing and siding material, defensible space around the structure, and vegetation density. Creating and maintaining accessible wildfire risk assessment information has proved useful in multiple ways:*

- *Homeowners were very responsive to the online website— it increased awareness and engagement.*
- *The site fosters proactive mitigation actions prior to any wildfire event occurring.*
- *The level of information available to practitioners has also facilitated greater learning after the wildfire.*

A post-fire assessment team, led by the Insurance Institute for Business and Home Safety, observed where mitigation strategies were effective during the Waldo Canyon Fire by conducting home assessment surveys. The results showed less damage to homes that had employed mitigation strategies such as reducing fuel loads, spacing structures appropriately, and including landscaping breaks to prevent spread. The pre-fire data provided invaluable information for comparative post-fire damage assessments, and enabled wildfire practitioners to glean insights on wildfire mitigation. Finally, promoting awareness and partnerships through the risk assessment process complemented the success of many other mitigation efforts, such as the development of a Community Wildfire Protection Plan, grant funding and administration, adoption of progressive code requirements for new construction, and fuel treatments.



The Colorado Springs Fire Department provides the public with an opportunity to view their wildfire hazard rating online. This information is collected for properties in the area of the city designated as the WUI.

Source: Colorado Springs Fire Department. Wildfire Mitigation. April 3, 2014 gis.coloradosprings.gov/Html5Viewer/?viewer=wildfiremitigation

ADVANTAGES AND KEY TALKING POINTS

Developing and implementing a CWPP has many advantages for a local community, including:

- Provides the opportunity to establish a locally appropriate definition and boundary for the wildland-urban interface (WUI) and enables communities to identify local priorities and actions.
- Enables access to additional state funding opportunities (for example, CWPPs are an eligibility requirement for communities pursuing funds through the Colorado Forest Restoration program).
- Can assist communities in influencing where and how federal agencies implement fuel reduction projects on federal lands and how additional federal funds may be distributed for projects on nonfederal lands.
- Reinforces existing stakeholder partnerships and establishes relationships among a wide variety of non-traditional partnerships.

CHALLENGES

As is the case with many specialized local plans, there are also a few common challenges:

- Can become “one more plan” for stakeholders to put on their to-do list, and the burden of implementation may fall unevenly on a few individuals. To address this challenge, some

communities now include their CWPP as a chapter or appendix to their local hazard mitigation plan. This ensures adoption and maintenance, and can provide additional leverage for funding support.

- Depending on the scale, scope, and level of detail, CWPPs can be time-intensive and costly to develop. Can require specialized knowledge to develop that may not exist in local agencies.
- Creating a plan does not necessarily guarantee actions will get funded, although this can be addressed more effectively when coordinated with other community plans and priorities.

KEY FACTS

Administrative capacity	Experienced planner; coordination with local fire authority; emergency manager
Mapping	WUI map required, which can be a substantial effort
Regulatory requirements	C.R.S. § 30-15-401.7
Maintenance	Recommended updates every five years
Adoption required	Yes for counties, optional for all others
Statutory reference	C.R.S. § 23-31-312; §30-15-401.7
Associated costs	Varies significantly depending on the level of detail and the technical analysis included in the document

EXAMPLES

Boulder County CWPP	bouldercounty.org/property/forest/pages/lucwppmain.aspx
Montezuma County East Canyon CWPP	csfs.colostate.edu/media/sites/22/2015/02/East-CanyonCWPP-0215.pdf
Lake Tahoe, CA CWPP	tahoe.livingwithfire.info/wp-content/uploads/2015/03/LTBCWPP__01-07_BasinWideNarrative.pdf
West Region Wildfire Council CWPPs	cowildfire.org/cwpps

FOR MORE INFORMATION

Colorado State Forest Service CWPP webpage

csfs.colostate.edu/wildfire-mitigation/community-wildfire-protection-plans

Community Guide to Preparing and Implementing a CWPP

stateforesters.org/CWPP-community-guide

CWPPs in the American West (Ecosystem Workforce Program)

ewp.uoregon.edu/wfresilience

Fire Adapted Communities

fireadapted.org

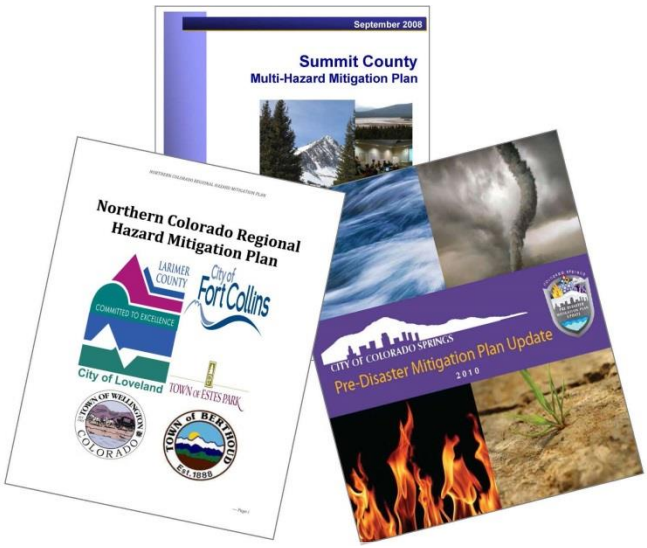
Firewise Communities

firewise.org

Ready, Set, Go!

wildlandfirersg.org

HAZARD MITIGATION PLAN



Source: Adapted by Clarion Associates

HAZARDS ADDRESSED

HOW IT WORKS

Hazard mitigation plans are prepared and adopted by communities with the primary purpose of identifying, assessing, and reducing the long-term risk to life and property from hazard events. Effective mitigation planning can break the cycle of disaster damage, reconstruction, and repeated damage. Hazard mitigation plans can address a range of natural and human-caused hazards. They typically include four key elements: 1) a risk assessment, 2) capability assessment, 3) mitigation strategy, and 4) plan maintenance procedures. Plans can be developed for a single community or as a multi-jurisdictional plan that includes multiple communities across a county or larger multi-county planning region. While most hazard mitigation plans are prepared as stand-alone documents, they can also be developed as an integrated component of a community's local comprehensive plan. Ninety-five percent of Colorado's population resides in a community that has adopted a local hazard mitigation plan.

Local hazard mitigation planning did not become a common or standard practice for most communities until the passage of the U.S. Disaster Mitigation Act of 2000, which amended federal legislation to require the development of a hazard mitigation plan as a condition for local jurisdictions to receive certain types of non-emergency disaster assistance, including funding for mitigation projects. Today, more than 27,000 communities nationwide have adopted local hazard mitigation plans in compliance with the planning laws, regulations, and guidance promulgated by the Federal Emergency Management Agency (FEMA). To maintain their compliance and eligibility for grant funding these plans must be updated and approved by FEMA every five years.

Similar to other local community plans, hazard mitigation plans are oriented toward anticipating and preparing for future conditions or impacts rather than responding to events as they occur. While there

are various methods and practices applied in the development of hazard mitigation plans, they should all be prepared in conformance with the latest regulations and guidance from FEMA and the Colorado Division of Homeland Security & Emergency Management (DHSEM).

Perhaps even more important for local governments is the horizontal coordination and integration of hazard mitigation plans with other plans, policies, and regulations for guiding community development. Describing a process for doing so is a requirement for local hazard mitigation plans, and in recent years both FEMA and the American Planning Association (APA) have distributed specific guidance for planners on this topic (see *Additional Resources*). **When developed and implemented in concert with land use plans, zoning ordinances, or other local planning mechanisms, the local mitigation plan can be a powerful tool for reducing community vulnerability to known hazards.** Moreover, in cases where a community may not have effective plans or regulations already in place, the hazard mitigation plan can become a critical document for guiding future decision and policy making.

IMPLEMENTATION

Many communities have already prepared and adopted a local hazard mitigation plan, and often have done so as part of a multi-jurisdictional planning effort. Regardless, **the responsibility for plan implementation lies with each jurisdiction**. Community-specific risk assessments, actions, and procedures in support of the overall goals for the planning area must be included as part of the mitigation strategy and plan maintenance elements of the plan. While the risk and capability assessment studies help form the foundation for the plan, mitigation policies, projects, or other actions and the community's roadmap for plan implementation are found in these latter elements. The actions included in a community's mitigation strategy should address the vulnerabilities identified in the risk assessment and include a comprehensive range of mitigation measures including structural projects and non-structural activities such as development codes and regulations, public education and outreach initiatives, and natural resource protection strategies.

At a minimum, per FEMA regulations, local hazard mitigation plans must undergo a comprehensive update and be formally approved and re-adopted by the community's governing body every five years. However, to promote more effective local implementation, they should be routinely monitored, updated, and reported on by each community on a frequent basis. This is particularly critical for integrating the hazard mitigation plan into other local planning mechanisms as described above.

WHERE IT'S BEEN DONE

Mesa County (2015) has been implementing and maintaining its hazard mitigation plan since it was first approved by FEMA in 2005. The plan was initially developed as a multi-jurisdictional plan and today covers not only all incorporated municipalities but extends to other jurisdictions including the 5-2-1 Drainage Authority and several fire protection districts. Mesa County led the plan's third comprehensive update process in 2014 under the direction of a planning committee that included representatives from all participating jurisdictions in addition to local businesses, utilities, state agencies, and other stakeholders. The County has also successfully integrated the 10-step planning process prescribed under FEMA's Community Rating System (CRS) and is among only a handful of Colorado communities to gain significant CRS credit points for floodplain management planning.

Examples of mitigation actions already completed under the direction of Mesa County's plan include the mapping of geologic and wildfire hazards, a community wildfire protection plan for the Plateau Valley, a flood mitigation project that removed more than 100 structures from the regulatory floodplain, and achieving certification as a *StormReady* community by the National Weather Service.

The plan also recognizes the importance of integrated planning, stating that "an important implementation mechanism that is highly effective and low-cost is incorporation of the hazard mitigation plan recommendations and their underlying principles into other plans such as comprehensive planning, capital improvement budgeting, and regional plans. Mitigation is most successful when it is incorporated in the day to day functions and priorities of government and in land use and development planning." As such, the incorporation of information contained in the plan into other planning mechanisms remains a high priority action for all jurisdictions. Per the 2015 plan update the County has also proposed to conduct community resilience planning through a more structured planning process.

In 2014, **Tulsa, Oklahoma,** completed a comprehensive update to its existing *Multi-Hazard Mitigation Plan* using the 10-step planning process as recommended through FEMA's Community Rating System (CRS). Although subject to many past flood disasters, today Tulsa is renowned for its status as one of the nation's most resilient and highest rated CRS communities (Class 2), thereby providing its floodplain residents with the direct benefit of a 40% discount on flood insurance costs. In order to maintain and enhance this rating, the City maintains a highly actionable and successful hazard mitigation plan that methodically addresses all natural and man-made hazards. The plan is widely recognized in as an exemplary model for other communities to follow in their own hazard mitigation and CRS planning efforts.

Tulsa, Oklahoma.

Source: Rex Brown

ADVANTAGES AND KEY TALKING POINTS

One of the most direct benefits and motivating factors for communities to prepare and adopt a hazard mitigation plan or integrate this into their comprehensive plan is maintaining their eligibility to pursue pre-disaster and post-disaster grant funding assistance for mitigation projects. Other benefits include:

- Gaining an increased awareness and understanding of local hazard risks and vulnerabilities, as well as existing mitigation capabilities and activities.
- Identifying, evaluating, and prioritizing potential risk reduction measures including both mitigation project and policy alternatives.
- Engaging and communicating with the public, community leaders, other stakeholders on the assessment and mitigation of known hazards.

- Building partnerships by involving citizens, organizations, and businesses to more comprehensively address disaster risk reduction.
- Developing strong partnerships between planners and emergency managers to fully integrate land use and hazard planning efforts.
- Aligning disaster risk reduction strategies with other community objectives.
- Communicating local risk reduction priorities to state and federal officials.
- Increasing the speed and decreasing the costs associated with disaster recovery.
- Pre-identifying risk reduction activities that can be partially or wholly funded through existing mitigation grant programs, including but not limited to FEMA's Hazard Mitigation Assistance (HMA) programs, in addition to leveraging other financial assistance to support multi-objective projects.
- Making the hazard mitigation plan a meaningful planning document rather than a requirement that simply needs to be submitted to FEMA for approval.

CHALLENGES

The greatest challenge for most communities is the initial development of a hazard mitigation plan that meets all state and federal requirements. The planning process, which is typically managed over the course of 8-12 months, must follow a fairly prescriptive and thoroughly documented approach in order to gain final plan approval. For this and other reasons, many communities opt to participate in a multi-jurisdictional plan and/or hire an outside consultant for planning assistance. Other related challenges include:

- Sustaining momentum and keeping the plan current and relevant can be a struggle for communities, especially those without clear plan implementation and maintenance procedures and/or the resources to carry them out.
- Multi-hazard risk assessments may require various levels of technical expertise, data, and technology to accurately identify and analyze hazard threats, vulnerabilities, and potential consequences.
- Unlike many other plans, the hazard mitigation plan is not a department-specific plan but should rather include the active participation and buy-in from many local offices and community and private-sector partners that can support risk reduction efforts.
- To be effective in engaging the public and other community stakeholders in the planning process, communities have to employ a coordinated, multi-faceted approach for outreach and communications. Civic engagement in hazard mitigation planning is a challenge for many communities.
- While plan updates should not be as challenging as initial plan development, communities are expected to run through a similar planning process at least every five years to maintain compliance with state and federal requirements.

KEY FACTS

Administrative capacity	Experienced planner with broad intergovernmental support; emergency manager

Mapping	Mapping highly desirable for risk assessment, but is not technically required, especially for hazards for which reliable map data does not exist, or for communities that have no capacity to do their own mapping. In these cases it is still possible to do quality risk assessments and mitigation plans through other means
Regulatory requirements	None required, but can support plan implementation
Maintenance	Must be updated every five years per federal rules and state regulations (Disaster Mitigation Act of 2000)
Adoption required	Yes
Statutory reference	Code of Federal Regulations (CFR), Title 44, Chapter 1, Part 201.6; no state statutory requirements
Associated costs	Staff time, plus potential costs for mapping or other technical work, public outreach activities, and consultant services

EXAMPLES

Adams County Hazard Mitigation Plan (Integrated into Comprehensive Plan)	co.adams.co.us/index.aspx?NID=1086
City of Colorado Springs Pre-Disaster Mitigation Plan Update	oem.coloradosprings.gov/public-safety/emergency-management/plans-reports-guides/2010-pre-disaster-mitigation-pdm-plan
Mesa County Hazard Mitigation Plan	sheriff.mesacounty.us/WorkArea/DownloadAsset.aspx?id=10319
Tulsa, OK Multi-Hazard Mitigation Plan	cityoftulsa.org/public-safety/hazard-mitigation.aspx

FOR MORE INFORMATION

FEMA Multi-Hazard Mitigation Planning Website

fema.gov/multi-hazard-mitigation-planning

DHSEM's Regional and Local Hazard Mitigation Plans Website

dhsem.state.co.us/emergency-management/mitigation-recovery/mitigation/regional-local-hazard-mitigation-plans

Beyond the Basics: Best Practices in Local Mitigation Planning

mitigationguide.org

PARKS AND OPEN SPACE PLAN


Source: Jefferson County

HAZARDS ADDRESSED

HOW IT WORKS

Parks and open space plans are intended to guide a systematic approach for communities to provide and preserve parks, undeveloped lands, and recreation services for the public good. While all comprehensive plans adopted by Colorado communities are required to include a recreation and tourism element, many choose to develop a separate, complementary parks and open space plan that includes more detailed information. Parks and open space resources within a community may include natural, scenic, cultural, historic, and recreational features or amenities. While such resources often are dispersed, communities increasingly are attempting to build interconnected park and open space systems linked by trails, greenways, or other public corridors.

The development of a parks and open space plan is often spurred by the desire to enhance public functions such as environmental protection, outdoor recreation, and growth management, thus shaping future development patterns to meet community needs while preserving areas in their natural state. **Parks and open spaces often overlap with critically sensitive or hazardous areas such as floodplains, steep slopes, or areas prone to wildfire.** This provides communities with unique opportunities to pursue the mitigation of natural hazards by avoiding development in these areas jointly with other community goals through the implementation of their parks and open space plan. Multi-benefit solutions have the additional advantage of being more likely to be supported by

Ridgeline Open Space Map, Town of Castle Rock.

Source: crgov.com/DocumentCenter/View/296

elected officials and the community at-large, and could even help leverage outside technical or non-traditional funding assistance.

Some common examples of how parks and open space plans dovetail with hazard mitigation goals include:

- **Mitigation of flood hazards**. Parks and lands preserved as open space play a critical role in flood risk reduction. Prohibiting development in known flood hazard areas is the only sure method to minimize future flood losses with little to no residual risk. This strategy is often employed along rivers and streams that are also very appealing areas for:
    - Creating parks and recreational assets such as picnic areas, hiking trails, and bicycle paths;
    - Providing riparian buffers and other green infrastructure assets for improving water quality and stormwater management; and
    - Preserving or enhancing the natural and beneficial functions of floodplains.

  The acquisition and demolition or relocation of existing flood-prone structures is also a common technique for communities seeking to reduce flood risk and synergize the efforts with other compatible goals as expressed in the parks and open space plan. In addition, the use of parks and other undeveloped lands for stormwater detention or retention practices can serve not only as a flood mitigation technique but also as a means to conserve water, improve water quality, increase biodiversity, or enhance aesthetics.
- **Mitigation of geologic and other hazards**. Many communities have adopted plans for parks and open space to support the acquisition or conservation of lands that also happen to be in hazardous areas, such as mountainous locations that are subject to landslides, avalanches, or wildfires. These areas are preserved not only for their aesthetic and ecological value, but also to support economic development opportunities that are associated with park and recreational amenities. Parks and open space plans are ideally suited for promoting synergies between these values and linking the added benefits of public safety by discouraging the development of lands facing dangerous geologic conditions or wildfire threats.

INTEGRATING HAZARD MITIGATION INTO THE PLAN

Much like any other planning document, parks and open space plans vary widely in terms of format, organization, and level of detail, based on the goals of the jurisdiction and the resources available to support the planning effort. Most parks and open space plans contain the following components, or some variation:

- **Inventory of assets** – What is the current total amount of parks, open spaces, trails, and recreation areas and facilities? Where are they located? Where are there gaps in the system? Are assets located in hazard areas?
- **Policies** – How should the community address issues related to parks and open space? Should additional investments and land acquisitions occur outside of hazard areas? Is increased maintenance a priority? Should the community consider sharing resources?

- **Priorities and recommendations** – What are the specific steps a community can take to address a stated issue? Are there gaps in the system that should be treated as priorities? Should areas outside known hazard areas be given higher priority than others?

These elements are described below, including example policy language to integrate hazard mitigation, where applicable.

Inventory of Park and Open Space Assets

When identifying existing parks, open space, trails, and recreation areas, it is important to recognize the synergies between conservation of those areas and hazard mitigation.

The **Town of Frederick's** *Open Space Inventory* includes a table that identifies which open spaces and greenways are used for drainage or detention. The far right column on the table below indicates uses for drainage and detention.

Town of Frederick P.O.S.T. Master Plan
Open Space Inventory / Analysis

Good ● Average ◒ Poor ○

	Quality/Aesthetic Value	Access / Accessibility	Help Protect Wildlife	Access Water/Wetland	Recreational Opportunities	Intrusion (lighting, sound, visual)	External Connectivity (On Trail)	Used for Drainage (Detention)
Angel View Estates	○	●	○	○	○	○	○	Detention
Bulrush Wetlands	●	◒	●	●	●	●	○	100 Year Floodplain
Creekway Greenway	●	◒	●	●	●	◒	○	100 Year Floodplain
Eagle Valley Greenway	●	●	●	○	●	●	●	100 Year Floodplain
Fox Chase Open Space	◒	○	◒	○	○	●	●	No
Fox Run Greenway	○	◒	○	○	○	◒	●	East Parcel Detention
Moore Farm Open Space	●	●	●	●	●	◒	●	Detention
Nelson Lakes Open Space	●+	◒	●	●	◒	●	○	100 Year Floodplain
Prairie Greens Greenway	○	◒	○	◒	○	◒	○	Detention/Channel
Savannah Greenway	◒	◒	○	○	○	○	●	No
Summit View Estates Open Space	○	●	○	○	○	◒	●	NW Parcel Serves as Drainage
Wildflower Greenway	○	○	◒	○	○	●	○	Detention
Wyndham Hill Northeast Open Space	◒	○	◒	○	○	◒	○	No

The Town of Frederick's Open Space Inventory Analysis indicates which open spaces are used for drainage and detention.

Source: Town of Frederick frederickco.gov/index.aspx?nid=354

The **Colorado Springs** *Park System Master Plan* dedicates an entire section of its inventory of park/open space assets to recognizing the impacts of natural events such as drought, fire, and flood. The plan states, for example:

> "Drought can have significant impacts on parks, open space, and recreation sites:

- Increased wind erosion of soils and poor soil quality
- Forest and vegetation quality degradation
- Increased risk of wildfires
- Loss of wetlands and aquatic habitats for wildlife
- Loss of water-related recreation activities
- Need for increased watering of turf and plant materials to prevent loss"

North Cheyenne Canyon Park, Colorado Springs, CO.

Source: Miguel Vieira

Developing comprehensive maps is an important tool for summarizing and communicating the results of the park and open space inventory. Maps should show the inventory of existing assets described above, along with providing analysis (e.g., access to parks/open space from residential neighborhoods, identification of gaps in the overall parks and open space system). Maps will also help identify future projects or acquisition areas. Natural hazard areas should be included in this mapping process, recognizing the linkages between conservation of open space and risk reduction to property and life. Areas to potentially identify in plan maps include:

- Steep slopes
- Flood hazard areas
- Wildland-urban interface
- Subsidence zones
- Avalanche paths
- Unstable soils
- Other geologic hazard areas

Policies

Parks and open space plans use the inventory of assets and identification of issues and gaps in service to develop policies to help achieve the goals of the plan. Those policies can include statements related to reducing risk and hazard mitigation. Some examples of policies that address hazard areas include:

- Encourage the use of floodplains and major drainage facilities for recreational use, open space, and other appropriate uses that preserve the natural environment and minimize the potential for property damage.
- Work with experts to ensure there is an adequate buffer between development and natural areas, water bodies, wetlands, and floodplains.
- Maintain adequate buffers through open space preservation to allow high-hazard landscapes to function in a natural way with minimal human intervention and modification.
- Strengthen safety and security in the community's parks, open space, and recreation areas by addressing flood, fire, drought, and other hazard issues.
- Design park facilities to preserve natural features that help control stormwater, and minimize the introduction of new structural features and impervious surfaces.

Priorities and Recommendations

Much like a comprehensive plan, the parks and open space plan typically establishes recommendations and strategies to achieve the stated policies and goals of the plan, such as:

- Review floodplain regulations and revise, as appropriate, to encourage recreational and open space uses within floodplains.
- Review floodplain regulations to ensure they sufficiently limit the amount a floodplain can be modified when considering current and future parks, open spaces, and recreation areas.
- Prioritize acquisition of riparian corridors for open space preservation to achieve multiple benefits (e.g., trail connectivity, stormwater management, habitat preservation, and recreation).
- For [*specific park or open space*], provide a trail surface that can stand up to intermittent flooding during high water events in an effort to reduce ongoing maintenance requirements.
- For steep slopes, allow adequate separation from developed landscapes.
- For fire zones, provide demarcation or buffer zones between development landscapes and natural forests.
- Land not suitable for development or passive recreation within new development proposals due to steep slopes, poor soils, floodplain areas, or other hazards should be maintained as deed-restricted private open space and not accepted as publicly dedicated open space.
- Landscape conditions caused by natural hazards (flooding, erosion, or wildfires) may be modified for habitat restoration, public safety, or the reconstruction of public facilities such as trails or cultural resources.

WHERE IT'S BEEN DONE

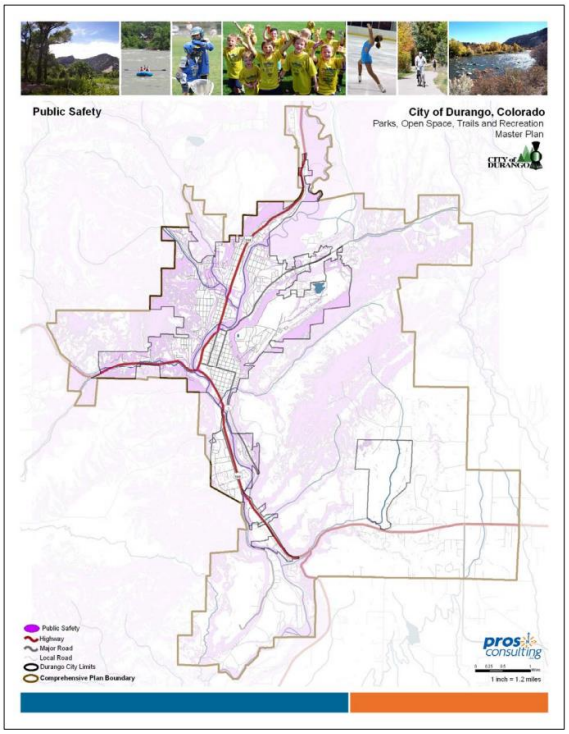
The **Colorado Springs** *Park System Master Plan* includes an entire page of recommendations to address floods, fires, and drought, including:

- Develop fire mitigation partnerships and create natural area management plans with land managers, utility providers, public safety officials and State Parks representatives.
- Work with natural resource managers of wildlife habitat to balance wildlife needs with management for fire, floods, and drought.
- Refer to the [drainage and stream buffer standards or guidelines] for recommendations regarding floodplain treatments, vegetation management, stream bank stabilization, and other elements that mitigate flood events.
- Provide education and enforcement to address unintentional forest fire starts and arson.
- Form stormwater, floodplain, and vegetation management partnerships with flood control districts, watershed managers, City and County public works departments, ditch companies, and other land managers.
- Install more drought-tolerant plant materials and reduce park dependency on water resources.
- Identify and re-route trails that are susceptible to frequent damage from flooding.

Durango adopted its *Parks, Open Space, Trails and Recreation Master Plan* in 2010 as a comprehensive update to its first plan that was completed in 2001. The primary purpose of the updated Master Plan was to establish a 10-year road map to provide strategic direction to the City over the course of the coming decade, and an important underlying factor to help guide this direction is protecting public

safety. This guiding principle is reflected throughout Durango's plan and is specifically addressed under its objectives and priorities for open space, where it states that steep slopes and hazardous landscapes should remain undeveloped where possible. It further clarifies how to achieve this objective by stating the following:

> *"Maintain sufficient buffer to allow these high hazard landscapes to function in a natural way with minimal human intervention/modification. Recognize that these are natural processes. Allow the geomorphology of the creeks and rivers to meander naturally. For steep slopes, allow adequate separation between developed landscapes. For fire zones, provide demarcation or buffer zones between developed landscapes and natural forests."*



This public safety map is an excerpt from Durango's Parks, Open Space, Trails, and Recreation Master Plan. The plan's "greenprinting" process uses GIS maps like this (which shows floodplain areas in purple) to help inform decision making regarding open space, preservation, and resource conservation.

Source: durangogov.org/index.aspx?NID=554

The protection of public safety and preservation of areas subject to natural hazards was further incorporated into Durango's plan through a "greenprinting" process, a GIS-based tool that graphically depicts areas within the city that are deemed potentially high value and should be considered for protection. One of the key categories (or layers) used to generate greenprinting scores in this process is Public Safety, which identifies those parcels with defined flood hazards and/or steep slopes. Such parcels are representative of a priority concern that makes them more valuable in terms of protection through open space preservation and resource conservation.

Teller County adopted its *Parks, Trails and Open Space (PTOS) Master Plan* in 1997 to summarize the main goals, policies, standards, and facilities recommendations for parks, trails and open space that are under its jurisdiction. While an older document, it is one of the best examples of a community that has addressed hazard risk reduction in its park and open space plan.

The plan was adopted after many years of effort by the County's Parks Advisory Board and community residents and was designed to meet the needs of the County well into the future and be actively coordinated with County growth management plans. In describing the physical setting of the County, the Plan emphasizes the flood control value of water features that "should be given a high priority to maintain as open space." It also states that environmentally sensitive areas including wetlands, floodplains, major faults, and extreme slopes preclude most development for safety reasons as well as environmental concerns, though all may be suitable for consideration as open areas, parks, or trails. **In identifying and mapping areas of open land suitable for protection, the plan establishes "Environmental Hazard Areas" as the first factor for consideration, including floodplains, areas with a slope greater than 25%, and geologic hazards such as known fault lines.**

In more recent years Teller County has amplified the importance and value of risk reduction in its parks and open space planning efforts by linking them with its *Multi-Hazard Mitigation Plan* (2008). For example, this includes establishing an objective to "expand…the PTOS Master Plan and implement an open space plan to protect natural resources, wildlife, wetlands, slopes, ridgelines, views, and cultural sites" and a specific policy statement to "encourage low density, nonstructural open space uses that are least subject to loss of life and property damage in flood hazard areas."

ADVANTAGES AND KEY TALKING POINTS

By preparing and maintaining a parks and open space plan, communities will clearly articulate their commitment and strategy to preserving and enhancing specific assets or lands that serve multiple purposes. Primary benefits include:

- Serves as a powerful project implementation tool for hazard mitigation or avoidance – especially with regard to competing land development interests.
- Promotes multi-objective planning for parks and open space properties that intersect with hazard areas.
- Can complement and provide more robust analysis and information on parks and open space than found in the community's comprehensive or master plan.
- Specific policy statements and pre-identified parks and open space projects that promote public safety can support more creative and competitive applications for grant funding.
- A parks and open space plan can set the policy foundation for a land acquisition and/or Transfer of Development Rights (TDR) program.

CHALLENGES

The development of parks and open space plans, as well as integrating hazard considerations into such plans, requires dedicated trained staff time or funding to hire a consultant. Other related challenges include:

- Can be challenging to implement or administer without dedicated parks planning staff.
- Some technical mapping and analysis of hazard areas may be required.
- Funding for plan implementation activities may be inadequate or difficult to obtain, particularly for the acquisition of private, developable properties.
- Plans should be updated and maintained on a regular basis, concurrent with comprehensive or master plan updates, and perhaps even more frequently for communities experiencing rapid changes through growth and land development.
- The timing of the preparation of parks and open space plans may not overlap with the development of a hazard mitigation plan. This means planners must make a concerted effort to promote coordination between the goals, policies, and actions of both efforts, as well as other related plans.

KEY FACTS

Administrative capacity Planner, parks and recreation staff

Mapping	Some technical mapping and GIS analysis may be required for integrating hazard areas and to support the supply inventory, demand assessment, or surplus/deficiency analysis
Regulatory requirements	None required, but can support plan implementation
Maintenance	Should be updated at a regular time interval, preferably every five years
Adoption required	Yes
Statutory reference	N/A
Associated costs	Staff time, plus potential costs for mapping or other technical work, public outreach activities, and consultant services

EXAMPLES

Town of Basalt Parks, Open Space, and Trails Master Plan	basalt.net/193/Parks-Open-Space-Trails-Master-Plan
City of Colorado Springs Parks System Master Plan	parks.coloradosprings.gov/sites/default/files/parks_recreation_and_cultural_services/cos_masterplandocument_140923-view.pdf
Douglas County 2030 Parks, Trails, and Open Space Master Plan	douglas.co.us/land/comprehensive-master-plan/parks-trails-and-open-space-master-plan-ptos-plan
City of Durango Parks, Open Space, Trails, and Recreation Master Plan	durangogov.org/index.aspx?NID=554
Town of Erie Parks, Recreation, Open Space, and Trails Master Plan	erieco.gov/825/PROST-Master-Plan
City of Fort Collins Natural Areas Master Plan	fcgov.com/naturalareas/masterplan/pdf/final-2014-natural-areas-master-plan.pdf
Town of Frederick Parks, Open Space, and Trails Master Plan	frederickco.gov/index.aspx?nid=354
Jefferson County Open Space Master Plan	jeffco.us/open-space/plans/open-space-master-plan
Johnstown/Milliken Parks, Trails, Recreation, Open Space Master Plan	townofjohnstown.com/documentcenter/view/34
Teller County Parks, Trails, and Open Space Master Plan	co.teller.co.us/CDSD/Planning/TC%20ParksTrailsOpenSpaceMasterPlan.pdf

FOR MORE INFORMATION

Colorado Parks and Wildlife

cpw.state.co.us

Colorado Department of Local Affairs, Conservation Trust Fund Website

colorado.gov/pacific/dola/conservation-trust-fund-ctf

PRE-DISASTER PLANNING


Source: Nathan Slaughter

HAZARDS ADDRESSED

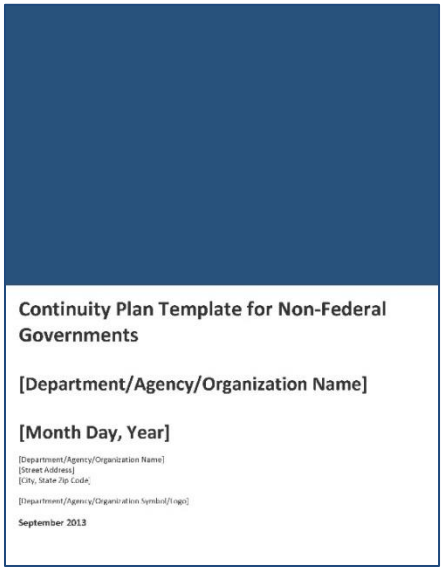
HOW IT WORKS

The post-disaster environment should not be the first time a community begins identifying and managing critically important issues such as how to keep the government and essential services up and running in times of crisis, how to deal with temporary housing, or how to reestablish essential economic activity. Communities can, and should, take steps before being impacted by a disaster to ensure that the aftermath of the disaster will not become a disastrous and chaotic situation in itself.

Three tools available to local governments are particularly important for helping smooth the road to post-disaster recovery.

1. **Continuity of Operations Plans (COOP)** can be developed in order to ensure that citizens do not experience significant disruption of services during and following times of emergencies and or disasters. FEMA states that:

   "Continuity of Operations is an effort within individual executive departments and agencies to ensure that Primary Mission Essential Functions (PMEFs) continue to be performed during a wide range of emergencies, including localized acts of


Continuity Plan Template for Non-Federal Governments

[Department/Agency/Organization Name]

[Month Day, Year]

[Department/Agency/Organization Name]
[Street Address]
[City, State Zip Code]

[Department/Agency/Organization Symbol/Logo]

September 2013

FEMA Guidance Document for Developing COOP plan.

Source: FEMA

nature, accidents and technological or attack-related emergencies" (Continuity of Operations, 2015).

2. A **Continuity of Government (COG) Plan** is similar to a COOP, although its primary focus is to establish defined procedures for allowing a government entity to continue its essential operations following a catastrophic event. COG plans set procedures for preserving facilities, equipment, and records. Many times a COG plan is part of a more comprehensive COOP.
3. **Recovery Plans** can be developed either pre- or post-disaster (although they are most effective when developed pre-disaster) and are designed to help communities address critical land use issues that arise following disasters. One definition of a recovery plan states that such plans can be used to:

   "Identify policies, operational strategies, and roles and responsibilities for implementation that will guide decisions that affect long-term recovery and redevelopment of the community after a disaster. The plan emphasizes seizing opportunities for hazard mitigation and community improvement consistent with the goals of the local comprehensive plan and with full participation of the citizens. Recovery topics addressed in the plan should include business resumption and economic redevelopment, housing repair and reconstruction, infrastructure restoration and mitigation, short-term recovery actions that affect long-term redevelopment, sustainable land use, environmental restoration, and financial considerations as well as other long-term recovery issues identified by the community"(Post-Disaster Redevelopment, 2011).

Recovery plans can lead to a much more organized and efficient approach to a community's post disaster recovery.

IMPLEMENTATION

In many communities, these types of plans are developed by Emergency Management staff; however, the planner has an important role to play in the development of each of these plans. For example, planners can help establish continuity of operations procedures for the Planning Department to be included in the COOP and there are many planning/land use issues that must be addressed in pre- or post-recovery plans.

Though the recovery plan could be developed after a disaster to guide recovery decisions, these three highlighted plans should ideally be prepared in advance of a disaster. Making the investment in pre-disaster plans that address post-disaster issues will pay dividends for the communities that take the time and initiative to do the planning. These plans should be regularly revisited, especially following an event that would require activation of such plans.

WHERE IT'S BEEN DONE

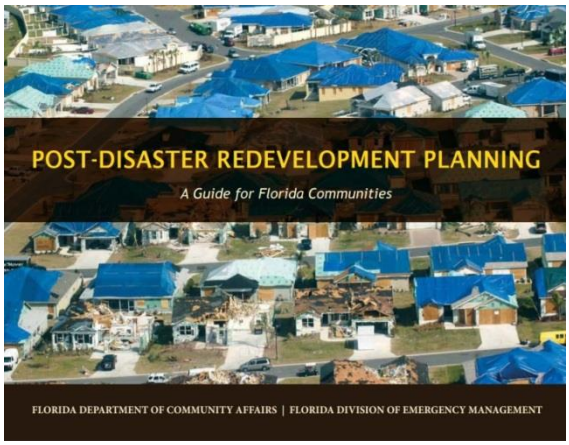
In 2015, officials in **Douglas County** adopted the County's first Disaster Recovery Plan. The plan establishes the County's comprehensive framework for managing recovery efforts following a major disaster.

"Having been through our own wildfires, floods, and other local emergencies, as well as having witnessed other counties navigate their own incidents, our staff had the foresight to recognize the importance of collaboration among our partners to assemble a recovery plan," said

Commissioner David Weaver. "By focusing on what could occur instead of what is or already has happened, places Douglas County in the best possible shape to react to any potential disaster, be it man-made or natural" (County adopts Disaster, 2015).

The County had also previously developed a Continuity of Operations Plan that is referenced throughout the Disaster Recovery Plan. This helps emphasize the importance of having both types of plans to facilitate successful disaster preparedness and recovery efforts for Douglas County.

Some of the nation's most progressive pre-disaster planning examples and resources come from the **State of Florida's *Post-Disaster Redevelopment Planning (PDRP) Initiative*** (2010, October). The purpose of the Initiative, which began in 2007, was to develop and test guidelines for a planning process to be applied in the pre-disaster environment to ensure the effective and timely implementation of post-disaster policies that result in more sustainable, resilient communities. While the resulting guidebook can certainly be helpful to Colorado communities, the subsequent plans and policies from the initial pilot PDRP communities provide real-world examples for a variety of local governments dealing with a variety of post-disaster scenarios. This includes the adoption of some advanced and fairly bold planning strategies designed to disinvest and steer redevelopment from known hazard areas to safer locations as opportunities arise through future disaster events. For instance, **Hillsborough County** established the concept of Priority Redevelopment Areas (PRAs) which essentially pre-identifies locations within the community to receive focused and prioritized attention for redevelopment to promote rapid recovery and facilitate the growth of disaster resilient centers of activity. The implementation of this concept would likely rely on the transfer of development rights (TDR) and similar tools as a means of shifting growth and development from one area of a community to another.



State of Florida's Post-Disaster Redevelopment Planning Initiative.

Source: State of Florida Division of Emergency Management

ADVANTAGES AND KEY TALKING POINTS

- Each of these plans can help a community more effectively and efficiently respond to disasters and shocks. These plans can inform decision-makers and reduce reactionary decisions (and thus, lead to less confusion) in the post-disaster environment.
- Adopting a plan puts a community in an excellent position to maintain essential services at the time of a disaster.
- Helps ensure a community has discussed how recovery should take place prior to a disaster.
- Can strengthen application for post-disaster funding, as it demonstrates a clear and carefully considered path to recovery.

CHALLENGES

- Each of these plans requires considerable coordination with multiple government departments and often partner organizations and community members. Once developed, the plans will need to be "exercised" (i.e., routinely tested and communicated) so that everyone understands their roles as defined in these plans.
- Keeping COOPs and COGs accurate and updated is imperative and requires initiative. Updates should be conducted consistently and thoroughly.
- As for recovery plans, at this time there is no dedicated federal funding source for communities seeking financial assistance in developing their recovery plan. There are also no official regulations for what needs to be included in a recovery plan. However, there are many useful resources that can be referenced when developing a recovery plan (see additional resources below).

KEY FACTS

Administrative capacity	Emergency manager (lead for COOP/COG), planner (lead for recovery plan), department heads, executive-level government staff
Mapping	COOP: Minimal/ N/A COG: Minimal/N/A Recovery plan: Dependent on whether or not there is a risk assessment or scenario-driven analyses that are done to support the plan
Regulatory requirements	COOP/COG: National Security Presidential Directive-51 (NSPD-51)/Homeland Security Presidential Directive-20 (HSPD-20) Recovery plan: N/A
Maintenance	COOP/COG/Recovery plan: Should be annually updated and exercised. Plan effectiveness should be evaluated after any type of event that would be require the plans to be put in place or tested
Adoption required	COOP/COG/Recovery plan: Adoption is not required but some sort of official acknowledgement of support of the plans by the local governing body can help give greater power to these plans
Statutory reference	See regulatory requirements
Associated costs	Dependent on the level of effort, level of public outreach, and the type of plan (hard copy, digital, web-based, etc.)

EXAMPLES

Douglas County Disaster Recovery Plan	douglas.co.us/documents/douglas-county-recovery-plan.pdfhttp://www.floridadisaster.org/Recovery/IndividualAssistance/predevelopmentplan/Index.htm

State of Florida Post-Disaster Redevelopment Planning Initiative	floridadisaster.org/Recovery/IndividualAssistance/pdredevelopmentplan/Index.htm

FOR MORE INFORMATION

COOPs/COGs: National Security Presidential Directive-51/Homeland Security Presidential Directive-20 (NSPD-51/HSPD-20)

fema.gov/pdf/about/org/ncp/nspd_51.pdf

National Continuity Policy Implementation Plan (NCPIP)

fema.gov/media-library/assets/documents/85665

FEMA Continuity of Operations Page

fema.gov/continuity-operations

FEMA Continuity Resources Page

fema.gov/additional-resources-and-videos-continuity-operations

PDRPs: National Disaster Recovery Framework

fema.gov/national-disaster-recovery-framework

FEMA Community Planning and Capacity Building (CPCG) Recovery Support Function (RSF)

fema.gov/media-library/resources-documents/collections/493

American Planning Association, Recovery Planning Blog

blogs.planning.org/postdisaster

American Planning Association, Planning for Post-Disaster Recovery: Next Generation

planning.org/research/postdisaster

STRENGTHENING INCENTIVES

The most successful incentives result in significant cost- and time-savings in exchange for some community benefit.

Incentives are effective strategies for enhancing relationships with the development community, guiding growth and development to desirable areas, and encouraging compliance with community objectives without additional regulation. Incentives can come in the shape of financial savings, increased density, relaxation of regulations, expedited review processes, or waivers of either fees or regulations altogether. For any incentive to work, there has to be good reason for a developer to take advantage of the incentive. This often means careful and thorough analysis of the benefits to be exchanged prior to moving forward for adoption of any such program or tool. A developer will not simply participate in an incentive program because the local government thinks it's a good idea. The most successful incentives result in significant cost- and time-savings in exchange for some community benefit (such as protecting known hazard areas from development). They should be designed to address existing (or perceived) roadblocks to development.

This section explores planning tools and programs that communities can use to encourage development away from known hazard areas by way of incentives. Tools profiled in this section include:

- Community Rating System
- Density Bonus
- Development Agreement
- Transfer of Development Rights

Source: Shutterstock

COMMUNITY RATING SYSTEM

Source: Manitou Springs

HAZARDS ADDRESSED

Flood

HOW IT WORKS

The **Community Rating System** (CRS) is a voluntary, incentive-based community program that recognizes, encourages, and rewards local floodplain management activities that exceed the minimum standards of the National Flood Insurance Program (NFIP). CRS provides a framework and a variety of technical resources to help participating communities implement a comprehensive flood risk management program designed to reduce and avoid flood losses and to strengthen the insurance aspects of the NFIP. In return, flood insurance rates for existing policyholders community-wide are discounted to reflect the reduced flood risk resulting from community actions.

The CRS program is administered by FEMA with support from Insurance Services Office, Inc. (ISO). It uses a class rating system that is similar to fire insurance ratings to determine flood insurance premium reductions for properties located in and outside of the Special Flood Hazard Area (SFHA). Communities earn credit points based on the local implementation of specific activities recommended in the *CRS Coordinator's Manual*, and the number of points earned determines the CRS class. Classes are rated from 9 to 1, with each incremental improvement providing an additional five percent insurance premium discount. A community in the CRS Class 9 qualifies for a premium reduction in the SFHA of five percent; whereas a community in the CRS Class 1 receives the highest possible reduction of 45 percent.

In total there are nearly 100 distinct activities or elements eligible for credit under CRS, all organized under four categories:

- **Public Information Activities.** This includes local activities that educate people about flood hazards, flood protection, and flood insurance. Activities are typically directed toward residents, property owners, insurance or real estate agents, or other stakeholders. Examples

include elevation certificates, map information service, outreach projects, hazard disclosure, flood protection information, flood protection assistance, and flood insurance promotion.

- **Mapping and Regulations.** This includes activities that exceed the NFIP's minimum standards to offer flood protection for new and existing development. Examples include floodplain mapping, open space preservation, higher regulatory standards, flood data maintenance, and stormwater management.
- **Flood Damage Reduction Activities.** These activities focus primarily on reducing flood damage to existing buildings. Examples include floodplain management planning, acquisition and relocation, drainage system maintenance, and retrofitting existing buildings.
- **Warning and Response.** These activities focus on emergency warnings and response in order to save lives and minimize property damage. Examples include flood threat recognition systems, critical facilities planning, levee or dam failure warning systems, and response operations planning.

IMPLEMENTATION

To join the program, communities must submit a letter of interest to the FEMA regional office along with an application to ISO that demonstrate that the community can (1) meet all of the responsibilities and prerequisites to participate; and (2) obtain at least 500 credit points to become a Class 9 community. The calculation of credit points is based on a variety of criteria established by CRS to reflect the impact of each activity on floodplain development and on the community's flood insurance premium base. Credit points are calculated by the ISO/CRS specialist as assigned by FEMA.

WHERE IT'S BEEN DONE

The **City of Delta** recognized that the benefits of CRS extend beyond flood insurance premium discounts. Despite having less than 20 NFIP policyholders in the entire community, the City has actively participated in the program since 1996 and is currently rated as CRS Class 8. Delta receives credit points for a number of ongoing and routine municipal activities, including significant points for open space preservation and drainage system maintenance. The City also gets credit for public outreach activities administered by its Community Development Department, such as annual mailings to local realtors and insurance companies about floodplain management, hazard disclosure, and its participation in CRS. The City has also promoted the advantages of purchasing flood insurance at public meetings, presentations to community groups, and through local newspaper articles.

The **Pikes Peak Regional Building Department (RBD)** is an example of how a county or regional authority can help administer CRS-creditable activities for multiple jurisdictions across a region. Under an inter-governmental agreement, the Pikes Peak RBD serves El Paso County; the cities of Colorado Springs, Fountain, and Manitou Springs; and the towns of Green Mountain Falls, Monument, and Palmer Lake. Although primarily tasked with the enforcement of building codes, the RBD's Floodplain Management Office provides services to all communities, including but not limited to: enforcing regulations, reviewing site plans, issuing floodplain development permits, maintaining local floodplain maps, investigating and resolving floodplain violations, performing flood mitigation evaluations, and other activities for credit under CRS. Through its efforts, the RBD has assisted the City of Colorado Springs in becoming a CRS Class 6 community and all other jurisdictions to become CRS Class 7 communities, demonstrating how **regional collaboration on CRS can increase potential**

credit points while also reducing some of the local administrative burdens associated with the program.

Some argue that a similar concept to the Community Rating System should be developed for wildfire mitigation activities. The program could benefit communities that implement wildfire mitigation measures by offering incentives such as preferred forest management and fuel treatment, community planning assistance, or higher ranking for access to competitive grant programs (*Lessons for Wildfire*, 2014). **Summit County** has explored using the CRS concept to reduce wildfire hazards. The goal is to combine multiple approaches, including implementation of Firewise Community development guidelines, development code/zoning ordinance integration with wildfire hazard reduction planning, and community action, such as efforts by the Summit County Wildfire Council to provide free chipping and grants for improving firefighting infrastructure (cisterns, improved emergency access, fuels reduction programs, etc.). It is anticipated that through these efforts the community's wildfire hazard rating could be lowered, resulting in potentially lower insurance rates (*National Flood Insurance*, 2015).

ADVANTAGES AND KEY TALKING POINTS

The primary benefit and motivation for communities to participate in CRS is the reduction in flood insurance premiums for resident policyholders. Other benefits include:

- Enhanced life safety and reduction in damage to property and public infrastructure, avoidance of economic disruption and losses, reduction in human suffering, and protection of the environment provided by the credited activities.
- Access to training, technical assistance, and other resources made available to CRS communities.
- Ability to evaluate local programs and activities against state and nationally recognized benchmarks.
- Recognition for strong local floodplain management programs.
- The program is not all about creating new activities or policies. Communities can often obtain credit points for activities and policies they are already implementing.
- There is no cost to participate. The only costs the community incurs are to implement creditable floodplain management activities and the staff time needed to document those activities and prepare for and participate in the recertification process and verification visits.

CHALLENGES

The most significant challenge for communities is the administration of the program. Each community must designate a local representative to oversee the development, implementation, and documentation of activities for which they are seeking credit. Documenting requirements for credit verification can be time-consuming depending on existing recordkeeping practices. Other challenges include:

- A modification to a community's CRS classification requires additional submittal materials, and is limited to one modification per year.
- Prerequisites for advanced classes can become a road block.
- With staff turnover, the program can be difficult to administer.

KEY FACTS

Administrative capacity	Experienced planner; floodplain manager
Mapping	Depends on chosen activities
Regulatory requirements	N/A
Maintenance	Annual review required by FEMA to maintain credit rating
Adoption required	No
Statutory reference	N/A
Associated costs	Staff time, training and reporting

EXAMPLES

Delta County Multi-Hazard Mitigation Plan	deltacounty.com/DocumentCenter/View/812
City of Fort Collins Utilities, Class 4 – 30% discount	fcgov.com/utilities/what-we-do/stormwater/flooding/insurance
City of Gunnison Building Department, Class 8 – 10% discount	cityofgunnison-co.gov/Community%20Development/building_department/flood_protection_information
Town of Parker Class 6 – 20% discount	parkeronline.org/353/Floodplain-Management-Program
Pikes Peak Regional Building Department Regional Floodplain Management	pprbd.org/floodplain/floodplainmanagement.aspx

FOR MORE INFORMATION

FEMA's CRS Website

fema.gov/national-flood-insurance-program-community-rating-system

Floodsmart.gov

floodsmart.gov/floodsmart/pages/crs/crs_resources.jsp

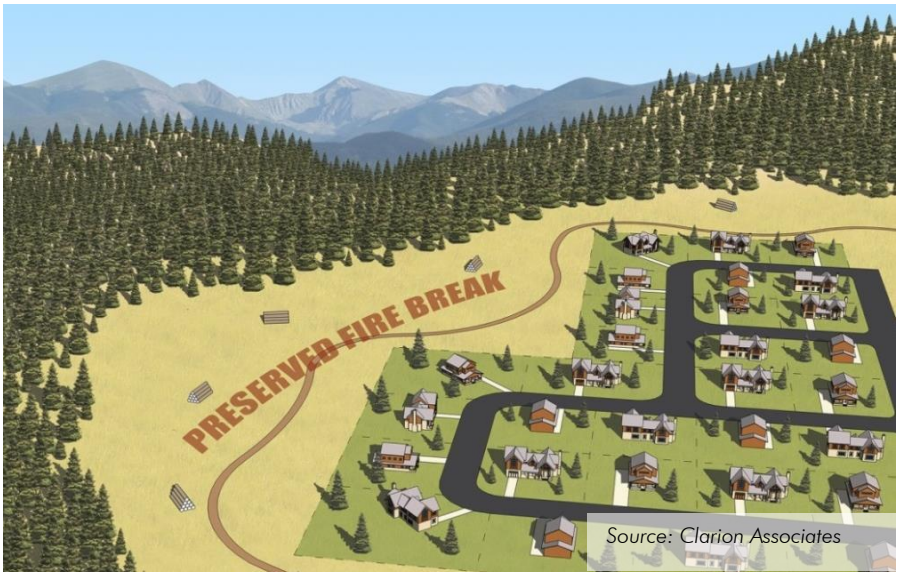
CRS Resources

crsresources.org

Lessons for Wildfire from Federal Flood Risk Management Programs

headwaterseconomics.org/wildfire/solutions/lessons-for-fire-from-floodrisk

DENSITY BONUS



HAZARDS ADDRESSED

HOW IT WORKS

Density bonuses allow greater density to be built on a site than would otherwise be allowed through underlying zoning. Density bonuses are often granted as an incentive to encourage preferred types of development activity. Some communities grant density bonuses for additional protection of open space, for example, beyond what is required by the underlying zoning, or for higher-quality building design or provision of other amenities. While the exact bonus granted is typically considered on a case-by-case basis, the amount of additional density granted is usually roughly proportional to the amount of benefit provided. Any additional density allowed can be subject to design standards that ensure a high level of site protection and building quality; such standards can help promote community buy-in for the bonus program.

IMPLEMENTATION

Density bonuses can be somewhat challenging to introduce in a community. Depending on why a density bonus is issued, it is important to have a process by which the local government can ensure that both ends of the bargain are maintained. For example, if a developer is issued a density bonus for conserving land in a geologic hazard area, the local government should require a permanent **conservation easement** to protect that area in perpetuity in exchange for the added density. (Conservation easements are profiled in the "*Protecting Sensitive Areas*" section.)

The community should consider the following basic steps:

- **Define the purpose of the program.** It is important that density bonuses be tied to the goals and policies of a community's comprehensive plan.
- **Identify where density bonuses are permitted.** Consider whether the incentives should apply to all zoning districts, only areas meeting certain conditions, or on a case-by-case basis.

- **Develop the specifics of the program.** Identify the degree to which incentives are issued, whether they are permitted by right or require a public hearing, and other conditions or agreements that must accompany the program.

WHERE IT'S BEEN DONE

Density bonuses are often used in tandem with conservation subdivisions, which are addressed in a separate profile. **Garfield County** provides density bonuses for conservation subdivisions in Section 7-501 of the Land Development Code. The applicant may propose a density neutral development plan, by which the overall density is not increased, but the lot sizes may be reduced to preserve the remainder of the parcel as open space. The applicant may also propose an increased density development plan, by which the calculation of total bonus lots permitted depends on the total expected yield allowed under the base zoning district and the proposed percentage of open space preserved.

The **Town of Milliken** issues conservation density bonuses for rural subdivisions that conserve areas in the 100-year floodplain, wetlands, valuable habitat areas, and natural geologic hazard areas (as defined by the Colorado Geological Survey). Rural subdivisions are permitted development up to a maximum of one unit per 20 acres by right. A conservation density bonus increases that maximum density to one unit per five acres.

ADVANTAGES AND KEY TALKING POINTS

Density bonuses can be effective ways to not only protect hazard areas, but also to direct growth toward desirable areas throughout a community as identified in the comprehensive plan. Other benefits include:

- Increased opportunity for developers to boost their bottom line. By purchasing development rights, a developer can increase the number of units and realize a higher profit.
- Increased density where the community wants it. Densifying receiving areas can result in a more diverse housing stock, can help boost surrounding commercial areas, and could potentially result in development of affordable housing units not otherwise feasible without the added density bonus.
- Density bonuses provide a direct incentive to a developer without requiring complex negotiations often associated with Transfer of Development Rights (TDRs).
- Density bonuses can be calibrated to be either by-right or discretionary, depending on community values and political climate.
- Density bonuses provide a community benefit without requiring public funding.

CHALLENGES

Challenges include the following:

- Requires additional maintenance to determine that the exchange of density is met with the agreed conservation in perpetuity.
- Like TDRs, density bonuses must be calibrated to local market demands, or the program might not be used.

- Requires education to inform the public about appropriate trade-offs for increased density in some areas.

KEY FACTS

Administrative capacity	Experienced planner with city or county attorney to write ordinance; skilled planners to administer
Mapping	Not typically, although maps indicating sensitive or hazardous lands may be required as part of the development application process
Regulatory requirements	Land use and subdivision regulations
Maintenance	Some on-going tracking with explicit documentation of density bonuses is required
Adoption required	Yes
Statutory reference	N/A
Associated costs	Ordinance development or amendment costs and staff time to review density bonus applications

EXAMPLES

Garfield County Land Use and Development Code	garfield-county.com/community-development/documents/land-use/Complete-Land-Use-and-Development-Code-07.15.2013.pdf Section: 7-501
Town of Milliken Land Use Code and Subdivision Regulations, Conservation Density Bonuses	municode.com/library/co/milliken/codes/municipal_code?nodeId=CH16LAUSCO_ARTIVSURE_DIV3RUSU_S16-4-270CODEBO Section: 16-4-270 Conservation Density Bonus

DEVELOPMENT AGREEMENT

HAZARDS ADDRESSED

HOW IT WORKS

A development agreement is a legally binding contract between a property owner or developer and a local government, often including terms not otherwise required through existing regulations. These agreements can specify various elements of the development process ranging from phasing of a larger master-planned community, to tax-sharing for retail development, to critical infrastructure responsibilities. Development agreements are sometimes used in combination with a planned unit development (PUD) in the form of a binding PUD agreement that specifies the negotiated terms of the development, but the two tools may also be used independently.

For hazard mitigation purposes, development agreements can be used to guarantee that a proposed development reduces risk to hazards by requiring it meet certain use requirements, site development standards, conservation practices, or long-term maintenance provisions not already required by land development regulations. Development agreements can also be used as an incentive. For example, if a developer agrees to enter into an agreement to include defensible space elements in a large-scale development in the wildland-urban interface, the local government might offer reduced fees, expedited review, or even density bonuses in exchange.

IMPLEMENTATION

To establish a development agreement, the developer and the local government both work with legal counsel to develop and execute a contract that binds all parties. During the negotiation of such an agreement, planning staff should work closely with their land use attorney, appointed and elected officials, and the public to answer the following:

- Why is the agreement necessary?
- Are the benefits to the community balanced with those to the developer?

- Is the agreement consistent with community policies in the comprehensive plan or other documented goals and policies?
- How will the agreement be maintained throughout the life of the agreement?
- Are there any long-term costs (e.g., maintenance requirements) that need to be considered?

WHERE IT'S BEEN DONE

La Plata County entered into an agreement with the Electra Sporting Club in 2012 for expansion of their existing facilities. The club was seeking to expand its uses to include new driveways and new cabin sites. The county and the club chose to enter into an agreement for the future development of the site. Although there are many provisions of the agreement, one of them is a wildfire mitigation and evacuation plan (WMEP). The article states that on an annual basis, Electra will notify all of its members of the WMEP and make available to each member appropriate hazard mitigation resources and materials. It also requires new cabins and replacement cabins to use fire-resistant materials, reduce fuel load on the site surrounding the structure, and to maintain vegetation consistent with the WMEP. The WMEP is included as an appendix to the agreement. It includes extensive rules for private owners within the club grounds dealing with, for example, techniques for maintaining defensible space around individual cabins (*Development Agreement*, 2012).

Historic Electra Sporting Club building.

Source:
co.laplata.co.us/departments_and_elected_officials/planning/historic_preservation/cultural_survey_potential_historic/electra_sports_club

ADVANTAGES AND KEY TALKING POINTS

Development agreements allow communities a degree of flexibility not otherwise available per existing regulations. Advantages include:

- Creation of a separate contract from the zoning code and other ordinances allows all parties to negotiate any aspects of the development. However, this can be just as much of a challenge as a benefit.
- Ability to tailor specific mitigation actions and tie them to conditions of approval, thereby securing the commitment.
- The agreement can prescribe periodic reviews for compliance. This is especially helpful for site development standards such as landscaping or parking.
- Allows developer to obtain "vested rights" protected from any changes to existing zoning or land use laws during the term of the agreement.

CHALLENGES

Critics of development agreements claim that they circumvent traditional development review processes. Other challenges include:

- Requires trained land use or real-estate attorney to draft and implement.
- The public can perceive these as "back-door deals" with little to no opportunity for input.
- Difficult for planners to track over time.
- Amendments to development agreements can be time-intensive. Once both parties enter into the agreement, they are locked into those provisions unless they both agree to an amendment.

MODEL CODE LANGUAGE AND COMMENTARY

Development agreements are negotiated on a case-by-case basis. Because each development agreement is unique and based on a particular development site and/or project, such agreements vary widely in content and the specific terms negotiated. The agreement depends largely on specific site conditions and/or mitigation objectives sought.

Many agreements contain the following basic elements at a minimum:

- **Recitals** – These function similar to a purpose statement. What is the intent of the development agreement? How are the parties authorized to enter into such agreement?
- **General Provisions** – This section describes the project and use of the property, definitions of key terms, process for amending or terminating the agreement, and the relationship of the agreement to other regulations.
- **Obligations** – This section outlines the specific terms of the agreement. For example, are there fiduciary responsibilities? Site maintenance obligations? The agreement should include both developer and local government responsibilities.
- **Exhibits or Attachments** – These typically include a legal description of the property, any specific costs related to the obligations in the agreement, and other necessary supporting documents.

The following sections describe each of these elements and provide standard language regarding hazard mitigation that can be considered by Colorado local governments. Model language is in blue shading. Commentary is located in *italics* in the column at the right. The model language used in this document is based on existing ordinances from several communities around the state, including municipalities and

Commentary

Negotiating and Drafting Development Agreements: *Development agreements allow local governments to achieve greater community benefits not otherwise required by adopted regulations. The local government attorney(s) should be involved in direct negotiations and drafting the agreement.*

counties. The language is illustrative only; consult local counsel to tailor language for your jurisdiction.

A development agreement is a legally-binding document, and should therefore be carefully reviewed and/or drafted by the local government's attorney.

Recitals

Below are some basic recitals that could be applicable to development agreements pertaining to hazard mitigation.

- WHEREAS, [*the developer*] seeks permission to [type of approval sought – e.g., subdivision, site development] the property as described on [*Exhibit A*].
- WHEREAS, the [*governing body*] seeks to protect the public health, safety, and welfare of the community.
- WHEREAS, the [*governing body*] seeks to implement policies from the [*comprehensive plan, local hazard mitigation plan, or other adopted policy*] regarding [*hazard mitigation, or similar*].
- WHEREAS, the mutual promises and obligations in this agreement are authorized by State law and the [*local government*] regulations.

Recitals: *Other recitals may be applicable to the agreement, depending on the history of the property, the application under review, suggestions by local attorney(s), and the obligations included in the agreement.*

General Provisions

This section of the agreement should describe the general terms of the agreement including:

A. Legal description of the property.
B. Definitions (e.g., "development" or "geologic hazard area").
C. Description of parties (local government, developer or applicant, etc.).
D. Process for amending, terminating, or extending the timeframe for the agreement.
E. Does the agreement prevail over other zoning and/or subdivision regulations where there is conflict?
F. Noticing requirements to comply with state and local laws.

General Provisions: *This section may or may not include additional sections for legal framework depending on the attorney and/or terms of the agreement. For example, the agreement may include interpretation, severability, remedies, no third-party beneficiary, and other paragraphs deemed necessary for an effective binding contract.*

Obligations or Terms of the Agreement

For the specific terms of the agreement, local governments should consider the following as they pertain to hazard mitigation:

A. Geographic location. Where are the terms of the agreement applicable? Do they apply to the entire property? A portion of the property?

B. Applicability. At what point do the terms of the agreement go into effect? Do they apply to new structures? Existing structures? Are they limited to a specific time period?

C. Duration. At what point in time do the terms of the agreement expire? Are the terms effective for three years? Until completion of the first phase of development? In perpetuity?

D. Responsibility. Which party is responsible for specific terms of the agreement? Does the developer bear the cost of all mitigation activities? Are there inspections of improvements by the local government? If so, how often, and are there penalties for noncompliance?

E. Sensitive lands and/or hazard areas. Specific hazard areas, such as seismic zones, the wildland-urban interface (WUI), geologic hazard areas, or floodways, can be specifically addressed in the agreement. Reference to hazard areas requires that some level of mapping exist or be performed. For developments in a mapped hazard area, the community may require avoiding development in those areas and/or require adequate mitigation techniques to reduce risk.

F. Additional documentation. To protect lives and property, a development agreement can require additional documentation be prepared and submitted prior to certain development activities. For example, an evacuation plan might be required for subdivision in the WUI, or a soils report for development in areas with subsidence.

G. Procedures. Just like procedures in a development code, a development agreement can establish specific procedures for permitting development within a defined area or time period.

Obligations or Terms of the Agreement: *This section does not have to be labeled "obligations." There might be several sections following the recitals that are dedicated to the individual terms of the agreement, such as "limitation on number of structures," or "long-term maintenance of landscaping." For the purposes of this model, we title the section "obligations" as a catch all for the terms of the agreement.*

H. Maintenance. Requiring mitigation activities as a condition for development approval can be effective for some time; however, including long-term maintenance provisions will ensure that effective mitigation is achieved for decades or longer. For example, a development agreement can require that defensible space required by the agreement be maintained and inspected annually, or that new structures in a development use fire-resistant building materials, or require the construction of safe-rooms (shelter against tornadoes and other wind events) for uses where large numbers of people congregate.

Maintenance: *Maintenance provisions can help achieve one of the greatest challenges in planning for hazard mitigation – addressing existing development. Addressing hazard mitigation for future development is easier – by avoiding hazard areas all together or imposing stricter standards on development within known hazard areas. But strengthening already approved developments through long-term maintenance provisions helps communities be more resilient to future hazard events.*

KEY FACTS

Administrative capacity	Experienced planners; land use or real estate attorney
Mapping	Depends on terms of agreement
Regulatory requirements	N/A
Maintenance	Yes, requires maintenance and enforcement of agreed terms
Adoption required	No adoption required, but formal agreement between local government and developer
Statutory reference	Colorado's Vested Property Rights Act (C.R.S. § 24-68-101, et. seq.)
Associated costs	Potentially high costs for attorneys and analysis of issues to address in agreement

EXAMPLES

La Plata County Agreement between the county and Electra Sporting Club	co.laplata.co.us/sites/default/files/departments/planning/researchstudies/documents/ESC_DA_12412_BOCC.pdf
Town of New Castle Agreement between the Town and the Lakota Canyon Ranch for wildfire mitigation plan	newcastlecolorado.org/wp-content/uploads/2014/03/Lakota-Canyon-Ranch-Annexation-Agreement-copy.pdf (p.8 of 14)

City of Black Diamond, WA Agreement between the city and BD Village Partners, L.P.	ci.blackdiamond.wa.us/Depts/CommDev/planning/MPDDevAgreements/June2011/TV/Villages%20MPD%20DA%20v4%20June%202011.pdf
Eagle County Covenants controlling wildfire mitigation regulations for the Cordillera property owner's association	Not a development agreement, but a good example of how to achieve a similar result through private controls cordillerametro.org/Owners_Site/PublicSafety_files/WildfireCombined.pdf

TRANSFER OF DEVELOPMENT RIGHTS (TDRS)


Source: Clarion Associates

HAZARDS ADDRESSED

HOW IT WORKS

A **transfer of development rights (TDR)** program allows additional density where the community wants to grow in exchange for preservation of sensitive areas that the community wants to protect from future development. This tool requires an adopted plan that clearly identifies areas the community desires to preserve or protect from development ("sending areas") and areas where growth and development are encouraged ("receiving areas"). A potential developer who owns property in a receiving area may purchase development rights (either from a TDR bank or directly from a property owner in the sending area) to boost her overall development potential; that additional potential could come in the form of additional buildings, additional height, additional density, or some other form established by the jurisdiction. Similarly, a property owner in a sending area may have limited building potential, but can realize a financial return by selling their development rights to an owner in a receiving area. TDRs have been used successfully in Colorado for decades to protect environmental resources, agricultural land, historic areas, and areas susceptible to natural hazards, such as steep slopes and floodplains, which often are identified as sending areas.

A closely related concept is a **purchase of development rights program (PDR),** in which development rights are acquired from an owner of property in an area that the community has identified as appropriate for protection and less development intensity. The rights are extinguished rather than transferred, thus lowering the number of potential developable sites both in the protected area and in the jurisdiction overall. In exchange for selling her development rights, the landowner grants a conservation easement on the property, permanently protecting the land from development. The land may be sold or transferred, but the deed restriction remains in place.

IMPLEMENTATION

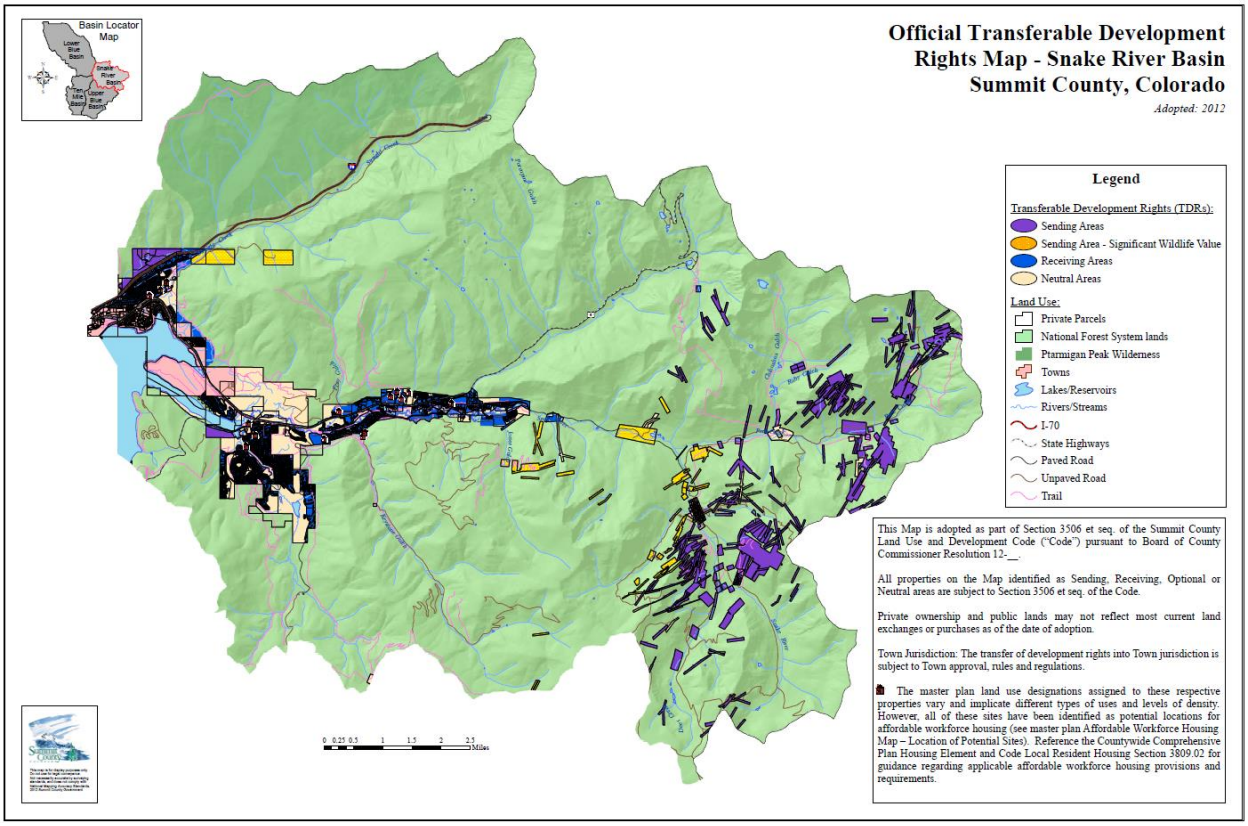
While simple in concept, creation and administration of a TDR program can be complex. Adopting a TDR program involves designating sending and receiving areas, as well as establishing values and allocation rates for development rights. For the program to work, developers must realize value (extra profit) beyond the cost of the additional development rights. Additionally, landowners in sending areas must feel that they are adequately compensated for giving up the right to develop. For example, a TDR program may sell development rights at a rate of $10,000 per TDR, yet the added density would increase the value of the property or development by only $13,000; the $3,000 extra profit might not be enough incentive to promote the use of the program. Planners should consult with valuation experts to determine the appropriate rates and allocations to ensure that transactions will occur.

The community should follow the following basic steps:

- **Define the purpose of the program.** It is important that TDRs be tied to the goals and policies of a community's comprehensive plan and its hazard risk reduction priorities.
- **Identify where the TDRs are permitted.** Consider whether the incentives should apply to all zoning districts, only areas meeting certain conditions, or on a case-by-case basis. Identify specific sending areas and receiving areas.
- **Determine valuation and costs.** Establish values and allocation rates for development rights. This could be done by researching existing programs in comparable jurisdictions, or conducing new research with landowners and economists.
- **Establish procedures and institutions to administer the program.** Communities must decide whether to work with an existing financial institution or develop their own internal systems and procedures to promote the program, bank development credits, and handle transactions.
- **Develop the specifics of the program.** Identify the degree to which incentives are issued, whether they are permitted by right or require a public hearing, and other conditions or agreements that must accompany the program.
- **Adopt the ordinance.** Draft and adopt an ordinance formally establishing the TDR program and covering basic information such as the program purpose, applicability, and other specifics addressed in the sample model language below. Ensure consistency with other land use regulations.

WHERE IT'S BEEN DONE

Summit County has a robust TDR program that protects environmentally sensitive areas from development. The program is divided into four geographically specific TDR areas, generally protecting rural backcountry parcels (sending areas) in exchange for more development in the urban (receiving) areas. Summit County's program also includes "neutral areas" and "optional areas." Neutral areas are parcels that are not suitable for either sending or receiving development rights, and are not eligible for sending or receiving density. Optional areas include parcels that are determined to be suitable for either sending or receiving density. Summit County recently explored options for directly addressing natural hazards, in particular wildfire, through the TDR program. Those discussions were still underway at the time of drafting this guide.



The official TDR Map for the Snake River Basin in Summit County. Sending areas are in purple and orange – receiving areas are in blue.

Source: co.summit.co.us/DocumentCenter/Home/View/182

Routt County established a Purchase of Development Rights (PDR) Program in November 1996 and reauthorized the program in 2005 with increased funding through 2025. The program is intended to provide landowners a financially viable alternative to selling land for development by compensating them for the development rights on their land. Agricultural lands and natural areas (including wildlife habitat and riparian areas) have been the focus of the preservation efforts. An Advisory Board assists the County Commissioners in administering the program and selecting sites for acquisition (*Routt County PDR,* 2015).

ADVANTAGES AND KEY TALKING POINTS

TDR programs can be effective ways to not only reduce development in hazard areas, but also direct growth to the desirable areas throughout a community. Other benefits include:

- Increased opportunity for developers to boost their bottom line. By purchasing development rights, a developer can increase the number of units and realize a higher profit.
- Increased density where the community wants it. Densifying receiving areas can result in a more diverse housing stock, can help boost surrounding commercial areas, and could potentially result in development of affordable housing units not otherwise feasible without the added density bonus.

CHALLENGES

Administering a successful TDR program is not as simple as protecting one area and increasing the density elsewhere by means of a transaction. TDR programs are often highly political and can be difficult to both map and maintain over time. Other challenges include the following:

- Receiving areas can be potentially contentious. It might look good on paper, and the comprehensive plan might even state that additional density is appropriate in the vicinity; but officially designating an area as a receiving area can elicit mixed emotions related to density.
- Conversely to the receiving areas, designation of sending areas can be perceived as stripping a landowner's right to develop and can result in legal challenges and lengthy negotiations.
- Values of a development right must be calculated and recalibrated to respond to market conditions.
- Not all sending or receiving areas are created equal. In larger counties or municipalities, the perceived values of TDRs could vary in different locations. For example, a sending area that is surrounded by encroaching development might be the basis for argument that the value of developing that land is greater than another less desirable sending area. These nuances can be addressed by adjusting allocations, but only add to the complexity of the program.
- A TDR program can be complex to administer without adequate staff training and education. Planners must strike a balance between a simplified approach that is easy to understand, yet responsive enough to development realities to act as an effective incentive.
- Intergovernmental agreements (IGAs) are needed to effectively implement a TDR program if multiple jurisdictions are involved. In Summit County, the TDR program within the Upper Blue Basin has been very effective due in large part to an IGA between the County and the Town of Breckenridge where many of the receiving areas are located.

MODEL CODE LANGUAGE AND COMMENTARY

A TDR program should be tailored to the needs of the individual community and reflect local planning goals. Key features found in TDR programs include:

- Purpose
- Applicability
- Designation of Sending and Receiving Areas
- Determination and Allocation of Development Rights
- Requirements for Sending and Receiving Sites
- Program Monitoring
- TDR Bank (optional)

The following sections provide example language for each of the common elements. Model language is in blue shading. Commentary is located in *italics* in the column at the right. The model language used in this document is based on existing ordinances from several communities around the state with effective TDR programs, including municipalities and counties.

Commentary

Local Examples: *In Colorado, two of the more longstanding TDR programs are in Boulder County and Summit County. See "Where It's Been Done" above for more detail.*

The language is illustrative only; consult local counsel to tailor language for your jurisdiction.

Purpose

The purpose of the transfer of development rights program is to help implement the goals and objectives of the community's comprehensive plan and to:

A. Preserve and protect environmentally sensitive lands or land with development constraints;
B. Protect public and private property from natural hazards, including but not limited to floods, geologic hazards, and wildfire;
C. Assist in the orderly development of urban and rural lands;
D. Encourage new development in areas with adequate existing infrastructure and services;
E. Provide a mechanism for willing landowners in sending areas to protect environmentally sensitive lands and land with development constraints and make reasonable use of their property rights by transferring some or all of their development rights to receiving areas; and
F. Provide an opportunity for landowners in receiving areas to obtain a higher return on investment through development at an increased density through the purchase of development rights from sending areas; and
G. Establish a system whereby development rights may be reliably transferred.

Purpose: *TDR programs are typically designed to address multiple goals. Typically TDR programs strive to preserve open space and environmental features in exchange for allowing more development in areas with planned or existing infrastructure and services capable of accommodating additional growth and development. The list of purposes may be tailored to the community's planning goals or may include a broad range of purposes to allow expansion of the program based on adjustments to planning goals.*

Applicability

A. The TDR program regulations are applicable only in designated sending and receiving areas as described in this ordinance.
B. The applicable provisions of this section shall be met by any development project, receiving site, or sending site that seeks to utilize the TDR program.
C. Additional density (in residential receiving areas) or square footage (in commercial receiving areas) must be approved as part of the required permit process for the type of development proposed and shall comply with all other applicable requirements of the zone district of the receiving area.

Applicability: *The purchase of a development right does not guarantee approval of a project.*

The TDR program establishes the units that will be traded, which in residential areas might be dwelling units, but in nonresidential areas, could be a range of things like square footage, height, or access to utilities.

Designation of Sending Areas and Receiving Areas

A. Official Transferable Development Rights Map: The properties designated as Sending Areas and Receiving Areas are depicted on a map designated the "Official Transferable Development Rights Map." This map is included as part of this ordinance by reference and shall be kept on file in the Planning Department and available for public inspection. The [*approval body*] may amend these maps from time-to-time based on the criteria for designating Sending Areas and Receiving Areas.

B. Comprehensive Plan: Sending and Receiving Areas designated on the Official Transferable Development Rights Map shall be consistent with the comprehensive plan.

Designation of Sending and Receiving Areas: *Some TDR programs use overlay zone districts to show TDR sending and receiving areas. Others establish specific zone districts as eligible sending areas or receiving areas and list them in the TDR section of the land development code. Whatever method is used, it is important to clearly define sending and receiving areas (or "optional areas," as used in Summit County).*

Determination and Allocation of Development Rights

The transfer of development rights program establishes a framework to match landowners that are eligible to transfer (sell) development rights with land developers that desire to acquire (purchase) development rights as follows:

A. Calculation of Transferable Development Rights in Sending Area

1. Properties located in a residential zone district in a Sending Area: Each residential unit permitted by the existing zone district shall be considered one development right.
2. Properties located in a non-residential zone district in a Sending Area: Each [unit] of non-residential development shall be considered one development right.
3. A subdivision plat and/or site plan may be required to determine the number of dwelling units or amount of non-residential square footage that could be established on the property in the Sending Area.

B. Allocation of Purchased Development Rights in Receiving Area

1. Development rights purchased from a Sending Area shall be used only in a designated Receiving Area.
2. Each purchased development right entitles a receiving site to increase the density allowed under the receiving site's zone district as follows:
   a. [*One*] additional residential unit; or
   b. [*Unit*] of non-residential space.

Determination and Allocation of Development Rights: *TDR programs need to gear the calculation of TDRs to the local market conditions, infrastructure capacity, and desired character for receiving areas. In some markets a TDR may need to be calculated at a higher "value" (e.g., one allowed residential unit in the sending area provides 1.5 residential units in a receiving area) to make TDRs desirable to developers. A local TDR program can also establish different density ratios for different Sending and Receiving Areas. A market study is critical to establish market demand in receiving areas and realistic TDR values.*

Nonresidential: *For nonresidential properties, an appropriate unit must be established, such as 15,000 square feet.*

C. Uses Allowed: Only the uses allowed by the receiving site's existing zone district are allowed under the TDR program.

Sending Site Requirements

A. Separation of Development Rights: Transferable development rights (TDRs) may only be transferred from specified Sending Areas to specified Receiving Areas. A landowner in a Sending Area may voluntarily sell development rights to a buyer at a market value established by the landowner and the buyer. Prior to the time of the sale, a deed restriction shall be recorded with the County Clerk's Office limiting the future development potential of the Sending Site. A TDR Certificate shall then be issued by [*name of local government*] identifying the number of transferred development rights and the book and page numbers of the recorded Declaration of Restriction of Development and Easement.

B. Future Development of a Sending Site: Development of the unrestricted portion of the sending site shall comply with the standards of the sending site's zone district and is limited to the remaining development rights not extinguished through conversion to a TDR. No rezoning of the sending site to a higher density shall be permitted by [*name of local government*].

C. Transferable Development Right Certificate: A certificate specifying the number of development rights to be transferred is required to sell and transfer development rights. The [*Planning Director or designee*] shall be responsible for:

1. Determining the development rights that may be transferred from an eligible sending site;
2. Issuing a transfer of development rights certificate specifying the number of development rights being transferred in either dwelling units or square feet of non-residential floor area eligible for transfer; and
3. Calculating the number of remaining development rights on a sending site, if any.

D. Declaration of Restriction of Development and Easement: The owner of the sending site shall execute an easement in perpetuity restricting development in accordance with the requirements of this section and in a form acceptable to the Planning Department, approved by the [*name of local government*] Attorney and signed by the owner of record. Such easement shall be recorded in the

Sending Site Easements: *The form of the easement should be tailored of the local community's goals and private landowner's needs. A standard easement agreement should be developed for ease of administration. The easement should detail what areas of the sending site are to be restricted from any future development to fully address natural hazard mitigation. The local government can work with local conservation agencies to accept an easement and take responsibility for working with sending site property owners to monitor the easement.*

Restriction on Sending Site: *A crucial part of the overall tradeoff behind the TDR system is the restriction placed on the sending site, here accomplished through a prohibition on future rezoning to higher density.*

Clerk's Office prior to issuance of a TDR certificate and approval of any development application on an eligible receiving site.

E. Recordation of Easement: Upon recordation of an easement restricting development based on issuance of a TDR Certificate, the number of development rights specified by the TDR Certificate shall be considered severed from the sending site and available for purchase and use on a receiving site or for purchase by a conservation organization and permanently retired or held for future purchase.

F. Use of TDRs Voluntary: An owner of record in a Sending Area choosing not to participate in the TDR Program shall retain the option to develop the property as provided by the property's existing zone district and applicable requirements of this code.

Mandatory TDR Programs: *Most TDR programs are voluntary, but a handful, such as the large Pinelands program in New Jersey, are mandatory.*

Receiving Site Requirements

A. Official Map: TDR Certificates proposed for use on a receiving site shall originate only from a Sending Area identified on the [*name of local government*] Official Transfer of Development Rights Map.

B. Pre-Application Meeting: Prior to making an application to purchase or use TDRs, an owner of record of a receiving site or their representative shall meet with [*name of local government agency*] to discuss:

1. Program requirements;
2. Availability of TDRs;
3. Potential density increase with the use of TDRs for the specific receiving site; and
4. Zoning and site development requirements for the receiving site.

C. Application to Use Transferable Development Rights: An application for use of transferable development rights on a property in a Receiving Area shall be submitted in conjunction with an application for a development permit. In addition to the information required for the development permit, the following shall be submitted:

Mapping Receiving Areas: *Mapping the receiving areas provides assurance to property owners and is often done, but not always. Boulder County, for example, does not map TDR receiving areas so as to influence land values and encourage speculation. Property owners are given flexibility to propose their land as a receiving site and show it meets the criteria for approval. Surrounding property owners and the public are given the chance to comment on proposed receiving areas.*

1. Affidavit of intent to transfer development rights to the receiving property;
2. Certified copy of the Transfer of Development Rights Certificate for the sending site; and
3. Certified copy of the recorded Declaration of Restriction of Development and Easement.

D. Use of TDRs Voluntary: An owner of record in a Receiving Area choosing not to participate in the TDR Program shall retain the option to develop the property as provided by the property's existing zone district and applicable requirements of this code.

Monitoring TDR Certificates

The [*name of local government*] Planning Department Director or designee shall be responsible for maintaining permanent records of all TDR Certificates issued, easements recorded, and development rights transferred to receiving sites or purchased and held by a conservation organization or otherwise extinguished. An annual summary of TDR Certificates issued shall be prepared by the Planning Department and submitted to the [*name of local governing body*] for information.

Monitoring TDR Certificates: *Tracking development rights severed from a sending site is critical to a TDR program's success. The details of the tracking system do not need to be in the ordinance, but requiring it is a critical part of the program and identifying who is responsible ensures it will be done. Planners will need to consult the records when reviewing applications for development in sending and receiving areas.*

TDR Bank (Optional)

A TDR bank is not a requirement for a TDR program to be successful but can be a useful tool for implementing the program and ensuring effective long-term, consistent program administration. A TDR bank is a freestanding entity that may be run by the local jurisdiction or by a participating partner organization such as a trust or other nonprofit. It is intended to help bridge the gap between sellers and buyers of TDRs, stabilize TDR prices, and market the TDR program. TDR banks also can be authorized to buy and sell TDRs, as well as buy and hold development rights for future acquisition. Proceeds from the sale of "banked" TDRs may be used to buy TDRs in key areas to further the goals of the program. King County, Washington, has a successful TDR program with an active TDR bank. See link below.

An example of a purpose statement for a TDR bank is below. Typically, an ordinance creating a TDR bank also details who administers the bank, funding mechanisms for the bank, duties and authority of the bank, procedures for sale and purchase of TDRs, and monitoring and reporting of transactions.

A. Purpose: The TDR bank is intended to facilitate the implementation of the TDR Program and the purchase and sale of transferable development rights as allowed in this section. The TDR bank may acquire development rights from Sending Areas and sell development rights for use in Receiving Areas as designated on the Official Transferable Development Rights Map.

KEY FACTS

Administrative capacity	Experienced planner with city or county attorney to write ordinance. Skilled planners to administer program and track implementation
Mapping	Technical mapping of sending and receiving areas is typically required
Regulatory requirements	Land use regulations such as a zoning code and/or subdivision regulations. An intergovernmental agreement (IGA) is typically used if the TDR program is administered as a joint initiative between multiple jurisdictions
Maintenance	Yes, requires extensive on-going tracking mechanism for TDRs
Adoption required	Yes, the requirements and conditions for TDRs must be specified in the local land use regulations
Statutory reference	General zoning and land use regulatory authority. Home rule authority. See earlier discussion in the *Planning Framework*
Associated costs	Extensive staff time. TDRs will require outside consulting for land value expertise and dedicated staff for long-term maintenance of the program

EXAMPLES

Boulder County Land Use Code	bouldercounty.org/doc/landuse/lucodearticle06.pdf Section 6-700
City of Fruita Land Use Code	fruita.org/sites/default/files/fileattachments/community_development/page/242/17.09.pdf Chapter 17.09 TDR
Mesa County Land Development Code	mesacounty.us/planning/land-development-code.aspx Section 9.8 Transferable Density Credits
Pitkin County Land Use Code	pitkincounty.com/DocumentCenter/View/5858 Section 6-70
Routt County PDR program	www.co.routt.co.us/DocumentCenter/View/16
Summit County TDR program	co.summit.co.us/index.aspx?NID=187
King County, Washington TDR bank	kingcounty.gov/environment/stewardship/sustainable-building/transfer-development-rights/bank.aspx

FOR MORE INFORMATION

American Planning Association Planning Advisory Service - PAS Memo May/June 2010: "TDR-Less TDR Revisited."
clarionassociates.com/pdfs/duerksen-tdr-less.pdf

PROTECTING SENSITIVE AREAS

The protection of environmentally sensitive areas is a high priority for many communities in Colorado. These areas offer a variety of benefits including beautiful scenery, opportunities for outdoor recreation, and plant and animal habitat, to name a few. Preserving sensitive areas often provides an additional benefit of protecting citizens and property against natural hazards. For example, protection of floodplains and the wildland-urban interface not only safeguard natural resources; they also help reduce vulnerability to flood and wildfire hazards.

Protecting sensitive areas can be accomplished through mandatory tools (such as zoning and subdivision regulations) or through incentive-based approaches (such as optional cluster subdivisions). Generally, protecting sensitive areas can be accomplished at various stages of the planning and entitlement process, including:

1. **Comprehensive plan.** The plan identifies sensitive areas, hazard areas, and other locations that may be unsuitable or less suitable for development. It also offers a chance to prioritize protection of such areas alongside other important community goals.
2. **Zoning district designation (and subsequent rezoning).** A property's zoning district designation identifies the land use activities that may take place on the site. Placing an initial zoning district designation on a site, and also subsequent rezoning of the property, are important opportunities for the community to reflect on and implement the comprehensive plan and other supporting plans and policies. If sensitive areas are marked for preservation, then their zoning classifications should only allow appropriate densities and uses. This step is critical for establishing limitations on development of sensitive areas.
3. **Subdivision.** Once an area has been zoned, subdivision and development can occur. Although the zoning of a property prescribes the density and intensity of development, subdivision regulations provide an additional opportunity to ensure appropriate layout of individual sites, including lot and block design, street layout, and connections to surrounding areas. Planners can apply special standards to subdivision of sensitive areas (such as allowing cluster development to preserve sensitive areas or requiring multiple points of egress for emergency vehicles).
4. **Building permits.** Once a development has been approved, the building permitting process is another opportunity for communities to ensure that sensitive areas are protected. Permits must demonstrate how a proposed building complies with applicable health and safety codes (such as building and fire).
5. **Maintenance.** After a property is developed, communities and landowners have to be diligent to ensure that sensitive areas are continually protected from risk to hazards.

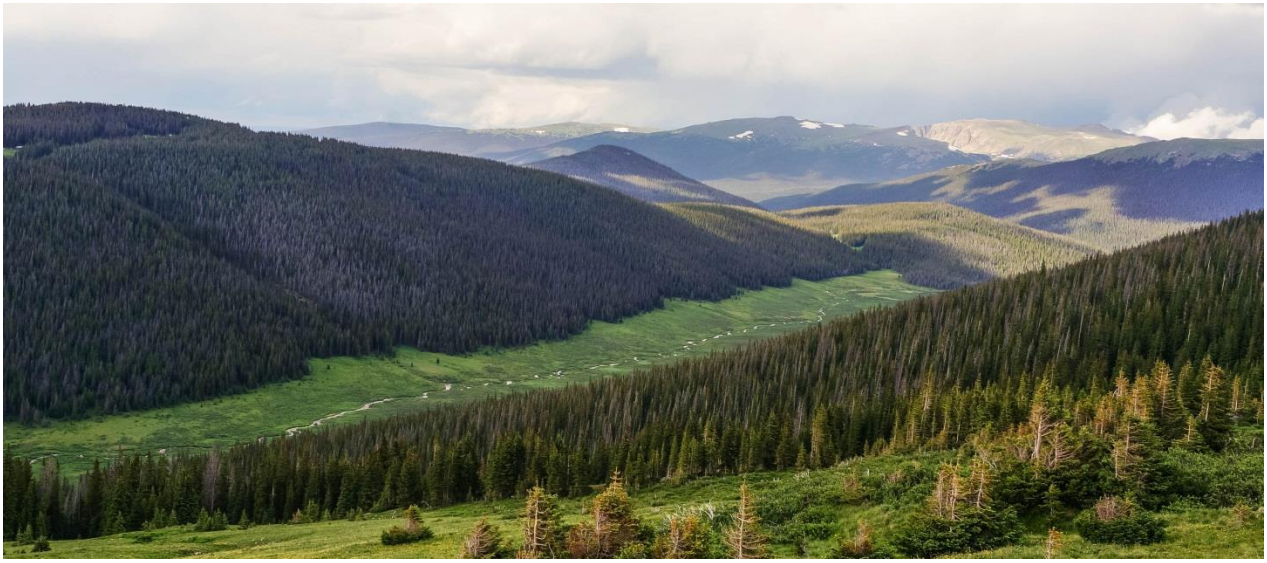
Protecting sensitive areas creates positive interaction between the built and natural environment.

Source: Arina P. Habich

For example, maintaining defensible space on a property in the wildland-urban interface means continuing to prune trees and remove brush to prevent build-up of fuels. This requires attention by landowners, but also from the community through ongoing enforcement of maintenance requirements.

This section explores tools that communities can use to advance their goals of protecting sensitive areas. Tools profiled in this section include:

- 1041 Regulations
- Cluster Subdivision
- Conservation Easement
- Land Acquisition
- Overlay Zoning
- Stream Buffers and Setbacks



Source: Shutterstock

1041 REGULATIONS

Source: landsofcolorado.com

HAZARDS ADDRESSED

HOW IT WORKS

In 1974, Colorado enacted House Bill 1041, which gives local governments additional authority for planning decisions related to areas or activities of statewide concern. This bill allows communities to identify, designate, and regulate those activities and areas through a local permitting process commonly known as "1041 regulations." The law was enacted to help clarify the roles and responsibilities of state and local governments in reviewing development projects that may have impacts beyond the local jurisdiction, and generally, the law allows the local jurisdiction to retain and increase control over such projects. 1041 regulations are different than any other special development review process in that they give local governments authority to regulate projects that may otherwise be out of their jurisdiction or control (such as siting of highways or airports). The statute identifies four areas and ten activities of statewide interest:

Areas of Interest:

- Mineral resource areas
- **Natural hazard areas**
- Areas containing, or having a significant impact upon, historical, natural, or archaeological resources of statewide importance
- Areas around key facilities in which development may have a material effect upon the key facility or the surrounding community

Activities of Interest:

- Site selection and construction of major new domestic water and sewage treatment systems and major extension of existing domestic water and sewage treatment systems

- Site selection and development of solid waste disposal sites except those sites specified in statutes
- Site selection of airports
- Site selection of rapid or mass transit terminals, stations, and fixed guideways
- Site selection of arterial highways and interchanges and collector highways
- Site selection and construction of major facilities of a public utility
- Site selection and development of new communities
- Efficient utilization of municipal and industrial water projects
- Conduct of nuclear detonations
- The use of geothermal resources for the commercial production of electricity

Communities may choose to adopt 1041 regulations for any or all of these areas or activities of state interest. Once adopted, development activities in these designated areas or activities are required to obtain a 1041 permit from the local jurisdiction, unless otherwise exempted by statute or local regulations.

IMPLEMENTATION

Communities considering adopting 1041 regulations should first consult their attorneys. The enabling statutes (C.R.S. Title 24, Article 65.1) define when and where 1041 regulations could apply to new development, which types of developments are exempt from 1041 regulations, guidelines for administration of the permitting process, and the respective roles of local governments and state agencies. C.R.S. § 24-65.1-202 includes criteria for administration of areas and activities of state interest. Those criteria prescribe how natural hazard areas shall be administered, including floodplains, wildfire areas, and geologic hazard areas.

1041 regulations can be integrated directly into existing land development regulations. For example, in addition to planned unit development (PUD) and/or annexation procedures, a community could describe the procedures for 1041 permitting in the same procedures chapter. When adopting 1041 regulations, communities must first identify areas and/or activities of state interest prior to enforcing the permitting process. Communities should also be sure to review other land use regulations and policy documents for consistency with any new ordinance in terms of definitions, procedures, exemptions, and enforcement authorities.

WHERE IT'S BEEN DONE

Chaffee County, Colorado, has adopted several types of 1041 regulations, including wildlife protection, geothermal energy, water and sewage treatment systems, and development of new communities. Each application of the 1041 regulations has been adopted through a separate chapter of the county code. The siting and development of new communities is addressed in Chapter 8 of the county's 1041 regulations and is intended to provide orderly development while reducing the impacts to the natural environment. As

Chaffee County, CO.

Source: J. Norman Reid

part of that 1041 permitting process, the county generally defines "new communities" as those needing to incorporate, or involving an extension of water and sewer services. New communities are required to identify potential natural hazards and also provide adequate mitigation to reduce the impacts of such hazards, among other approval criteria (*Chaffee County Land Use*, n.d.).

Many other Colorado municipalities and counties use 1041 regulations to review areas and activities of state interest, and it is common for the submittal requirements and approval criteria to include identifying and addressing natural hazards. For an inventory of Colorado counties and municipalities that have adopted 1041 regulations related to natural hazards, see the Colorado land use survey reports at: colorado.gov/pacific/dola/land-use-survey. The survey documents that 19% of the jurisdictions responding to the survey used 1041 regulations for natural hazard areas.

ADVANTAGES AND KEY TALKING POINTS

Adopting 1041 regulations may offer the following advantages:

- Provide an opportunity to consider potential impacts of natural hazard areas on the proposed infrastructure or development proposal.
- Allow local governments to review, comment, and impart change to proposed projects by statewide agencies that may impact the community.
- Provide a venue for public comment (during a public hearing) on activities and areas of state interest.
- Ensure that statewide interests are met without compromising the interests of local communities.
- Can be easily integrated directly into an existing land use code.

CHALLENGES

Administering 1041 regulations can also come with the following challenges:

- Requires designation of areas and activities of state interest prior to regulating them.
- Adds another procedure to land use and development codes, often with a unique set of definitions and approval criteria.
- Enabling statute is very prescriptive in terms of administration and criteria.

MODEL CODE LANGUAGE AND COMMENTARY

One key use of 1041 regulations is to address development activity in natural hazard areas. Three specific natural hazards can be addressed through 1041 regulations:

- Flood
- Geologic hazard areas
- Wildfire hazard areas

Below are samples of 1041 permit review language for each of these natural hazard designations. While 1041 regulations may be tailored to fit individual conditions, much of the language found in local 1041 regulations is directly from the state

Commentary

Authority for External Review: *1041 powers also allow local jurisdictions to review and regulate projects proposed by a state agency, other governmental authority, or special district that may otherwise be exempt from local land use review and permitting procedures.*

statute. Model language is in blue shading. Commentary is located in *italics* in the column at the right. The model language is based on existing ordinances from communities around the state, including municipalities and counties. The language is illustrative only; consult local counsel to tailor language for your jurisdiction.

Location of 1041 Regulations: *Most local governments adopt separate 1041 regulations that re-state the procedures included in state statutes. However, some have merged their 1041 process with other land use approval processes to minimize repetition and consolidate review times.*

Flood

A. Definition and boundaries: The requirements and standards in this section apply to mapped floodplain hazard areas as depicted in the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), National Flood Insurance Program (NFIP), and to areas later mapped and found to be in flood hazard areas.

1. Floodplains shall not be designated by [*City Council or Board of County Commissioners*] unless the Colorado Water Conservation Board (CWCB), through the local conservation district, identifies such area for designation.
2. These regulations apply if development is not otherwise regulated under other provisions of this code regulating floodplains.

Flood Hazard Mapping: *Some communities may use other sources for their flood hazard mapping. Sources normally used by local authorities to set floodplain boundaries and enforce regulations should be referenced here.*

B. Standards for Review: The permit authority shall grant approval of a development proposed in a flood hazard area if the following standards, in addition to the general standards for 1041 natural hazard area review, are met:

Permit Authority: *The permit authority is authorized by the local governing body and should be identified along with the process for designating a natural hazard area for 1041 regulations in the procedural section of the local land development code.*

1. Land use shall preserve the integrity of the flood hazard area by not altering or impacting it in any way which is likely to pose a significant threat to public health or safety or to property (including the subject property, other impacted properties, or the environment).
2. Development that, in time of flooding, will likely pose a significant threat to public health or safety or to property (including the subject property, other impacted properties, or the environment), shall be prohibited. In determining whether there will likely be a significant threat, the following factors shall be considered:
   a. Creation of obstructions from the proposed development during times of flooding;
   b. Vulnerability of the proposed development to flooding;
   c. Use of flood protection devices or floodproofing methods;

d. Nature or intensity of the proposed development;
e. Increases in impervious surface area caused by the proposed development;
f. Increases in surface runoff flow rate and amount caused by the proposed development;
g. Increases in flood water flow rate and amount caused by the proposed development;
h. Proximity and nature of adjacent or nearby land uses;
i. Impacts to downstream properties or communities; and
j. Impacts on shallow wells, waste disposal sites, water supply systems, and sewage disposal or on-site wastewater systems.

3. Development shall comply with all other Floodplain regulations of this code.

Geologic Hazard Area

A. Definition and boundary: All geologic hazard areas delineated on the Geologic Hazard Map for *[name of local government]*, available at the [*Planning Department*], are subject to review and permitting under this section. Geologic hazard areas included on the Geologic Hazard Map are defined as follows:

1. "Avalanche" means a mass of snow or ice and other material which may become incorporated therein as such mass moves rapidly down a mountain slope.
2. "Expansive soils and rocks" means any mineral, clay, rock or other type of geologic deposit having the property of absorbing water with an accompanying swelling to several times their original volume.
3. "Geologic hazard" means a geologic phenomenon that is so adverse to past, current, or foreseeable construction or land use as to constitute a significant hazard to public health and safety or to property. The term includes, but is not limited to: avalanches, landslides, rock falls, mudflows, unstable or potentially unstable slopes, seismic effects, radioactivity, and ground subsidence.
4. "Geologic hazard area" means an area which contains or is directly affected by a geologic hazard.
5. "Ground subsidence" means a process characterized by the downward displacement of surface material caused by natural phenomena such as removal of underground fluids, natural consolidation or

Geologic Hazards: *Each local community should include only those geologic hazards mapped in their community and found within the area designated as a geologic natural hazard. The definitions shown here are from the state statute. Most communities incorporate the state definitions and procedures into their 1041 regulations.*

dissolution of underground minerals, or man-made phenomena such as underground mining.

6. "Initial control area" means an area suspected, but not finally determined, to be a natural hazard area or a mineral resource area."Landslide" means a mass movement where there is a distinct surface of rupture, or zone of weakness, which separates the slide material from more stable underlying material.
7. "Mudflow" means a flowing mass of predominately fine-grained earth material possessing a high degree of fluid during movement.
8. "Nonconforming use" means any structure, development, or land use in existence as of the date of the adoption of these regulations, and not permitted under the terms and provisions of these regulations.
9. "Radioactivity" means a condition related to various types of radiation emitted by natural radioactive minerals that occur in natural deposits or rocks, soils, and water.
10. "Rock fall" means the rapid free-falling, bounding, sliding, or rolling of large masses of rock or individual rocks.
11. "Seismic effects" means direct and indirect effects caused by a natural earthquake or a man-made phenomenon.
12. "Unstable or potentially unstable slope" means an area susceptible to a landslide, a mudflow, a rock fall, or accelerated creep of slope-forming materials.

B. Standards for Review: The permit authority shall approve an application for a permit for development in a geologic hazard area if all of the following criteria are met:

1. Provision shall be made for the long-term health, welfare, and safety of the public from geologic hazards to life, property, and associated investments.
2. Permitted land uses, including public facilities, which serve such uses shall avoid or mitigate geologic hazards at the time of initial construction.
3. Man-made changes shall not initiate or intensify adverse natural conditions within a geologic hazard area.
4. Recommendations concerning the proposed development in the designated geologic hazard area by the Colorado Geological Survey shall be solicited and considered. The Colorado Geological Survey shall

Review by State Agencies: *Colorado statutes (§24.65.1-301 and 302) state that it is the function of local governments to receive recommendations from state agencies, and it is the function of state agencies to provide recommendations and technical assistance concerning the designation and guidelines for matters of state interest.*

be allowed no less than twenty-four (24) days in which to respond to such referrals.

Wildfire Hazard Area

A. Definition and boundary: All wildfire hazard areas delineated on the Wildfire Hazard Map for *[name of local government]*, available at the [*Planning Department or equivalent*], are subject to review and permitting under this section.

B. Standards for Review: The permit authority shall approve an application for a permit for development in a wildfire hazard area if all of the following criteria are met:

1. Any authorized development will have adequate roads for service by fire trucks, fire-fighting personnel, and other safety equipment, as well as fire breaks and other means of reducing conditions conducive to fire.
2. All precautions required to reduce or eliminate wildfire hazards will be provided for at the time of initial development.
3. A Wildfire Mitigation or Forest Management Plan will be prepared by a professional forester, reviewed and approved by [*name of local government*] [*Planning Department or equivalent*] and executed prior to issuance of building permits.
4. The development will adhere to the guidelines and criteria for Wildfire Hazard Areas promulgated by the Colorado State Forest Service.

KEY FACTS

Administrative capacity	Requires experienced planning staff to administer. 1041 permitting procedures are similar to other development review procedures in a typical land use code
Mapping	Mapping of hazard areas (known or potential) are often required with a 1041 application submittal
Regulatory requirements	Can work in tandem with other land use regulations; however, a land use code is not necessarily required to administer 1041 permitting procedures
Maintenance	Typical maintenance of ordinance and procedures. Also requires monitoring statutory requirements for changes for designated areas and activities of state interest

Adoption required	Yes, 1041 regulations require adoption by ordinance
Statutory reference	C.R.S. Title 24, Article 65.1. The statutes identify the general provisions, permitting procedures, and criteria for areas and activities of state interest
Associated costs	Staff time and resources required to adopt and maintain a new ordinance

EXAMPLES

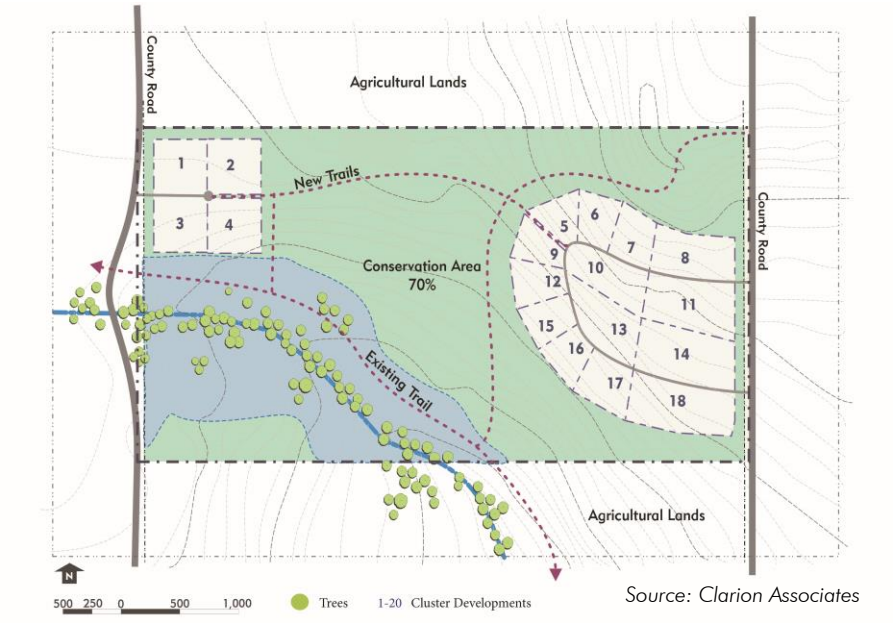
Boulder County 1041 Regulations	bouldercounty.org/doc/landuse/lucodearticle08.pdf
Chaffee County 1041 Regulations	chaffeecounty.org/Planning-and-Zoning-Land-Use-Code
DOLA Model Codes 1041 Regulations	colorado.gov/pacific/dola/1041-regulations
City of Golden Areas and Activities of State Interest	municode.com/library/co/golden/codes/municipal_code?nodeId=TIT18PLZO_CH18.80ARACSTIN Chapter 18.80
Pueblo County Areas and Activities of State and Local Interest	codes.co.pueblo.co.us/maintoc.htm Title 17, Division II Areas and Activities of State and Local Interest, Chapter 17.148 et. seq.
San Miguel County Areas and Activities of Local and State Interest	sanmiguelcounty.org/243/Land-Use-Code Article 5 Standards, Section 5-4: Areas and Activities of Local and State Interest/"1040" Environmental Hazard Review

FOR MORE INFORMATION

Colorado Land Use Survey

colorado.gov/pacific/dola/land-use-survey

CLUSTER SUBDIVISION



Source: Clarion Associates

HAZARDS ADDRESSED

HOW IT WORKS

Cluster subdivisions are a land development tool used by communities to protect open space or environmentally-sensitive lands, including hazard-prone lands. Clustering development simply means grouping or directing new development to relatively less sensitive areas within a subdivision, away from more sensitive areas like open space, steep slopes, or floodplains. Cluster subdivisions (also sometimes known as "conservation subdivisions") generally do not increase the overall density of a development but rather allow dwellings to be grouped (or "clustered") on smaller lots away from sensitive areas such as rivers or defined natural hazard areas. The key benefit to a developer is smaller lot sizes than otherwise permitted by the subdivision regulations in exchange for the conservation of sensitive lands. A developer also may benefit from local incentives that encourage the use of clustering, such as density bonuses, or state incentives, such as water rights.

IMPLEMENTATION

Cluster subdivisions are implemented through a community's subdivision regulations. Subdivision regulations are a community's opportunity to address new development in terms of location and density of lots, protection of environmentally-sensitive areas, and to meet other community goals. Communities that are interested in establishing cluster subdivision provisions can do so via a new ordinance or by amending their existing subdivision ordinance. Cluster subdivisions can be mandatory or used as an optional incentive in combination with other tools such as density bonuses and/or transfer of development rights (TDRs), both of which are addressed separately in this guide.

When developing a cluster subdivision ordinance, the community should:

- Identify the purposes behind the program, such as maintaining rural character, protecting valuable resources, creating defensible space, and/or avoiding development on hazard–prone land.
- Develop a set of clear thresholds that identify when and/or where cluster subdivisions are required and the minimum requirements for approval.
- Include provisions for the ongoing maintenance of required open space.
- Include standards for acceptable cluster designs, as well as graphics similar to the one at the start of this section to illustrate such strategies.

WHERE IT'S BEEN DONE

Longmont authorizes cluster lot subdivisions in its Land Development Code. Cluster lot subdivisions must be located in certain zoning districts and be of a minimum overall site area. While not explicitly designed to avoid hazard-prone lands, they are intended to create more compact residential developments to preserve and maintain open areas and natural lands (which often can include areas prone to hazards). They must provide common open space that meets specified requirements. Cluster lots are permitted in the R-1 and R-2 zoning districts, where minimum lot sizes are normally 5,500 and 5,000 square feet, respectively, for a single-family detached dwelling, but may be reduced in a cluster development to 3,000 square feet. The maximum development density is still limited to the R-1 and R-2 standards. Other minimum dimensional standards are also reduced for cluster subdivision lots in these districts, such as lot widths and setbacks. Approval of cluster lot subdivisions must follow the procedures for standard subdivisions in Longmont (*Code of Ordinances*, 2015).

Many other jurisdictions also have cluster subdivision provisions. For example, **Summit County's** Rural Land Use Subdivision (RLUS) process offers developers the opportunity to create smaller lots with lower infrastructure costs. Density bonuses are available based on the amount of, and restrictions placed on, the accompanying open space (*Summit County Land Use*, 2013, p. 33).

ADVANTAGES AND KEY TALKING POINTS

The primary benefit to adopting cluster subdivision regulations is the protection of environmentally sensitive areas and, in the case of hazard mitigation, protection of areas that pose risk to development. The development community also benefits from cluster subdivisions through paired incentives such as density bonuses. Other advantages include:

- There are synergies with other community goals and assets. Clustering development allows communities to protect development from hazard areas, while also conserving other sensitive areas such as wildlife habitat and migration corridors.
- The footprint of new development is reduced. When development is clustered, the needs for grading, paving roads, and laying infrastructure are diminished.
- Long-term maintenance costs are reduced. Because cluster development has a smaller footprint, this can equate to lower costs for maintaining roads, infrastructure, and other public or private amenities.
- Cluster subdivisions can be tailored to any Colorado community. Depending on political climate and demand, cluster subdivision can be mandatory or optional, and can be implemented through rigorous or more flexible standards. Tying cluster subdivision to other incentives such as TDRs or density bonuses is also optional.

- Property values may rise. Clustering has the potential to increase property values, since individual lots will enjoy access to an increased amount of open space.
- Varied housing stock. Cluster subdivisions often mean smaller lots, which can result in smaller dwellings, meeting diverse community housing needs.
- Wildfire risk reduction in the wildland-urban interface (WUI). Clustering lots away from the wildland-urban interface can reduce the wildfire risk to property and life.

CHALLENGES

Developing a cluster subdivision ordinance is relatively straightforward because there are many successful models in use around Colorado; however, there are some costs and challenges associated with the process.

- Less developable land. Without other incentives, developers may be forced to build smaller homes on smaller lots, making it difficult to maximize profit.
- Higher open space maintenance costs. Depending on the particular subdivision, the burden of maintaining the protected or open areas could become the responsibility of the developer or a subsequent metropolitan district or homeowners association. If dedicated to the local government, maintaining those areas becomes the responsibility of that jurisdiction.

MODEL CODE LANGUAGE AND COMMENTARY

While cluster subdivision regulations should be tailored to the needs of each individual community, there are some basic components found in most cluster subdivision ordinances throughout Colorado, including:

- Purpose
- Applicability
- Incentives and benefits
- Cluster subdivision standards
- Review procedures

The following sections describe each of the common elements and provide standard language that can be considered by Colorado local governments. Model language is in blue shading. Commentary is located in *italics* in the column at the right. The model language used in this document is based on existing ordinances from communities around the state, including municipalities and counties. The language is illustrative only; consult local counsel to tailor language for your jurisdiction.

Purpose	***Commentary***
The purpose of the cluster subdivision procedure is to:	***Purpose Statement:*** *The purpose statement is the jurisdiction's opportunity to describe the intent and benefits of the cluster subdivision procedures. Typically, the primary purpose of cluster subdivision is to allow for more compact development in exchange for preserving natural areas, open areas, or natural hazard areas. Communities also frequently tie the purpose of cluster subdivisions to their comprehensive plan policies.*

A. Preserve open areas in the [*town/city*] planning area;
B. Further the goals, policies, and policies set forth in the Comprehensive Plan;
C. Encourage flexibility and innovation through incentives;
D. Encourage development patterns that promote more efficient use of land;
E. Avoid development in known hazard areas;
F. Protect and enhance environmentally-sensitive areas; and
G. Promote an economical layout and street design that reduces infrastructure costs.

Applicability

A. Cluster subdivisions are permitted in the [*name of district(s)*] zoning districts.
B. Clustering of lots is required in the following:
  1. New subdivisions in the [*name of district(s)*] zoning districts.
  2. New subdivisions in a wildfire hazard area of [insert range of severity level of mapped wildfire hazard areas].

Incentives and Benefits

The [*Planning Commission, City Council, Board of Trustees, Board of County Commissioners, etc.*] may approve one or more of the following incentives in connection with the approval of a cluster subdivision application:

A. Expedited review process (such as 30 days for approval);
B. Priority application review status (moves to the top of the list);
C. Density bonuses as follows:

	[*name of district*]	[*name of district*]
Maximum density without clustering (DU/acre)	0.2	0.5
Maximum density with clustering (DU/acre)	1.0	2.0

Applicability: *Cluster subdivision can either be mandatory or optional. Many communities limit the districts where clustering benefits can be achieved (such as low-density residential or agricultural districts). For mapped hazard areas, communities can require clustering in certain instances (e.g., high to extreme wildfire hazard rating). Mapping can be tied to the comprehensive plan or hazard mitigation plan.*

Incentives and Benefits: *This section describes any benefits that the developer achieves by clustering development, such as reduced setbacks, additional lots, increased density, and expedited review procedures. The opening statement to this section should include the appropriate approval body for subdivisions.*

Other benefits, such as the potential for increased open space, increased property values, and protecting known hazard areas from development can be included in this section, if desired. Communities often allow for more flexible lot and dimensional standards such as small lot sizes and setbacks without allowing an increase in the overall net density of the development.

Greater densities than shown in the table can be permitted through cluster subdivisions and PUDs than can be achieved using the cluster development procedures authorized under C.R.S. 30-28-401. The trade-off for the greater flexibility of cluster subdivisions is a more involved and lengthy review and approval process.

D. Density bonus(es) up to one additional buildable lot per 17.5 acre increment; and
E. Reduced minimum lot sizes in the [name of district(s)] zoning districts.

Cluster Subdivision Standards

This section describes the minimum requirements for designing cluster subdivisions.

A. Site Layout

1. In cluster subdivisions, a minimum of [*30 percent*] of the development shall be preserved as common open space, and shall be permanently maintained and protected as:
   a. Common open space with deed restrictions;
   b. Land dedication to the town; or
   c. Protected through a conservation easement.

2. Where possible, structures shall be oriented to preserve scenic views, natural topography and drainage ways, solar orientation, and other important natural features of the site.

3. Buildable lots shall be located to minimize the impacts of clearing, grading, and infrastructure development on riparian areas, steep slopes, wetlands, woodlands, or other known natural hazard areas.

B. Dimensional Standards

1. A cluster subdivision shall be a minimum of [*10 acres*].

2. All dimensional standards from [*Section X.X]* shall apply to cluster subdivisions unless otherwise stated in this section.

3. Buildable lots in a cluster subdivision shall follow the following standards:

	[***name of district***]	[***name of district***]
Minimum lot size	4,000 sf	6,000 sf
Minimum lot width	25 feet	40 feet
Minimum setbacks		
Front	15	20
Side	5	10
Rear	5	10
Maximum block length	600 feet	600 feet

Preserving Common Open Space: *The option for preserving common open space can include other minimum percentages; however, 30 percent is common. The options for preservation (deed restrictions, land dedication, or conservation easements) should be discussed during a pre-application meeting between the local government and the applicant to determine the most effective approach.*

Minimum Project Size: *The minimum size for a cluster subdivision refers to the overall subdivision, not an individual lot. Not all communities require a minimum project size for cluster subdivision. The advantage of having a minimum project size is to prevent one-off subdivisions that try to increase density on small projects without any significant benefit to the community through preservation.*

Flexible Lot Standards: *Most cluster subdivision ordinances allow for a greater degree of flexibility on individual lot dimensional standards. The table included at left is an example of how a community might communicate adjusted development standards for cluster subdivisions. This section should cross-reference other applicable district-specific regulations and/or development standards that would otherwise apply, then modify applicable standards in a table or list. This sample language suggests additional adjustments to lot standards be allowed for cluster lots when they abut required common open space areas.*

4. Minimum setbacks may be further reduced by the [*Director*] where such setbacks are adjacent to required common open space areas.

Review Procedures

Review and approval procedures for cluster subdivisions should include similar procedural steps and approval criteria to those required for preliminary and final plats. Some codes may allow for minor subdivision approval for cluster subdivisions creating fewer than 4 or 5 lots.

Many communities include cluster subdivisions as part of a subdivision exemption procedure. The review procedures for subdivisions, including cluster subdivisions, often follow the statutory language closely. This allows statutory counties to regulate cluster subdivisions while ensuring that they remain in compliance with state law. It is important for city and county attorneys to review any changes to state statutes that would necessitate an update to their cluster subdivision regulations.

This section describes the procedures for cluster subdivision review and approval.

A. Review and approval of a cluster subdivision shall follow the procedures for a sketch plan, preliminary plat, and final plat in [*Section X.X, Subdivision Approval Procedures*].

B. The following additional approval criteria shall apply for cluster subdivisions:

1. The proposed development will preserve [*in perpetuity (or at least 40 years)*] high-priority environmental resources, agricultural land, natural hazard areas, or open space;

2. Density bonuses will not result in adverse impacts to adjacent properties, or such impacts have been identified and appropriately mitigated (through tools such as landscaping buffers, building stepbacks, screening, etc.);

3. Existing infrastructure is available, or will be available, to serve the proposed cluster subdivision.

KEY FACTS

Administrative capacity	Experienced planners with city or county attorney to write regulations and normal capability to administer the standards once adopted
Mapping	Not required, but sample cluster subdivision layout drawings help illustrate the desired result through the cluster subdivision process
Regulatory requirements	Subdivision ordinance required to effectively administer cluster subdivisions
Maintenance	Minimal
Adoption required	Yes
Statutory reference	The adoption of subdivision regulations is authorized for municipalities and required for counties through detailed enabling legislation (C.R.S. § 30-28-133 for counties and § 31-23-214 for municipalities). Local governments may adopt cluster subdivision provisions as part of this general enabling authority
Associated costs	Staff time and ordinance development or amendment costs

EXAMPLES

Archuleta County Subdivision Regulations	archuletacounty.org/index.aspx?nid=247
City of Aurora Small Lot Development Standards	municode.com/library/co/aurora/codes/building_and_zoning
DOLA Model Codes Cluster Subdivision Regulations	colorado.gov/pacific/dola/land-use-codes
City of Durango Cluster Development	online.encodeplus.com/regs/durango-co
Larimer County Rural Land Use Process	co.larimer.co.us/planning/planning/landuse
City of Longmont Cluster Lot Subdivisions	municode.com/library/co/longmont/codes/code_of_ordinances
Town of Pagosa Springs Conservation Subdivisions	municode.com/library/CO/pagosa_springs/codes/code_of_ordinances
Routt County Land Preservation Subdivision	www.co.routt.co.us/index.aspx?nid=194
San Miguel County Areas and Activities of Local and State Interest	sanmiguelcounty.org/243/Land-Use-Code

Summit County Rural Land Use Subdivision Process	co.summit.co.us/DocumentCenter/Home/View/63 (Section 8420)

FOR MORE INFORMATION

EPA's Essential Smart Growth Fixes for Rural Planning, Zoning, and Development Codes
epa.gov/smartgrowth/essential-smart-growth-fixes-communities

CONSERVATION EASEMENT

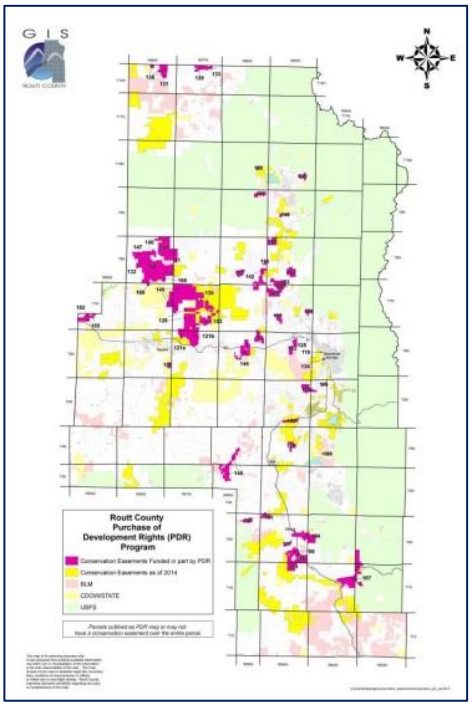

Source: Clarion Associates

HAZARDS ADDRESSED

HOW IT WORKS

A **conservation easement** is a specific type of restriction placed on land to protect open spaces and sensitive resources, such as areas prone to hazards. An easement limits the ability to use or develop the land in some way, while still allowing the property owner to live on and use the land, sell it, or pass it on to her heirs. The property is legally protected, usually permanently, from certain types of uses or development that would harm the resources being protected. Conservation easements have been used widely throughout Colorado to protect a variety of resources such as riparian areas, scenic views, farm and ranch land, wildlife habitat, and historic buildings. They are a good tool for communities that have identified specific privately owned areas for natural resource protection, hazard mitigation, watershed protection, open space, parks and recreation, or other public benefit.

Conservation easements for private property are volunteered or sold to land trusts or governmental agencies that have a stake in preserving the property's use through conservation. As with other real property interests, the easement is recorded in local land records and



Map of Conservation Easements in Routt County, CO.

Source: Routt County

becomes part of the title for the property.

They often are used in conjunction with cluster subdivisions; for instance, Summit County requires open space tracts within a Rural Land Use Subdivision to be covered by a conservation easement or similar instrument; the associated density bonus allowed is in large part determined by the type and term of the easement.

IMPLEMENTATION

Implementation of conservation easements requires collaboration between local governments, land trusts, and the owners of the property to be protected.

Conservation easements essentially involve private contracts, not public land use controls. Thus, in many communities land trusts lead the way in setting up conservation easements, rather than local governments. Land trusts also typically have more resources readily available to establish and monitor easements, such as staff to monitor development activity and funding for carrying out the transactions. That is not to say that local governments cannot establish their own conservation easement programs. It simply requires a higher level of capacity to do so, and it is often easier for communities to coordinate with land trusts to maintain the easements. Some steps that can be taken by local governments to implement conservation easements include: mapping high-hazard areas, then identifying and partnering with a local land trust (often by approaching an organization such as the Colorado Coalition of Land Trusts), and then approaching landowners in high-hazard areas to gauge interest in establishing easements.

WHERE IT'S BEEN DONE

In 2003 **Colorado Springs** coordinated with its Cedar Heights subdivision and a local land trust to protect a 295-acre park with a conservation easement to prevent any new residential development and create an open space buffer between the Pike-San Isabel National Forest and the community. The easement allowed for fire mitigation work to take place on 100 acres of the park which, in combination with defensible space around homes, was credited with helping to save the neighborhood from the 2012 Waldo Canyon Fire (*League*, 2012).

In 1996, voters in **Routt County** approved a property tax increase to establish a Purchase of Development Rights (PDR) Program. The purpose of the program was to provide funds for conserving private property from development for uses that are important to County citizens such as agriculture, recreation, and conservation uses. Citizens reaffirmed the program in 2005 and extended it until 2025.

As defined by Routt County, the PDR is a land protection tool in which a property's development rights are purchased from willing landowners. In exchange, the landowner grants a perpetual conservation easement, or deed restriction on the property, thereby permanently protecting the land from development. The land may be sold or transferred, but the deed restriction remains in place.

Since the program's inception, almost 40,000 acres have been protected through this program. Several of the properties that have been protected include floodplain areas that will be forever preserved from development pressures.

ADVANTAGES AND KEY TALKING POINTS

Some of the benefits of implementing conservation easements include:

- Provides a beneficial way to preserve private lands with intrinsic public value or hazard risk without the need to acquire or further regulate.
- Provides income tax and estate tax benefits for landowners.
- Provides a relatively inexpensive way to meet community goals for open space, hazard mitigation, parks and recreation planning, etc.

CHALLENGES

Implementation of conservation easements can be cumbersome as there are many different players involved including, but not limited to, the landowner (and their families), community officials, land trust staff, realtors, and lawyers. Some conservation easements also require payment, which requires a dedicated funding source to administer.

KEY FACTS

Administrative capacity	More advanced administrative capacity is needed to implement and maintain conservation easements
Mapping	Mapping of conservation areas is generally part of a local government's mapping program
Regulatory requirements	N/A
Maintenance	Maintenance of the conservation lands will be required by the community, the land trust or the landowner
Adoption required	No
Statutory reference	C.R.S. §38-30.5
Associated costs	Primarily only staff time for local governments. Requires funding to purchase properties if administered by local government

EXAMPLES

Boulder County Conservation Easements	bouldercounty.org/os/openspace/pages/ces.aspx
City of Colorado Springs Cedar Heights Conservation Easement	palmerlandtrust.org/news/open-space-proves-asset-fight-against-waldo-canyon-fire
Larimer County Conservation Easements	co.larimer.co.us/openlands/conservation_easement.htm
Routt County Purchase of Development Rights Board	co.routt.co.us/index.aspx?NID=110

FOR MORE INFORMATION

Colorado Department of Regulatory Agencies

colorado.gov/pacific/dora

The Nature Conservancy: Conservation Easements

nature.org/about-us/private-lands-conservation/conservation-easements/what-are-conservation-easements.xml

nature.org/about-us/private-lands-conservation/conservation-easements/conservation-easements.pdf

Colorado Coalition of Land Trusts

cclt.org/cclt

The Trust for Public Land: A Return on Investment: The Economic Value of Colorado's Conservation Easements

tpl.org/sites/default/files/cloud.tpl.org/pubs/benefits-CO-easements-taxcredit.pdf

Colorado Open Space Alliance: Holding Conservation Easements: A Best Practices Handbook for Local Governments

coloradoopenspace.org/best_practices_handbook.pdf

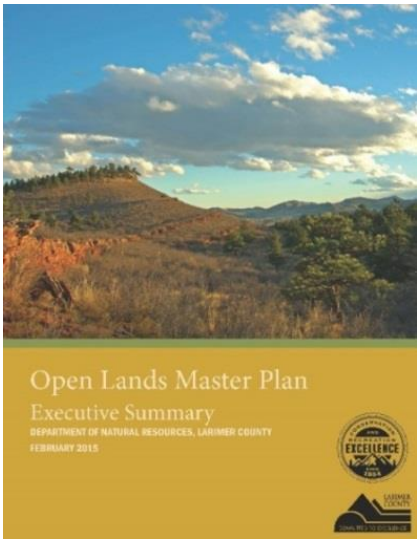
LAND ACQUISITION

Source: City of Fort Collins

HAZARDS ADDRESSED:

HOW IT WORKS

Often the simplest, most effective way for government to protect an area is to acquire it. For the purposes of this document, the term **"land acquisition"** refers to the acquisition of private land by the government (local, state or federal) in fee simple (through purchase or donation). (The related concept of acquiring conservation easements is discussed separately.) Across Colorado, land acquisition is a tool that can help local governments achieve multiple community goals, such as watershed protection and provision of open space and parks. Land acquisition also can be an important mitigation technique to protect against hazards, by removing the development potential from vulnerable areas. Examples of lands that might be considered for acquisition for community hazard mitigation purposes include floodplains, areas of high wildfire risk, stream corridors, steep slopes, and/or other geologic hazards.



Cover from Larimer County's Open Lands Master Plan.

Source: Larimer County

IMPLEMENTATION

Land acquisition as a tool for protecting sensitive areas involves obtaining buy-in from the community's leadership and from the property owner. Implementing land acquisition programs requires political will, community support, and funding. For this reason, land acquisition can be one of the more difficult tools to implement.

Some of the more successful land acquisition programs in the

country have addressed all three of these critical components. First, they are well-supported by the local governing body and the community, generally because of a high-priority community goal (open space preservation, hazard mitigation, protecting cultural resources, scenic lands, etc.). This often leads to the establishment of a funding mechanism for acquiring the sensitive lands that advance community goals. Some funding tools that have been implemented include direct line-item appropriations, taxes or fees such as stormwater utility fees, tax incentives, and bonds. In other instances communities may apply for grant funding (for example, Great Outdoors Colorado or FEMA Hazard Mitigation Assistance funding) and/or work in partnership with private or non-profit organizations to offset the full costs of property acquisition.

While land trusts are more often thought of as preservation organizations, they can also be used to assist communities with more traditional land acquisitions projects. Land trusts typically have more resources, such as staff and funding, readily available to assist communities with land acquisition projects. That is not to say that local governments cannot establish and manage their own land acquisitions programs. It does, however, require a higher level of administrative capacity to do so, and it is often easier for communities to coordinate with the land trusts to implement land acquisition programs.

WHERE IT'S BEEN DONE

Often times, especially when done for hazard mitigation purposes, local communities will pursue the acquisition of individual land parcels on a case-by-case basis. Such was the case in 2011 when **Cañon City** successfully acquired a flood-prone residential property that had been experiencing repetitive losses and had become a chronic problem for the City's Engineering Department. Although not located in a mapped special flood hazard area, the home was built in an area that saw heavy stormwater runoff and would suffer flooding during even fairly small rainfall events. Through the assistance of a FEMA hazard mitigation grant and in coordination with the homeowners, who were eager to relocate, the City was able to acquire the property and replace the structure with permanent green space. The site is now filled with natural vegetation and serves to absorb stormwater flows and reduce the potential flood risk for neighboring properties (*Best Practices*, 2014, p. 23-24).

Since 1995 **Larimer County** has enforced a quarter cent, county-wide open space tax called the *Help Preserve Open Space Tax*. Funds are shared with all of the municipalities in the county to help maintain and expand the Larimer County Open Lands Program. With these funds Larimer County and its communities implement active open space preservation programs that promote land acquisition as a primary means of preservation.

Larimer County and Estes Park, CO.

Source: Nataliya Hora

The program originated from a grassroots effort of citizens determined to establish a county-wide open space program. By going door-to-door to ask other citizens to sign petitions, the initiative was eventually put before voters and was passed overwhelmingly. Since the tax was passed in 1995, over 43,000 acres have been preserved and in 2014 voters extended the program through 2043. One of

the priority areas discussed in the Larimer County Open Lands Master Plan is river corridors. The plan recognizes the value of these lands as buffers that help mitigate property damage from flood and fires. The plan lays out procedures to ensure that conservation efforts along river corridors, including further implementation of land acquisition, will continue in the future (*Open Lands Programs*, n.d.b.).

Transfer of development rights (TDR) programs can be very effective in supporting land acquisitions. For instance, in the Upper Blue Basin of Summit County, the TDR program jointly administered by the county and the Town of Breckenridge has resulted in the public acquisition of over 1,050 acres of backcountry property and generated over $2 million for future land acquisitions (*Transferable Development Right*, n.d.). See *Transfer of Development Rights (TDRs)* earlier in this chapter for additional information.

Boulder County participates in FEMA's 404 program, commonly known as the "buyout" program whereby properties can apply to the local government for property acquisition if they meet FEMA guidelines for substantial damage following a disaster. The process can be lengthy, taking up to three years to complete. Planners should learn about the HMGP program before a flood to better understand who would qualify under the 404 program. One of Boulder County's biggest challenges has been communicating and finding alternative funding sources for property owners that did not qualify for the 404 program following the 2013 flooding events. For more information, contact Abby Shannon at 720-564-2623. The program is also discussed in the County's Flood Recovery Resource Guide from the following link: bouldercounty.org/doc/flood/floodrecoveryguide.pdf

ADVANTAGES AND KEY TALKING POINTS

Some of the benefits of land acquisition include:

- Complementing policies and strategies found in a community's comprehensive plan or other plans associated with future land use, open space preservation, hazard mitigation, floodplain management, community wildfire protection planning, parks and recreation, and environmental protection.
- Promoting natural resource protection as a hazard mitigation technique.
- Providing locations for citizens to recreate.
- Protecting environmentally sensitive areas.
- Achieving the above objectives through a permanent solution versus relying on land development policies or regulations which may be changed over time.
- Preventing property damage and loss of life, thereby reducing public and private resources expended on disaster recovery.
- Preserving habitat for threatened species.
- Removing land from development pressure that might otherwise be highly desirable to developers.

CHALLENGES

- Likely the greatest challenge for communities in implementing land acquisitions is the amount of money it takes to purchase sensitive lands.
- Land acquisition also requires resolving complicated coordination issues.
- Communities need a higher level of technical expertise to administer land acquisitions.

- Any land a jurisdiction acquires may be subject to easements that dictate how the land is to be maintained and used. If the land is located in a hazard area, staff must consider whether the easement requirements allow specific mitigation activity on the land.
- Finally, as previously mentioned, land acquisitions requires political will, community support, and financial capital, which may be challenging to obtain.

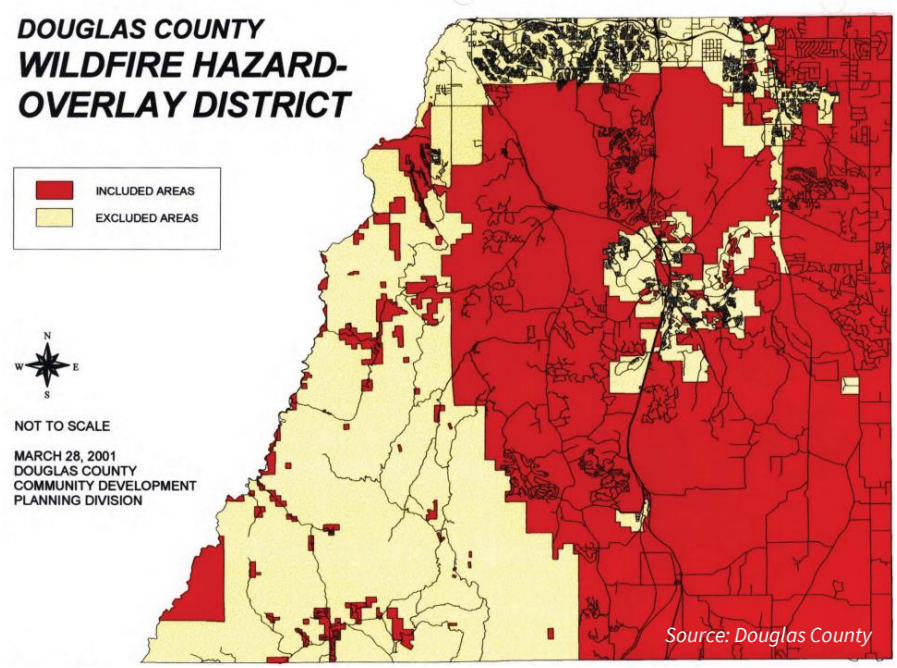
KEY FACTS

Administrative capacity	More advanced administrative capability and knowledge of real estate transactions are required to implement land acquisitions
Mapping	Can be coupled with open space or regular land use mapping but land acquisitions should become part of a community's mapping efforts
Regulatory requirements	N/A
Maintenance	Community maintenance of the acquired lands is required. Parks and Recreation Departments, Public Works Departments, etc. can assist with maintenance
Adoption required	Land acquisition policies may be included in comprehensive plans or other community plans that may be required to be adopted
Statutory reference	N/A
Associated costs	Dependent on the lands being acquired. Costs can sometimes be quite substantial

EXAMPLES

Boulder County Long-Term Recovery Group	bocofloodrecovery.org/get-help Also, see the County's Flood Recovery Resource Guide, including a description of the FEMA 404 "buyout" program here: bouldercounty.org/doc/flood/floodrecoveryguide.pdf
City of Boulder Open Space and Mountain Parks Department	bouldercolorado.gov/osmp/land-acquisition-program
City of Fort Collins Natural Areas Department	fcgov.com/naturalareas
Larimer County Open Lands Program	co.larimer.co.us/openlands

OVERLAY ZONING



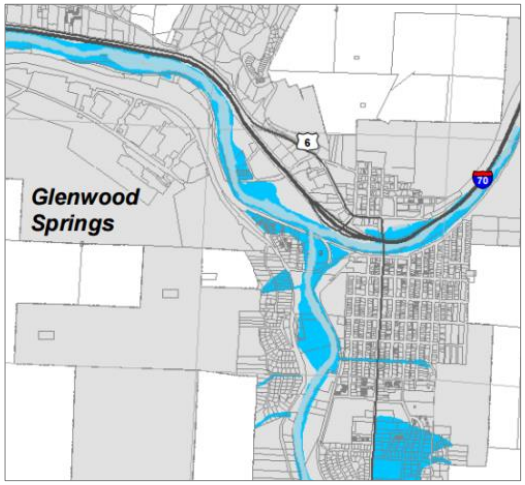
Source: Douglas County

HAZARDS ADDRESSED:

HOW IT WORKS

Overlay zoning is used by communities to apply area-specific standards and/or conditions. A **base zoning district** (such as residential or mixed-use) determines the types of uses permitted and the minimum dimensional requirements of lots and buildings. An **overlay district** (or overlay zone) applies an additional layer of standards to all areas within a defined overlay boundary, regardless of the underlying base zoning district. For example, an area with single-family homes that is zoned R-1 might also be within a hillside overlay zone. In this example, the permitted uses might allow construction of a single-family home according to the R-1 standards; however, the hillside overlay zone might prevent construction without first obtaining a geo-technical report.

Overlay zoning supplements or supersedes existing regulations within an underlying base zoning district. When drafting an overlay zoning district ordinance, consider whether all overlay zoning districts shall supersede existing zoning regulations, or if certain overlay zones should be treated differently. Some overlay zones (e.g., infill and redevelopment) are drafted to permit exceptions or require a less-restrictive set of standards than otherwise provided in



Excerpt of the floodplain overlay from the Garfield County overlay districts map.

Source: garfield-county.com/geographic-information-systems/documents/zoning/OfficialZoneOverlays7536.pdf

the zoning regulations.

For hazard mitigation purposes, overlay zoning is commonly applied to the following:

- **Floodplain management.** Regardless of the underlying zoning in place, areas that are subject to riverine flooding require special attention. Many communities use an overlay zone to apply floodplain regulations. Properties within this overlay are often subject to additional standards concerning land uses, building elevation, stream buffers, outdoor storage, building materials, and permitting procedures.
- **Hillside development.** Hillsides can be protected for both aesthetic and safety purposes. Hillside overlays often include additional standards to address natural features, steep slopes, viewsheds, and dangerous geologic conditions. These overlays can include provisions for special procedures, suitability analysis requirements, grading, landscaping, building height, and sometimes wildfire mitigation standards.
- **Wildland-urban interface.** Overlay zones also can be used to identify and protect areas subject to wildfire risk.

IMPLEMENTATION

To implement an overlay zoning district, many communities first prepare a study or report identifying a problem and linking the benefits of an overlay district to broader community policies or objectives in the comprehensive plan. Often, and particularly in the case of natural hazard mitigation, overlay zoning requires technical analysis and mapping (spatial definition) of the hazard boundary. The community then prepares the ordinance to include standards and procedures that apply to that defined overlay. As with other zoning code amendments, adoption of the ordinance requires approval by the governing body (City Council, Board of Trustees, or the County Commissioners). Overlay districts also can be amended, expanded, and lands reclassified through the rezoning process.

WHERE IT'S BEEN DONE

Douglas County adopted a Wildfire Hazard Overlay District as part of their zoning resolution. The first item listed in the purpose statement for the district is "to develop and maintain a map of Douglas County that allows for preliminary identification of Wildfire Hazard Areas." The regulations and procedures within the overlay district not only apply to those included on the overlay map, but also any land areas field-verified as potential hazard areas. Within the overlay, land use applications must comply with general mitigation and forest management provisions, road and street design criteria, water supply provisions, and structural design elements.

In **Weld County**, the zoning ordinance includes a Geologic Hazard Overlay District. The district is intended to minimize hazards to people and property, especially related to geologic hazards. With assistance from the Colorado Geological Survey and the US Geological Survey, Weld County maintains a digital map delineating coverage based on previous studies related to underground coal mines (which could lead to subsidence). In this overlay, any special use permit, planned unit development, change of zoning, or subdivision of land requires a geologic hazard overlay development permit prior to approval from the Board of County Commissioners.

ADVANTAGES AND KEY TALKING POINTS

The primary benefit of overlay zoning is applying a unique set of standards to a specified area without having to amend all other relevant sections of the code. Other benefits include:

- Provides additional protection for defined hazard areas without negotiating on a case-by-case basis.
- Allows existing zoning regulations to be superseded or complemented to solve a known problem.
- Can implement comprehensive plan policies and strategies associated with future land use and the environment.
- Relatively easy to maintain over time following initial adoption.

CHALLENGES

Overlay zoning often requires a higher level of technical expertise to administer. For example, enforcement of a floodplain overlay requires detailed knowledge of technical FEMA and NFIP requirements and other local building and engineering requirements. Other challenges include:

- Can require trained planning and engineering staff to develop the initial maps and standards.
- Adds an additional layer of requirements to the development review process.
- To mitigate natural hazards, requires fairly technical mapping of hazard area.
- Requires a zoning amendment, which requires formal action by the governing body.
- Requires that a community have a zoning ordinance in place, which may present a challenge to some smaller communities in Colorado without zoning.

MODEL CODE LANGUAGE AND COMMENTARY

Overlay zoning can be tailored to local conditions, which makes it an effective tool for addressing natural hazards. Overlay zoning typically is used in areas with flood, wildfire and geologic (steep slopes) hazards. The overlay zone district is often named for the type of natural hazard it is regulating, e.g., Hillside Protection Overlay or Floodplain Overlay District. Key elements of an overlay zone district include:

- Purpose
- Applicability
- Overlay district map
- Development standards
- Review procedures

The following sections describe each of these common elements and provide standard language that can be considered by Colorado local governments. Model language is in blue shading. 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

Commentary

Typical Hazards Addressed by Overlays: *The natural hazards most typically addressed with overlay zoning are flood, wildfire and steep slopes. Overlay zones can also be used to address other natural hazard risks or sensitive lands such as mapped avalanche zones, unstable soil conditions, dipping bedrock, wetlands or riparian corridors.*

communities around the state, including municipalities and counties. The language is illustrative only; consult local counsel to tailor language for your jurisdiction.

Purpose

A. The purpose of the [*name*] Overlay District is to promote the public health, safety and welfare of the citizens of [na*me of local government*]; minimize the risk of loss of life and property due to [*natural hazard*]; encourage and regulate prudent land use; permit only such uses that will minimize the danger to the public health, safety, welfare and property; reduce the demands for public expenditures for disaster relief, hazard mitigation, and protection of structures and facilities permitted in the underlying zone district(s); and regulate buildings and structures so as to minimize the hazard to the public health or property.

B. Furthermore the [*name*] Overlay District implements the following goals and policies of the [*name of local government*] Comprehensive Plan: [*relevant goals and policies*]

Purpose: *The purpose statement articulates the intent for the overlay district and identifies what is being regulated through the overlay standards. It should communicate why the overlay zone district was created and can identify the goals and objectives of local planning documents it is intended to implement.*

Applicability

A. The provisions and regulations of this section shall apply to all lands within [*name of local government*] designated a [*type of natural hazard/sensitive land*] as identified by the official map for the [*type of natural hazard/sensitive land*] Overlay District.

B. Uses permitted by the underlying zoning district are allowed unless specifically prohibited and provided that the proposed use complies with the standards and submittal requirements of this section.

C. All land use activities and development requiring a development, building, grading or other land use permit, are subject to the provisions of the [*type of natural hazard/sensitive land*] Overlay District as identified by the official map.

D. If a structure, lot, or other parcel of land lies partly within the [*type of natural hazard/sensitive land*] Overlay District, the part of such structure, lot, or parcel lying within the Overlay District shall meet all requirements for this district as set forth in this section.

Overlay District Map

The [*type of natural hazard/sensitive land*] Overlay District Map is hereby incorporated by reference and shall be maintained by the [*name of local government*] [*Planning Department*].

In cases where a boundary or the severity of conditions at a specific location within the Overlay District are disputed, the land owner of the property where the boundary is in dispute shall be given a reasonable opportunity to present their case to the [*Director of Planning or Administrator*] and shall submit technical evidence to support such dispute. The [*Director of Planning or Administrator*] shall not allow deviations from the boundary line as mapped unless technical and geological evidence clearly and conclusively establish that the map location of the line is incorrect, or that the designated hazard conditions do not present a significant hazard to public health, safety, or to property at the specific location within the hazard area boundary for the particular proposed land use.

Overlay District Map: *The natural hazard areas that are being regulated by the overlay zone district should be mapped based on reliable technical data. Official maps produced by state or Federal agencies, such as the Colorado Geological Survey or Federal Emergency Management Agency, can be adopted by the local government as official maps to define an overlay district. The maps need to be available for public reference at the local government offices and online if possible.*

Development Standards

This section should contain the substantive requirements that a proposed land use or development must comply with in order to meet the community's goals for the overlay zone district. This can include standards for building bulk, height, site layout, impervious surface area, specific construction methods, grading, vegetation and landscaping requirements, and special standards for public infrastructure such as roads and water systems. The required standards must directly relate to mitigating the risks posed by the natural hazard or the protection of sensitive lands.

Development Standards: *Identify possible development standards and narrow this list to those likely to be effective in the local community at achieving desired outcomes. The community may already have standards in existing development and engineering manuals that address steep slopes, soil conditions and flooding that can be made specific to natural hazard overlay districts.*

A. General Standards

1. The provisions of this Overlay District shall apply in addition to the applicable requirements of the underlying zoning district. When the standards of this Overlay District conflict with any other provision of the [*code/ordinance*], this Overlay District shall control.
2. Development determined to be subject to the provisions of the [*type of natural hazard/sensitive land*] Overlay District shall be required to mitigate identified hazards through compliance with and utilization of the [*name of local government*] development standards listed below, and may require the implementation of a Mitigation or Management Plan specifically addressing the natural hazard conditions of the subject property.

3. Additional measures aimed at reducing the risk of [*type of natural hazard/sensitive land*] may be imposed at the discretion of the [*Chief Building Official or approval body*] for the type of development being proposed.

B. Development Standards: All land use activity and development must comply with adopted [*name of natural hazard*] mitigation standards (such as floodplain regulations, or a hillside protection ordinance) in addition to the applicable requirements of the underlying zoning district. When these requirements conflict with any provision of the underlying zone district, the provisions of [*type of natural hazard/sensitive land*] Overlay District shall control. The types of mitigation measures required are as follows: (*Note: The model language below is an example for a wildfire hazard overlay zone district.)*

1. Wildfire Mitigation and Forest Management plan prepared by a professional forester, including but not limited to:
- **a.** Identification of fuel type as related to slope and aspect
- **b.** Reduction of fuel loading on-site
- **c.** Existing condition of current vegetation
- **d.** Recommendations to improve vegetative condition

2. Roads, streets and driveways designed for safe access for emergency fire equipment and evacuation.

3. Road, street, building, and emergency access signage designed for clear visibility from public roads.

4. Emergency water supply appropriate for the type and location of development proposed as determined by the [*Chief Building Official, Public Works Director, or Administrator*] in conjunction with the Fire Department.

5. All forms of development located, designed, and constructed in a manner to minimize ignition from a wildfire and the spread of fire from structures to wildland areas and/or structure to structure.

Mitigation Standards Manual: *Douglas County adopted a Wildfire Mitigation Standards manual that sets forth all requirements for site layout and building construction in its Wildfire Overlay Zone District. Adopting standards outside the zoning code allows the standards to be more easily updated as new construction techniques and fire-fighting methods are developed.*

Submittal Requirements and Review Procedures

This section describes the submittal requirements and review procedures for the [*type of natural hazard/sensitive land*] Overlay District.

A. Submittal Requirements: These submittal requirements are in addition to the underlying zoning district submittal requirements for the type of land use activity or development proposed. The following information must be included in all applications for development or land use activity: (*Note: The model language below is an example for a wildfire hazard overlay zone district.)*

1. A description of the existing site characteristics including vegetative, topographical, and other pertinent environmental conditions.
2. A determination by a professional forester or qualified wildfire interface fire specialist as to whether the site characteristics constitute a hazard conducive to wildfire.
3. An assessment of the severity of the wildfire hazard and implications of future development relative to the protection of life-safety and resource protection.
4. An analysis of the intensity and character of existing and proposed development and its effect on the hazard.
5. An analysis of the relationship between the proposed development and the hazard both inside and outside the proposed development.
6. Recommendations pertaining to the form, type, and extent of required mitigation measures and how the proposed mitigation measures meet the standards and provisions of this Overlay District.
7. A site plan detailing the recommended mitigation measures incorporated into the proposed development.
8. A Hazard Mitigation or Management plan if determined necessary by the [*Planning Director*].

B. Review Procedures: The review procedure for the provisions of this Section will coincide with the review procedures for the type of development or use proposed and the requirements of the underlying zoning district.

1. Land use activity or development in the [*type of natural hazard/sensitive land*] Overlay District shall be determined based on the evidence and information required by this Section.
2. The approving body for the type of development application being processed in the [*type of natural hazard/sensitive land*] Overlay District shall approve, approve with conditions, or deny the requested development activity.

Submittal Requirements and Review Procedures: *Review and approval procedures for development in an overlay district should be concurrent with all other review processes required for the proposal.*

3. Additional conditions for approval may include, but are not limited to, the following:
   a. Alteration of the physical characteristics or vegetative features of the land;
   b. Construction standards required for proposed structures;
   c. Construction standards for roads;
   d. Design and density within the proposed development; and
   e. Location of structures, uses, or other improvements within the proposed development.

KEY FACTS

Administrative capacity	Experienced planners with city or county attorney to write regulations and more advanced technical capability to administer the overlay requirements
Mapping	Technical mapping typically required to identify hazard areas
Regulatory requirements	Land use regulations with established zone districts
Maintenance	Minimal, but adjustments may be necessary to ensure overlay districts are appropriately meeting the goals of hazard mitigation over time
Adoption required	Yes
Statutory reference	C.R.S. §31-23-301
Associated costs	Ordinance development or amendment costs and staff time to review rezoning applications for approved development within the overlay zone district

EXAMPLES

Boulder County Natural Resource Protection and Floodplain Overlays	bouldercounty.org/doc/landuse/landusecode.pdf Sections 4-300 and 4-400
Chaffee County Floodplain Overlay	chaffeecounty.org/EndUserFiles/47582.pdf Section 2.6.4
Douglas County Wildfire Hazard and Floodplain Overlays	douglas.co.us/documents/section-17-3.pdf douglas.co.us/documents/section-18.pdf
Garfield County Floodplain Overlay	garfield-county.com/community-development/land-use-regulations.aspx Section 3-301

Jefferson County Floodplain, Geologic Hazard, Wildfire Hazard, and Dipping Bedrock Hazard Overlays	jeffco.us/planning-and-zoning/regulations/zoning-resolution Sections 30, 31, 32, and 33
City of Montrose Uncompahgre River Buffer Overlay	cityofmontrose.org/DocumentCenter/View/288 Section 4-4-8.3
Summit County Floodplain Overlay	co.summit.co.us/DocumentCenter/Home/View/59
Weld County Geologic Hazard Overlay	municode.com/library/co/weld_county/codes/charter_and_county_code?nodeId=CH23ZO_ARTVOVDI_DIV2GEHAOVDI Article V, Division 2 of the zoning ordinance

FOR MORE INFORMATION

APA Zoning Topics

planning.org/divisions/planningandlaw/propertytopics.htm#Overlay

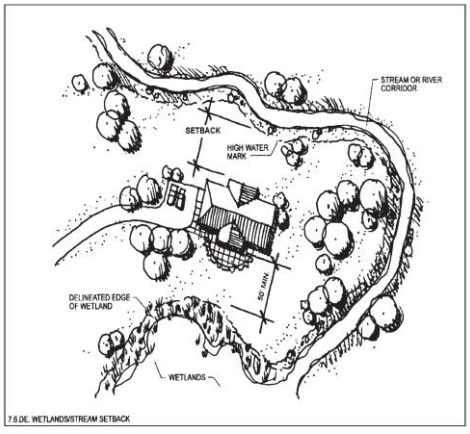
STREAM BUFFERS AND SETBACKS

Source: Billy Hathorn

HAZARDS ADDRESSED:

HOW IT WORKS

A **stream buffer or setback** is a defined area along a watercourse that is to be protected from development for the purpose of preserving the natural benefits and reducing hazards risks of such areas. They are implemented in a similar manner and often in concert with buffers for wetlands and other sensitive areas such as tundra, steep slopes, and wildlife habitat. They are intended to protect the many functions (hydrologic, biological, ecological, aesthetic, recreational, and educational) that riparian areas provide to communities. They help preserve stream banks and natural vegetation. Buffers and setbacks are enforced through local ordinances and codes and are used to limit or prohibit certain types of (or all) development within them. They help reduce or eliminate the adverse effects of land development on the natural and beneficial functions of the water course and provide many other benefits as discussed further below.



Setback schematic from Estes Park.

Source: Best Practices – Promoting Successful Mitigation in Colorado dhsem.state.co.us/sites/default/attachments/WRP%20Appendix%20F%20-%20Mitigation%20Best%20Practices%20Guide.pdf

IMPLEMENTATION

Stream buffers and setbacks are implemented and enforced through local ordinance or codes. Generally, local requirements may be adopted either as part of a land use or zoning code, as stand-alone ordinances, or as part of other regulations (such as stormwater management regulations). Local governments take many different approaches to implementing stream buffers and setbacks. Some communities have fixed-width, non-varying setbacks

for a variety of riparian areas (e.g., a 100-foot setback applies to all waterways). Other communities may adopt sliding-scale approaches with variable standards, based on different stream sizes and classifications and different types of land uses (e.g., certain intensive uses must be set back 100 feet, while less-intensive use must be set back 20 feet).

In addition, communities are authorized by statute to include provisions "establishing, regulating, and limiting such uses on or along any storm or floodwater runoff channel or basin as such storm or floodwater runoff channel or basin has been designated and approved by the Colorado Water Conservation Board (CWCB) in order to lessen or avoid the hazards to persons and damage to property resulting from the accumulation of storm or floodwaters." (C.R.S. § 30-28-111(1) and §31-23-301(1))

WHERE IT'S BEEN DONE

Aspen/Pitkin County enforces fixed-width buffers (100 ft. standard may be modified to a minimum of 50 ft./25 ft. minimum for isolated wetlands). Buffers may be reduced to a minimum of 50 ft. under certain conditions (*Wetland and Stream Buffers*, 2007, p. 22).

Estes Park requires new construction of all buildings and accessory structures be set back at least 30 feet from the annual high-water mark of stream corridors, and if that mark is not readily discernible, from the defined bank of the stream. Additionally, all buildings must be set back at least 50 feet from the annual high-water mark of river corridors, which are a different designation than stream corridors (*Estes Valley*, 2013). In most cases these requirements result in new construction being located outside of special flood hazard areas, and are credited with saving numerous structures from damage during the September 2013 flood event.

Fort Collins has fixed-width buffers based on specific stream corridors or the size of wetland (50 - 300 ft.). No development is allowed in the buffer zones which are determined through the site development plan (*Wetland and Stream Buffers*, 2007, p.21).

San Miguel County has fixed-width buffers of 100 ft. Permits are offered with discretionary review standards (*Wetland and Stream Buffers*, 2007, p. 23).

ADVANTAGES AND KEY TALKING POINTS

Benefits of implementing stream buffers and setbacks include:

- Helps to preserve natural and beneficial functions of the floodplain.
- Protects the water course from the impacts of neighboring and upstream land uses.
- Helps reduce flood vulnerability both at the site as well as the surrounding area and downstream.
- Promotes habitat preservation of aquatic and adjacent riparian environments.
- Helps preserve water quality by limiting proximity of potential pollutants.
- Facilitates stream bank stability and reduces erosion potential.

CHALLENGES

Some of the challenges associated with stream buffer and setback regulations include:

- Political will and community support is required to implement limitations on development location.
- Inability to implement along corridors where properties are already developed unless the property is destroyed or redeveloped.

MODEL CODE LANGUAGE 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 blue 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:

A. To promote, preserve, and enhance the hydrologic, biological, ecological, aesthetic, recreational, and educational functions that stream and river corridors, associated riparian areas, and wetlands provide;
B. To identify flood hazards and avoid development within those flood hazards to the extent practicable;
C. To establish regulations seeking maximum protection of all waters of [*name of jurisdiction*];
D. To avoid development activity within [*buffer zones*];
E. To minimize the adverse impacts of development activity within [*buffer zones*];
F. To mitigate the impacts of development within [*buffer zones*];
G. To subject development within [*buffer zones*] to heightened review;
H. To prevent property loss and loss of life while ensuring the natural and unimpeded flow of watercourses; and

Commentary

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.*

I. To encourage development and land uses that preserve existing watercourses as important natural features.

Applicability and Exemptions

Applicability standards describe when the riparian buffers and setback standards apply, and if there are any types of development activities or land uses that are exempt from the standards. The applicability section should include the following provisions:

A. The provisions of this [*chapter/article/section*] apply to all development within [*100 feet*] from the high-water line of the [*name of watercourse(s)*] and to all development within the 100-year floodplain.

B. This section shall apply to all new development, except for the following:

1. Maintenance and repair of existing public roads and utilities within easements or public rights-of-way;

2. Maintenance and repair of flood control structures;

3. Emergency response activities following a flooding event;

4. The expansion, remodeling, or reconstruction of an existing development provided the following standards are met:

a. The development does not add more than [*ten percent, or desired percentage*] to the floor area;

b. No portion of the expansion, remodeling, or reconstruction will be closer to the high water line than the current development; and

c. The expansion, remodeling, or reconstruction shall not constitute a substantial improvement in terms of floodplain regulation, and shall not increase the amount of ground coverage of structures within the 100-year floodplain.

Expansion, Remodeling, or Reconstruction: *Expansions of current structures or uses within designated floodplains or stream buffers require consideration of appropriate thresholds. For example, what if a roof needs replacement? What if a deck is proposed? What if the expansion is upward and does not expand the footprint?*

Development Standards

Standards for riparian buffers and setbacks vary widely; however, general approaches to managing development within stream buffers include the following:

Development Standards: *Depending on the chosen standards, communities can apply them so that all standards have to be met or that a defined number of standards have to be met. For example, the community could state that "development shall not be approved in the buffer zone unless at least two of the following standards are met."*

A. Development within the required buffer zone shall not be permitted unless the proposed development:

1. Is required to provide protection against property loss and/or damage;

2. Will improve the quality of the [*name or type of watercourse, or buffer zone*] and enhance the ecosystem by improving water quality, wildlife habitat, or biodiversity;
3. Will not increase the base flood elevation on the parcel; and
4. Will not pollute or interfere with the natural changes of the river, stream, or other tributary, including erosion and sedimentation during construction.

B. There shall be no development below the top of slope or within [*15 feet*] of the top of slope or the high waterline, whichever is more restrictive;

C. No development or use shall be permitted that will disturb, remove, fill, drain, dredge, clear, destroy, or alter any area, including vegetation, within stream or river corridors, wetlands, or their associated [*buffer/setback areas*] unless expressly allowed by this [*code/ordinance*].

D. No fill material or debris shall be placed on the face of the slope in a stream buffer, and historic drainage patterns and rates shall be maintained;

E. Parking lots shall be setback a minimum of [*15 feet*] from the top of slope;

F. All buildings, accessory structures, and parking lots shall be setback a minimum of [*50 feet*] from the delineated edge of any wetland; and

G. If development in a [*buffer zone/setback area*] causes any disturbance within the [*buffer zone/setback area*], the applicant shall undertake restoration and mitigation measures such as regarding and revegetation to restore any damaged or lost natural resource.

Top of Slope Limitation: *This standard is developed to protect bank stability and riparian vegetation.*

Procedures

When development is proposed in areas where riparian buffers and setbacks apply, additional procedural requirements often apply. For example, a special use review application might not ordinarily require a grading plan; however, if the property contains a designated watercourse, then the community may require delineation of grades at two-foot contours. The specific procedural adjustments vary depending on the type of development and the type of approval being sought.

The following are examples of the types of supplemental procedures that may apply to development subject to riparian buffers and setbacks:

A. The development application shall include the following:

Procedures: *Approval procedures in a zoning code will likely already be defined in a separate administration and procedures chapter or section. These additional procedures would apply above and beyond those required for a development that is not subject to riparian buffers and setbacks. Additional procedures that apply in hazard-prone areas often build on and cross-reference the common review procedures that apply to all development applications.*

1. Existing and proposed grades at two-foot contours;
2. Proposed elevations of the development;
3. Delineation of the high water line and the 100-year floodplain; and
4. A description of the proposed construction techniques, including for grading, erosion, and sediment control.

B. The [*Director/Administrator*] may recommend and the [*Planning Commission/City Council/Board of County Commissioners, or equivalent*] may impose conditions to approval of an application with stream buffers and setbacks that include:

1. Minimizing adverse impacts of the proposed development including the operation, type, and intensity of land uses;
2. Controlling the timing of the proposed development;
3. Controlling the duration of use of the development and the time in which structures must be removed; and
4. Assuring that development is maintained properly over time.

KEY FACTS

Administrative capacity	Experienced planners with city or county attorney to write regulations and normal capability to administer the standards once adopted
Mapping	Mapping is strongly recommended. Can be coupled with open space, FEMA or floodplain overlay, or regular land use mapping
Regulatory requirements	Local regulations are generally adopted as part of land use or zoning codes or as part of other regulations (such as stormwater management regulations)
Maintenance	Minimal. Generally part of development review once regulations are adopted
Adoption required	Yes
Statutory reference	General land use authority is found in C.R.S. § 29-20-101. Colorado's "1041 Regulations" further describe the administration of natural hazard areas as they pertain to floodplains. 1041 Regulations are addressed in a separate model
Associated costs	Ordinance development or amendment costs and staff time to review development for compliance with regulations and monitor for enforcement

EXAMPLES

City of Aspen Environmentally Sensitive Areas and Stream Margin Review	aspenpitkin.com/Portals/0/docs/City/clerk/municode/coaspent26-400.pdf Land Use Code, Part 400, and Section 26.435.040
City of Boulder Stream, Wetland, and Water Body Regulations	bouldercolorado.gov/plan-develop/stream-wetland-water-body-protection
Town of Estes Park Wetlands and Stream Corridor Protection	municode.com/library/co/estes_valley/codes/development_code?nodeId=CH7._GENERAL_DEVELOPMENT_STANDARDS_S7.6WESTCOPR Estes Valley Development Code, Section 7.6
City of Fort Collins Natural Habits and Features and Establishment of Buffer Zones	municode.com/library/co/fort_collins/codes/land_use?nodeId=ART3GEDEST_DIV3.4ENNAARRECUREPRST_3.4.1NAHAFE Land Use Code, Division 3.4, and Section 3.4.1.E
San Miguel County Wetland Areas	sanmiguelcounty.org/DocumentCenter/Home/View/214 Land Use Code, Section 5-22

FOR MORE INFORMATION

Colorado Water Conservation Board: Watershed Protection and Restoration

cwcb.state.co.us/environment/watershed-protection-restoration/Pages/main.aspx

Conservation Tools.org

conservationtools.org/guides/119-riparian-buffer-protection-via-local-government-regulation

National Handbook of Conservation Practices: Conservation Practice Standard, Riparian Forest Buffer

nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_026098.pdf

Protecting Stream and River Corridors: Creating Effective Local Riparian Buffer Ordinances

rivercenter.uga.edu/wp-content/uploads/sites/17/2015/03/Guidebook-for-Developing-Local-Riparian-Buffer-Ordinances.pdf

IMPROVING SITE DEVELOPMENT STANDARDS

Where zoning districts define appropriate locations for various land uses and/or building types (the "where"), site development standards describe the quality expected of development (the "how"). Site development standards address a wide range of issues:

- How the existing land is protected (e.g., floodplain regulation, open space and natural area protection);
- How the development site is laid out and planned (e.g., lot and block standards, circulation and connectivity, landscaping, parking); and
- How new buildings are located, designed, and operate (building dimensions, signage, lighting, and circulation and connectivity).

These standards can often impact a development's vulnerability to certain hazards. For example, landscaping standards might require a certain number of trees be provided on a lot, regardless of its location within the wildland-urban interface. Meeting the landscaping standards might conflict with defensible space standards. Reconciling these competing interests is where interdepartmental coordination is critical.

Like many other tools in this report, well-crafted site development standards can accomplish more than just mitigating hazards. For example, low-impact development helps communities reduce the risk of downstream flooding triggered by stormwater runoff, but also improves water quality. Also, subdivision regulations can help prevent densification in known hazard areas but also ensure orderly growth and development and support transportation investments. Tools that meet multiple goals and objectives are often more supported by the community.

Tools that meet multiple community goals and objectives are often more supported by the community.

This section explores tools that communities can use to improve site development standards to reduce risk or mitigate hazards. Tools profiled in this section include:

- Stormwater Ordinance
- Site-Specific Assessment
- Subdivision and Site Design Standards
- Use-Specific Standards

Enhanced Stormwater Management Techniques at the Watershed Scale

Traditional stormwater management practices are implemented at the local level. This is for good reason, as controlling the quantity and quality of runoff from land development is most effectively managed by applying site-specific techniques close to the source. ***Low-Impact Development (LID)*** *and* ***stormwater management Best Management Practices (BMPs)*** *embrace this concept and are appropriately designed for the individual parcel or lot level. However, regardless of approach, these management methods may still convey large volumes of stormwater to community drainage systems that are interconnected and only have so much capacity. Major rainfall events in particular will exceed this capacity and create flood hazards both at the site and downstream with stormwater overflows, backflows, and increased velocities with potentially destructive impacts to the built and natural environment.*

Watersheds *are larger areas of land where all water flows across or through and drains into a common stream, river, lake, or ocean. They include all the natural and structural channels designed to convey stormwater, the floodplains which store and transport floodwaters, and all other lands up to the highest elevation. No matter how they are delineated, all watersheds meet this definition and thus are critical for understanding and taking a holistic approach to stormwater and floodplain management. All communities are affected by development that takes place upstream in their watershed, and similarly will have an impact on downstream communities through their own development activity. Consequently, communities should plan on a watershed-wide scale.*

- *One of the first steps to implementing such an approach is the completion of a watershed master plan that assesses the potential impact of development on existing and future conditions – including impervious surfaces, drainage and stormwater flows, natural systems, and structures throughout the watershed. Plans should also assess the potential impacts to the community from larger rainfall events that exceed the performance standards (design storm) used for existing stormwater facilities.*
- *Once these impacts are known, a more comprehensive program can be created to prevent or minimize adverse impacts including new or revised regulations for development, enhanced macro-scale techniques for stormwater or floodplain management, or capital projects for flood control and mitigation. Such a program will help the community identify opportunities to address problems before and as they arise.*

In taking the watershed view, communities are better positioned to consider additional tools or strategies for risk reduction and avoid making development decisions that lead to increased flood hazard vulnerability. Watershed-based planning can also help facilitate regional or multi-jurisdictional coordination on stormwater and flood-related issues that traverse political boundaries. These enhanced efforts can lead to more integrated, coordinated, and systematic solutions across the watershed versus dealing with stormwater solely by locality. For example, by working with neighboring jurisdiction, communities may be able to consider the development and use of regional retention or detention measures. Pursuing these and other types of larger-scale projects may be used to leverage more non-traditional sources of funding for plan implementation. For these reasons, watershed-scale planning is often best executed at the regional scale, with coordination and creation of a regional planning entity with appropriate authority.

STORMWATER ORDINANCE

HAZARDS ADDRESSED

HOW IT WORKS

Low-impact development (LID) and **stormwater best management practices (BMPs)** are common environmentally sensitive approaches to site development that minimize the adverse effects of stormwater runoff. They emphasize the use of site-specific design and other planning techniques to preserve natural systems. These may include both structural and non-structural measures to accommodate the infiltrating, filtering, storing, evaporating, and detaining of rainfall in proximity to where it falls. Structural measures are engineered solutions to reduce runoff through absorption and filtration such as vegetated buffers or swales, retention or detention basins, and permeable pavements. Non-structural measures include land use planning techniques that promote the use of natural features such as floodplains, riparian areas, and porous soils to reduce runoff while simultaneously limiting new impervious landscapes through site design. While a primary goal of LID and BMPs is to protect water quality and reduce flooding, they differ from conventional stormwater management strategies in that they also strive to minimize impervious areas and preserve or enhance the local landscape, habitat and ecological functions, aesthetics, public health, and other community assets or values.

Example of LID (bioswale) in large commercial parking area in Aurora, CO.

Source: Colorado Association of Stormwater and Floodplain Managers

LID and stormwater management BMPs include a broad range of practices for various sites and development types, and can be applied to redevelopment or renovation projects as well as

new construction.

LID practices are often development-specific, and include the conservation of open space, vegetation, wetlands, and other natural features, as well as the use of green infrastructure for lands intended to be developed or otherwise disturbed. **Green infrastructure** includes natural landscapes or facilities that seek to mimic natural functions. Examples include rain gardens, permeable pavements, cisterns, bioswales, vegetated infiltration beds, and green roofs – all of which are designed to capture and absorb, store, or use stormwater runoff, versus conveying it from the site.

Stormwater management BMPs are often managed by communities using a more holistic, systems-based approach with an emphasis on pollutant control and regulatory compliance. BMPs encompass a wide range of practices that are primarily intended to reduce or eliminate water quality impacts from stormwater runoff leaving a site. Examples include requirements for erosion and sediment control during construction and regulations for limiting post-construction runoff from the site, including LID and other design techniques for the on-site detention, retention, or treatment and conveyance of stormwater flows from impervious coverage.

Applied on a broad scale, LID and BMPs can maintain or restore a watershed's hydrologic and ecological functions and reduce the risk of downstream flooding triggered by excessive stormwater runoff that often accompanies community growth and urbanization. Additional hazard-related benefits include reducing an area's susceptibility to drought conditions through regenerative design measures such as water reuse and maintaining groundwater recharge.

IMPLEMENTATION

Requirements or incentives for applying LID and BMP approaches to site design can be incorporated into existing land development codes, stormwater management regulations, or erosion and sediment control ordinances. They can also be implemented in local public works projects. Communities typically implement LID or BMPs by regulating development on a case-by-case basis through site development standards that require the peak flow and volume of runoff from a site to be no greater than before it was developed. This may include a range of options or requirements for developers such as the use of structural BMPs for temporary stormwater detention or nonstructural techniques such as LID to maximize a site's ability to absorb site runoff. Communities must also specify certain criteria in the regulations such as the scale of development that is subject to the regulations and the performance standards (i.e., the design storm, which refers to a rainfall event of a specified frequency and magnitude) to be applied for facilities used to manage runoff from the site. The completion of hydrologic and hydraulic studies showing compliance with these standards is typically required of developers during site plan reviews.

WHERE IT'S BEEN DONE

Since 2007 the **Southeast Metro Stormwater Authority (SEMSWA)** has worked in close partnership with the City of Centennial, Arapahoe County, and Douglas County to provide stormwater management services for drainage and flood control facilities. Created by a local intergovernmental agreement for a "drainage authority" in Colorado, SEMSWA operates as a political subdivision and a public corporation of the State. Per its mission statement, SEMSWA provides services "essential to the protection, preservation, and enhancement of our neighborhoods, community and natural resources through flood control, water quality, construction, maintenance, and education."

In addition to managing compliance with federal environmental regulations, SEMSWA reviews and approves various plans and reports for stormwater compliance through the planning and development process, including but not limited to land use cases, construction documents, drainage plans and reports, erosion and sediment control plans and reports, and floodplain development. It also plans and implements a variety of stormwater projects to ensure proper drainage, reduce flooding risks and property damage, and protect water quality. SEMSWA actively promotes the use of LID and stormwater BMPs for development projects throughout its service area, especially through minimizing impervious surface areas that are directly connected to the storm sewer system and maximizing pervious areas that receive stormwater runoff. Through its efforts SEMSWA has helped the City of Centennial, Arapahoe County, and Douglas County achieve among the highest credit scores in Colorado for stormwater management as assessed by FEMA's Community Rating System (CRS).

Wheat Ridge promotes the use of LID and stormwater BMPs through specific requirements that must be followed by all proposed developments or re-developments. The City's Site Drainage Requirements (2014) provide explicit information and guidance to development applicants that are based on the latest editions of the Drainage Criteria Manuals promulgated by the Urban Drainage and Flood Control District (UDFCD) and encouraged by the Colorado Association of Stormwater and Floodplain Managers (CASFM). This includes utilizing the UDFCD Four-Step Process that focuses on (1) reducing stormwater runoff volumes; (2) employing BMPs; (3) stabilizing drainageways; and (4) the implementation of long-term source controls. The requirements document includes clear descriptive language on the mandatory criteria and recommended practices for various development categories and activities, along with a series of flow charts to help applicants navigate the process with the City's Public Works Department.

ADVANTAGES AND KEY TALKING POINTS

LID and BMP approaches to stormwater management provide communities and developers with flexible, cost-effective options for site design that maintain predevelopment volumes and rates of stormwater runoff. Other notable benefits include:

- Prevents future community development from increasing flood hazards to existing development.
- Helps maintain or improve surface water quality.
- Encourages small-scale designs for stormwater and water quality control that are tailored to specific site characteristics.
- Saves money:
    - The cost of LID is often less than the cost of conventional land development and stormwater management. Savings come from reduced costs for site preparation (clearing, grading, paving, stormwater infrastructure, etc.).
    - Reduces need for community infrastructure and utility maintenance costs (streets, curbs, gutters, sidewalks, storm sewers, etc.). In fact, many property owners and homeowner associations perceive LID/BMP systems as value-added amenities and actively provide for their maintenance.
- Decreases the need for large stormwater detention areas or treatment plants, possibly enabling more land to be developed or used for other community purposes.

- Improves regulatory expediencies. LID and BMP practices are currently promoted by the Environmental Protection Agency (EPA) as a method to help communities meet goals of the Clean Water Act.
- Increases the ecological health of riparian stream corridors due to lower amounts of sediment and pollutants and/or decreased erosion due to stormwater velocity entering the waterway.

CHALLENGES

Similar to other regulatory or capital project reviews for stormwater management, LID and BMPs often requires technical expertise to administer. For example, the review and enforcement of local regulations requires an engineer to review site plans, hydrologic and hydraulic studies, and other information demonstrating local compliance. Other challenges include:

- Requires that a community have stormwater management plans, regulations, and ordinances in place.
- Can be challenging to administer and enforce without trained staff.
- Adds an additional layer of requirements to the site plan or development review process.
- Requirements need to address the ongoing maintenance of LID or structures, which will become less effective over time without appropriate maintenance. Maintenance can be challenging for staff to monitor.
- Existing codes or regulations may prohibit or restrict the implementation of LID or BMP practices, requiring revisions or updates.

MODEL CODE LANGUAGE AND COMMENTARY

There are numerous options for how low-impact development and stormwater BMP standards may be integrated into a local government's various regulations. For example, they can be organized as a stand-alone chapter of a zoning and development code, or integrated into other site development standards (such as access and connectivity, erosion and sediment control, open space, and sensitive area protection). They also can be located outside the zoning regulations altogether, such as within technical engineering manuals, stormwater master plans, or other similar documents.

Wherever located in the regulatory framework, key issues to consider when adopting LID and stormwater requirements include the following:

- Purpose and intent
- Applicability
- Stormwater management site design standards

The following sections describe each of these elements and provide standard language that can be considered by Colorado local governments. Model language is in blue shading. Commentary is located in *italics* in the column at the

Commentary

Cross-Reference Technical Standards: *Many zoning and land development codes simply cross-reference adopted stormwater management guidelines or criteria manuals.*

right. The model language used in this document is based on several existing ordinances and programs from varying communities around the state and the nation, including municipalities and counties. The language is illustrative only; consult local counsel to tailor language for your jurisdiction.

Purpose and Intent

Stormwater-related provisions may be found throughout a development code, whenever water quality issues are triggered. For example, consider the following purpose statement authorizing cluster development:

"This [*ordinance/section/etc.*] is intended to allow for the construction of [*residential/commercial/all development*] that promotes clustering arrangements. Flexibility is allowed in lot design in order to achieve alternative layouts than help preserve natural resources and allow for creative stormwater management solutions."

Or this more general purpose statement related to stormwater management:

This [*ordinance/section/etc.*] is intended to reduce the quantity of stormwater runoff generated, improve the quality of stormwater as it leaves a site, and increase the amount of onsite stormwater infiltration.

Purpose and intent statements should draw on applicable language from the comprehensive plan, if available. Comprehensive plans increasingly address issues like sustainability, resilience, and water quality that often include policies that support the development of LID code requirements and encourage the use of stormwater BMPs.

Applicability

A threshold decision for all communities is whether to encourage or require the use of LID principles and stormwater BMPs for new development. The more significant the stormwater issue in the community (hopefully documented in adopted plans), the more likely the community will mandate the use of LID and stormwater BMPs.

Exceptions to general development standards should be considered for projects anticipated to have relatively low impacts on stormwater quality or quantity. For example, consider the following conditions for exemptions from LID or stormwater and water quality standards:

Exceptions to this [*ordinance/section/etc.*] include:

Applicability: *If required, the jurisdiction also must consider what types of development will be subject to the standards. For example, does all new development have to include LID elements? The general trend is increasingly to require the implementation of LID principles in most new development, particularly auto-intensive uses that have significant amounts of parking and/or other impervious cover.*

A. New single-family or two-family residential developments (or redevelopments) that are not part of a new subdivision and that disturb an area of less than one acre.
B. Parking lot maintenance of existing pavement, or replacement or removal of pavement of less than one-half acre with drainage patterns unchanged.

When establishing the applicability of stormwater requirements, many communities set thresholds and hold projects of different types to different standards. For example, new development can be categorized as minor development, moderate development, major development, and/or redevelopment. Major development would include the most significant potential impacts to stormwater quantity or quality and would be subject to the most stringent regulations.

Categories of Development: *If categories of development are established, those thresholds can apply more broadly to the site plan review procedure and other development standards, not just for drainage or water quality. A community would not want to classify a "major" development differently within the context of drainage and water quality than it does for general site plan review procedures.*

Stormwater Management Standards

Because of the importance of reducing the quantity of stormwater runoff, most communities that mandate any type of low-impact development establish a broad requirement that post-development stormwater runoff rates be the same as or less than pre-development rates. Beyond that basic requirement, there are a variety of opportunities for integrating LID and stormwater BMPs into development codes. The sections below discuss some of these options.

Require Onsite Stormwater Management

The treatment and retention of stormwater onsite is an important goal of most regulations. Communities can reduce the amount of runoff that leaves a site by adopting minimum onsite stormwater management controls, such as:

A. Development shall infiltrate [*90 percent*] of runoff through on-site management.
B. Development shall control either [*85 percent of a 24-hour storm runoff event*], or [*10 percent of the 50-year peak flow rate*] through landscape-based treatment to the maximum extent possible.
C. Development shall reduce urban runoff from all impermeable surfaces by [*0.75 inches*] using infiltration or treatment and release.

Impervious areas can be further reduced or "disconnected" by allowing methods for infiltration such as disconnecting downspouts, pavement disconnection (curb cuts), tree canopy increase, reducing impervious cover, and using green roofs or porous paving materials.

Dimensional Standards

Directly limiting impervious surface or building coverage can improve infiltration and vastly reduce total stormwater runoff. Consider the following:

In the [_____ *zoning district*], building coverage shall not exceed [*30 percent*] of the total lot.

Communities could also consider a system by which impervious coverage maximums are scaled to the size of the development, with more dense districts allowing for greater impervious coverages as shown in an example below.

Maximum impervious lot coverage shall not exceed the following percentages:

Size of Development Project	**R-1 district Low Density**	**R-2 district Medium Density**	**R-3 district High Density**
Less than 15,000 sf	50 percent	50 percent	60 percent
Between 15,000 sf and 49,999 sf	40 percent	50 percent	60 percent
Between 50,000 and 200,000 sf	25 percent	50 percent	60 percent
More than 200,000 sf	10 percent	50 percent	60 percent

The jurisdiction can adjust minimum lot sizes if necessary to accommodate LID and achieve permitted densities:

If compliance with [*LID standards/stormwater BMPs*] can only be achieved by increasing the amount of open space or landscaping beyond that otherwise required, the maximum residential density shall be calculated as though the additional required open space or landscaped area is developable land for dwellings, and the minimum lot sizes shall be adjusted as necessary to accommodate additional residential dwelling units permitted by that calculation.

Landscaping and Screening

Encouraging or requiring low-water and native landscaping can help create a more natural landscape and ultimately improve water quality and conservation efforts. Allowing for natural berms or screening materials other than walls can help improve drainage and reduce runoff. Some examples of integrating LID and stormwater BMPs into landscaping requirements are included below.

Incorporating LID into landscaping purpose statement:

The purpose of these urban landscape standards is to help support the creation of attractive places that reduce the negative impacts of an urban environment by:

A. Requiring canopies of tree-lined streets;
B. Requiring integration of xeriscape plant materials; and
C. Developing standards for public spaces.

Address future impervious areas added following a certificate of occupancy:

Following the issuance of the initial certificate of occupancy, if additional impervious area in excess of [*500 square feet*] is added to the site, open spaces and landscaped areas shall be revised to provide the required capture volume for the additional impervious area.

Parking and Loading

Reducing the minimum amount of required parking and loading areas can be one of the most impactful and effective techniques a local government can take to reduce stormwater quantity and improve water quality. Some communities establish parking maximums, and further establish that those maximums can only be exceeded if using LID principles such as porous pavers, or grass-lined swales within the parking design. Other communities are eliminating loading berth requirements to reduce runoff. For example:

Parking and Loading: *Parking standards require striking a balance between several competing interests. For example, reducing parking or setting parking maximums can result in improved water quality and reduced runoff; however, neighborhoods are often concerned with adjacent commercial parking inadequacies resulting in spillover onto residential streets.*

A. Maximum parking requirements can be exceeded up to [*ten percent*] if pervious pavement or pavers are used for the amount of parking in excess of the maximum parking requirements.
B. Retail sales and services with an aggregate gross floor area of less than [*15,000 square feet*] shall not be required to provide loading spaces.

Parking lot design should also be considered for incorporation of LID principles, such as:

A. Structured parking is required for some zoning districts or uses (thus reducing the per-space impermeable surface);
B. Landscaped swales are required between parking rows;
C. Breaks in curbs are required so that parking lot runoff flows into landscaped areas; and
D. Landscaped islands are required to break up large parking areas (such as blocks of 20 spaces or more).

Subdivision and Site Design Standards

The layout and design of new subdivisions presents an opportunity to consider overall stormwater drainage and LID techniques (e.g., clustering lots to preserve greater opportunities for natural drainage and detention within the project). Consider alternative approaches to subdivision and circulation design, by implementing LID principles such as:

A. Requiring alternative residential street layouts with narrower, open-section streets;
B. Limiting on-street parking to one side of the street where possible;
C. Incorporating bioswales and tree-lined streets;
D. Encouraging shared driveways for certain residential uses; and
E. Reducing minimum driveway widths.

Place the burden on the applicant to demonstrate why LID techniques could not be pursued under certain conditions:

For subdivisions where LID techniques are technically infeasible to meet stormwater quantity standards, the applicant shall provide a full justification and demonstrate why the use of LID techniques is not possible. In such case, LID stormwater management techniques shall still be used to meet water quality standards. Documentation of technical infeasibility shall include engineering calculations, geologic reports, hydrologic analyses, and site maps.

Subdivision and Site Design Standards: *Communities often include a separate section for subdivision design and site layout standards within a development standards chapter of the zoning code. Procedures related to subdivision approvals should be located with other development application approval procedures.*

Incentives

Some communities encourage LID and stormwater BMPs through incentive programs and alternative or optional development standards, such as those described below.

Green Factor

Seattle, Washington, and subsequently Indianapolis, Indiana, adopted the "green factor," a performance-based landscaping system that encourages LID principles (and other benefits) by offering bonuses. Under the green factor, property owners are required to meet a minimum percentage parcel vegetation and can use various techniques to reach that threshold, including rainwater harvesting, drought tolerant plants, tree preservation, green roofs, and more. In Seattle, the green factor was originally limited to downtown business districts as a pilot program before applying it to other zoning districts.

Green Factor: *Although rainwater harvesting is one of the encouraged LID techniques under the Green Factor program, it is not currently permitted under Colorado Law. Exceptions were made through House Bill 09-1129 to allow for pilot projects in select new developments to evaluate the feasibility of rainwater harvesting as a water conservation technique in Colorado.*

To read more about the green factor in Indianapolis, see page 531 of the adopted Indianapolis Consolidated Zoning and Subdivision Ordinance, here:

indy.gov/egov/City/DMD/Current/Pages/ordinance.aspx

Green Alley Program

Chicago, Illinois, has implemented several green infrastructure incentive programs to encourage LID, including the "green alley" that began in 2006 to showcase pilot projects testing various permeable paving materials for use in alleys to both reduce flooding and increase infiltration of runoff. The city shares its best practices related to this program in the *Green Alley Handbook*, available here:

cityofchicago.org/city/en/depts/cdot/provdrs/street/svcs/green_alleys.html

Xeriscape Rebate Program

Aurora, Colorado, offers rebates to its customers willing to replace high-water grass lawns to low-water use landscaping. Eligible areas include residential front and side yards, and commercial or large property areas that are highly visible to the public. Low-water use landscapes are eligible for up to $3,000 in rebates, and areas that require no supplemental watering following plant establishment are eligible for up to $4,500 in rebates. Learn more about the program, here:

auroragov.org/LivingHere/Water/Rebates/Xeriscape/index.htm

KEY FACTS

Administrative capacity	Water resource engineer or civil engineer
Mapping	Not required
Regulatory requirements	Stormwater management regulations; erosion and sediment control ordinance
Maintenance	Minimal
Adoption required	Yes
Statutory reference	C.R.S. §25-8 and Colorado Discharge Permit System Regulation 61.8(11)(ii)D)
Associated costs	Staff time for administration and enforcement

EXAMPLES

City of Aurora Zoning Ordinance and Xeriscape Rebate Program	Landscaping, Article 14. municode.com/library/CO/aurora. Also see draft development standards in Module 2, currently under review by the city, (see Section 4.7.4): auroragov.org/DoingBusiness/CityPlanning/ZoningCodeUpdate/index.htm Xeriscape rebate program: auroragov.org/LivingHere/Water/Rebates/Xeriscape/index.htm
City of Wheat Ridge Site Drainage Requirements	Site drainage requirements, at the bottom of the page under "resources" ci.wheatridge.co.us/64/Development-Review.
Southeast Metropolitan Storm Water Authority (SEMSWA), Colorado Stormwater Management Manual	semswa.org/semswa-stormwater-management-manual.aspx
Urban Drainage and Flood Control District (UDFCD), Colorado Stormwater Criteria Manual, Volume 3	udfcd.org/volume-three
City of Chicago Green Alley Program	cityofchicago.org/city/en/depts/cdot/provdrs/street/svcs/green_alleys.html
City of Indianapolis, IN Green Factor in Zoning	indy.gov/egov/City/DMD/Current/Pages/ordinance.aspx See page 531 of the adopted consolidated zoning and subdivision ordinance
Tri-County Regional Planning Commission, Central Illinois LID Residential Overlay Zoning Ordinance	tricountyrpc.org/files/Low_Impact_Development_Residential_Zoning_Ordinance_TCRPC_model.pdf

FOR MORE INFORMATION

Low Impact Development Center

lowimpactdevelopment.org

Colorado Department of Public Health and Environment, Water Quality Control Division

colorado.gov/pacific/cdphe/wqcd

Colorado Water Quality Control Commission

colorado.gov/pacific/cdphe/wqcc

Colorado Association of Stormwater and Floodplain Managers – Stormwater Quality Committee
casfm.org/stormwater_committee/default.htm

Colorado State University Stormwater Center
stormwatercenter.colostate.edu

SITE-SPECIFIC HAZARD ASSESSMENT

Source: K. Johnston

HAZARDS ADDRESSED

HOW IT WORKS

When hazards are potentially present on a site or are known through previous mapping efforts, the community should require a **site-specific hazard assessment.** This type of assessment requires a qualified professional with specialized knowledge of the particular hazard of which they are assessing. The appropriate professional (e.g., geotechnical specialist, civil engineer, wildfire mitigation specialist, certified forester, and certified floodplain manager) will consider existing state and/or local hazard maps; prior evidence of hazard history; and on-site features such as topography, soils, forests, water channels, and other structures to determine risk level of or to the proposed development. When applicable, communities may have a specific assessment form that is used to rate the hazard. This information will typically be compiled into a site-specific hazard mitigation plan that will require specific mitigation actions to be performed prior to or as a condition of approving the application or issuing a development permit, building permit, or a certificate of occupancy. This may include recommendations or requirements to adjust the land use, alter construction and building design, or utilize (or protect) surrounding environmental features to minimize the degree of hazard. This information will be provided to the developer, contractors, and/or property owner, and may be included in the planner's staff report for the planning commission or governing body.

Ultimately, the purpose of a site-specific hazard assessment is to identify hazards, determine a path for hazard mitigation, increase public safety, and reduce the threat of future property damage or loss of life.

IMPLEMENTATION

Requirements for when to require site-specific hazard assessments vary by jurisdiction and hazard. In some cases, the state may provide additional agency oversight, resources, or guidance as to when

further site investigation is required for hazard mitigation, such as the oil and gas requirements for soils information and potential geological hazards. Local regulatory requirements are usually stated in the zoning code, subdivision code, building code, or a separate code (e.g., wildland-urban interface code).

Jurisdictions typically have flexibility in deciding when a site-specific hazard assessment is required. For example, a jurisdiction may choose to adopt a mapped hazard overlay zone that requires all new construction or retrofits within that zone to undergo a site-specific hazard assessment prior to granting development permit approval. Conversely, jurisdictions may find it more appropriate to require a site-specific hazard assessment for any permit, regardless of the location.

In any case, the applicability standards that trigger an assessment as well as the criteria for when and what type of mitigation is required should be clear. Planning staff should discuss this requirement with an applicant early in the development review process, such as at the pre-application meeting or when a sketch plan is first submitted.

WHERE IT'S BEEN DONE

In 2003, **Eagle County** adopted wildfire regulations that require new development (special use permit, planned unit development (PUD), and subdivision) and new building construction or exterior remodels to comply with wildfire regulations. Development involving subdivision or PUD must include a vegetation management plan submitted with the sketch plan that provides an initial site-specific evaluation prepared by a natural resource professional with expertise in the field of vegetation management and wildfire mitigation. The vegetation management plan submitted with the preliminary plan is required to contain a more detailed site-specific analysis as indicated by the regulations.

Wildfire hazard assessments are required based on criteria stated above. Other interested property owners may also request a wildfire hazard assessment from Eagle County to reduce their property's risk. Assessments are either initiated via an online request form or by calling the wildfire mitigation staff coordinator. The county's qualified mitigation staff will conduct an on-site hazard assessment utilizing a customized assessment form (based on a national model assessment standard). The on-site field observations and assessment criteria are considered in conjunction with the county's wildfire hazard map to determine a site's specific rating. Based on the rating, the applicant will then be given a set of mitigation requirements prior to the county issuing a building permit. Mitigation requirements may include fuel management (e.g., removal of trees and/or other vegetation) and the use of fire-resistant construction materials, such as a Class A roof assembly, Class A rated decking materials, and non-combustible siding. The assessments are free, but building permits that require additional review and on-site follow up will be charged fees. Requirements are identified early on in the process and publicly available on the county's wildfire mitigation website (*Wildfire Regulations,* 2003; *Overview,* 2015). **Boulder County** uses a similar approach to addressing their community's wildfire hazard (see Building Codes tool for more details).

The **Cordillera Community** in Eagle County takes their wildfire mitigation process one step further. They have their own local fire department that performs home assessments; every house is on a five-year rotation for re-assessment to ensure that vegetation is properly maintained.

The **Town of Vail** has adopted a requirement for a site-specific assessment for new construction and substantial remodels within avalanche hazard zones.

ADVANTAGES AND KEY TALKING POINTS

- Site-specific hazard assessments are the best (and in some cases the only) way to identify hazards on a site and determine the most effective methods for mitigation.
- Assessments can highlight potentially hazardous conditions prior to any development occurring.
- Assessment approaches that facilitate staff and applicant interaction regarding appropriate hazard mitigation requirements provide an important educational component for discussing solutions to addressing known hazards.
- Results in reduced risk to property and life.

CHALLENGES

- Site-specific hazard assessments require additional upfront time and resources for both the local government and the applicant. The process requires additional time to perform the assessment, create a mitigation plan, review the results with an applicant, and do a follow up site visit when necessary.
- A site-specific hazard assessment will also require specialized technical expertise that may result in additional costs borne by the applicant and/or local jurisdiction. If the local jurisdiction does not have qualified staff to perform the site-specific hazard assessment, consider maintaining a list of independent qualified contractors for referral.

KEY FACTS

Administrative capacity	High, requires technical expert
Mapping	Yes
Regulatory requirements	Yes, but varies by jurisdiction
Maintenance	N/A
Adoption required	Yes
Statutory reference	C.R.S. references relate primarily to general land use authority and administration and requirements for when site-specific assessments may apply, including but not limited to C.R.S. §§ 30-28-106, 30-28-133, 30-28-136, and 31-23-206.
Associated costs	Variable. Sometimes recovered by fees charged to applicant. Some fire districts may do these assessments for free

EXAMPLES

Boulder County Wildfire Mitigation	bouldercounty.org/property/forest/pages/wildfiremitigation.aspx

Eagle County Wildfire Regulations	eaglecounty.us/Building/Documents/Wildfire_Regs and eaglecounty.us/Building/Wildfire/Overview
Town of Vail Municipal Code	sterlingcodifiers.com/codebook/index.php?book_id=560 Chapter 21: Hazard Regulations

FOR MORE INFORMATION

American Planning Association

Zoning Practice, February 2005 Issue Number Two: *Practice Better Site Visits*. Stuart Meck.

American Planning Association Report Number 560

Hazard Mitigation: Integrating Best Practices into Planning. Provides additional examples of state legislation and local codes for site-specific assessments.

SUBDIVISION AND SITE DESIGN STANDARDS


Source: Clarion Associates

HAZARDS ADDRESSED

HOW IT WORKS

Subdivision and site design standards are used by communities to regulate how parcels of land are divided into developable lots, and how those lots are subsequently designed and laid out through the development process. Subdivision typically includes the creation of a sketch plan (showing basic lot layout and provisions for public infrastructure), and subsequent creation of a more detailed preliminary plat (indicating building footprints and specific measurements), and then culminating in a final plat that creates the new lots. Abbreviated procedures are typically established for minor subdivisions that involve the creation of just a handful of lots.

Site design standards are related and define the basic parameters for development on individual lots, including maximum or minimum lot size, how buildings are situated on a lot, traffic and circulation patterns, pedestrian connectivity, preservation of open areas, and avoidance of hazardous areas.

Communities increasingly consider hazard mitigation when adopting site layout standards. For example, applicants are required to avoid mapped hazard areas (like floodplains) in new development or to develop strategies to mitigate the hazard risk.

IMPLEMENTATION

As communities grow, they should identify where new growth should be concentrated through long-range planning mechanisms, such as the comprehensive planning process. There can be pressure to locate new development in areas that are known to be at risk from hazards. Communities must balance competing interests when reviewing proposed development. For example, the need for additional workforce housing in a community should be balanced against the desire to protect natural areas, view corridors, and natural hazard areas, as well as the safety and welfare of future inhabitants of the development. Communities are challenged with keeping development out of

harm's way while allowing individuals to develop land consistent with stated policies. Communities can often find middle ground through subdivision standards that allow for new subdivisions to be approved when they meet conditions to mitigate hazards, such as water cisterns for wildfire protection, slope stabilization for landslide and rockfall, and keeping buildable lots out of the floodplain. Additional incentives and regulations can be explored such as **cluster subdivisions**, **density bonuses**, and **Transfer of Development Rights (TDRs)**, each of which are good tools for promoting avoidance of hazards. Each of these are discussed in separate planning tool profiles.

According to APA's *Zoning Practice* issue on Safe Growth Audits (*Godschalk*, 2009), communities should ask themselves the following questions related to their subdivision regulations:

1. Do the subdivision regulations restrict the subdivision of land within or adjacent to natural hazard areas?
2. Do the regulations provide for conservation subdivisions or cluster subdivisions in order to conserve environmental resources?
3. Do the regulations allow density transfers where hazard areas exist?

As with zoning codes, adoption of subdivision ordinances or site design standards requires approval by the governing body (City Council, Board of Trustees, or County Commissioners).

WHERE IT'S BEEN DONE

Pagosa Springs adopted sensitive area protection standards for subdivisions and for redevelopment of existing areas in its *Land Use and Development Code* (2015). The standards generally address the following issues:

- **Slopes.** Slopes greater than 30 percent, or otherwise unstable or subject to hazards, are not allowed to be platted or developed for residential uses without mitigation controls in place.
- **Natural Features.** Subdivisions or development shall protect waterways, vegetation, and rocks and other natural features or vistas.
- **Areas of Special Flood Hazard.** Mapped special flood hazard areas identify areas where subdivisions shall not be approved without evidence that it is not in a flood hazard or meets other flood damage protection regulations to the satisfaction of the floodplain administrator.
- **Geologic Hazard Areas.** Subdivisions and site plans must meet mitigation conditions prior to approval in mapped geologic hazard areas in the Town as the information becomes available, including provisions to prevent danger to human life or property.
- **Wildfire Hazard Areas.** Applicants for subdivisions or other development must provide evidence from a professional forester that the proposal meets several conditions, including adequate roads for emergency services and criteria for wildfire areas published by the Colorado State Forest Service.
- **Perimeter Fencing.** Limits the height to protect migration of elk and deer.
- **Riparian Setbacks.** To promote and preserve the quality of the river ecology, aesthetic, and recreation.

In addition to these standards, approval criteria for major subdivisions also address areas that may involve soil or topographical conditions that present hazards.

Similarly, **Park County** has adopted a dedicated set of natural resource protection standards in its development code that address steep slope protection; ridgeline protection; drainage, erosion, and sedimentation control; irrigation and mining ditches; wildlife habitat; and geologic and wildfire hazards. The latter section incorporates approaches that are common in Colorado communities. It provides that:

On US24/285 in Park County, CO.

Source: Ken Lund

- Land uses are restricted to geologic and wildfire hazard-free areas if such areas exist on a site.
- If no hazard-free area exists on a site, the diversity of uses and permitted residential land use densities may be limited to minimize potential dangers to persons or wildlife.
- Land use applications shall be denied if the Board of County Commissioners finds that site planning and engineering techniques cannot reasonably mitigate potential hazards to public health, safety and welfare; land use shall also be prohibited if it subjects persons or the County to dangers or expenses required to mitigate hazardous conditions to respond to emergencies created by such conditions, or to rehabilitate improvements and lands (*Use and Development Standards*, 2014, p. 23).

ADVANTAGES AND KEY TALKING POINTS

In terms of hazard mitigation, the primary benefit of adopting effective subdivision and site design standards is to ensure that new development occurs in a high quality, well-designed manner that avoids potential high-hazard areas, in addition to meeting other important community goals. Other benefits include:

- Effective at managing new development in growing communities. Clearly defining hazard areas allows elected officials to say no to new development in unsafe areas.
- Provides additional protection for defined hazard areas without negotiation on a case-by-case basis. Approval criteria can be stated in the code, making expectations clear to the developer and the decision makers.
- Can be tailored to fit a common set of review procedures. Adding natural hazards as a component of existing subdivision regulations can be done relatively easily through an ordinance amendment.
- Relatively easy to maintain over time, following initial adoption.

CHALLENGES

As is the case with many planning tools, subdivision and site design standards that address hazard mitigation must also strike a balance with other community objectives and private property rights.

- To mitigate natural hazards, a fairly technical mapping of hazard areas is required. Identifying hazard areas can be costly, and keeping mapped areas up-to-date following successful mitigation measures requires a continual maintenance program.

- Requires a land use code amendment, which requires action by the governing body.
- Geared toward new development, and has little ability to address existing development in hazardous areas.

MODEL CODE LANGUAGE AND COMMENTARY

Subdivision regulations typically cover lot and block design, street design and improvements, drainage easements, layout of utility systems, and water distribution systems. Site design standards address a wide variety of site-specific design and operational issues such as parking (lot layout, location, and design), landscaping, exterior lighting, and trash enclosures. Key elements related to subdivision and site design that specifically address natural hazards include:

- Suitability of land for subdivision;
- Subdivision improvement agreements;
- Standards for natural hazard area mitigation, including but not limited to flood hazard, geologic hazard, and wildfire hazard; and
- Cross-references to zoning, site development, and subdivision requirements.

The following sections provide example language for each of the common elements. Model language is in blue shading. Commentary is located in *italics* in the column at the right. The model language used in this document is based on several existing ordinances and programs from varying communities around the state, including municipalities and counties. The language is illustrative only; consult local counsel to tailor language for your jurisdiction.

Commentary

Suitability of Land for Subdivision

Subdivision regulations often specifically prohibit the subdivision and subsequent development of land found to have or be subject to natural hazards. This prohibition often is included in the general design standards of the jurisdiction's subdivision regulations.

Suitability of Land for Subdivision: *Some subdivision codes contain standards for natural hazards mitigation or sensitive area mitigation. The Teller County subdivision regulations have a "Site and Development Goals, Objectives, and Guidelines" table stating design requirements for geologic, fire, flood and slope hazards.*

Suitability of Land for Subdivision: Land subject to natural hazards such as flooding, wildfire, falling rock, landslides, and avalanches shall be considered unsuitable for any occupancy that may impair the health, safety, or welfare of the inhabitants. Such land shall be identified and shall not be subdivided until the hazards have been mitigated or will be mitigated by the subdivision and construction plans in accordance with the Sensitive Area Protection Standards of

this Land Development Code. Where such hazardous conditions are adjacent to lands proposed for subdivision, the proposal may be denied unless potentially hazardous conditions are appropriately mitigated per this Code.

Subdivision Improvement Agreements

Land that is subject to hazardous conditions may need specific mitigation improvements that will be completed pursuant to a Development or Subdivision Improvement Agreement. The terms of this agreement should specify the work that will be completed and time-frame for completion. The long-term maintenance of such improvements will need to be identified in that agreement, as well. This agreement will need to be accepted by both the developer and the governing board of the local jurisdiction. As well, the developer will need to post a bond or letter of credit sufficient to complete the improvements as specified in the agreement.

If land with hazardous conditions is to remain undeveloped within the subdivision, an easement or deed restriction should be recorded specifically restricting its development and use based on the conditions posed by the natural hazard. The subdivision plat should specifically show the area to be restricted from development and reference the recorded easement or deed restriction.

Sensitive Area Protection Standards

Sensitive Area Protection Standards: *These are site layout/design standards similar to other required site design standards applicable to all development, whether in a new subdivision or a redevelopment/re-use of property on previously subdivided land. They are typically included in the jurisdiction's code and generally applicable to development and design standards since they are intended to apply to projects where subdivision may not be required, as well as new subdivisions.*

A. Purpose: Certain areas of [*name of local government*] contain natural resources that contribute to the [*name of local government*] character, such as waterways, wetlands and drainages, wildlife habitat, viewsheds, and hillsides. There are also certain areas that may pose hazards to property, infrastructure, and public safety because of natural hazard conditions on or adjacent to buildable lots, including flooding, geologic conditions, wildfire hazard, or soil conditions. The standards of this section are intended to ensure that environmental features are protected, the natural character of [*name of local government*] is maintained, and development on potentially hazardous lands protects inhabitants and minimizes environmental and aesthetic impacts.

B. General Site Design: Developments shall minimize impacts to sensitive natural resources, natural hazards, and other unique and fragile site elements including but not limited to wetlands, open space, and steep slopes. Such resources and features shall be preserved where

practicable. Subdivisions and any development shall be designed to preserve existing waterways (lakes, rivers, and streams), primary vegetation (trees), rock formations, and other natural vistas, as well as other environmental resources and features.

C. Slopes: Steep land (30 percent or greater slopes), unstable ground, and land subject to hazards such as landslides, rockfall, ground subsidence, wildfire, or flooding shall not be platted or developed for residential or other uses that may endanger life and limb or habitable improvements, unless appropriate provisions, as deemed necessary by the [*Building Department*], are made to eliminate or control the hazard.

D. Natural Features: Subdivisions and any development shall make every effort to preserve existing waterways (lakes, rivers, and streams), primary vegetation (trees), rock formations, and other natural vistas.

E. Flood Hazard Areas: The [*Planning Department*] shall keep on file and available to the public a set of maps showing all known and identified areas of special flood hazard in [*name of local government*]. A subdivision or development in a special flood hazard area shall not be approved unless adequate evidence, prepared by a registered professional engineer, is submitted that shows the proposed subdivision or development is not in an area of special flood hazard or that the conditions of Section [*X.X*], Floodplain Regulations, will be met.

F. Geologic Hazard Areas: The [*Planning Department*] shall keep on file and available to the public a set of maps clearly showing all known and identified geologic hazard areas in the [*name of local government*], as such become available. [*name of local government*] shall not approve any subdivision plan or site plan if the proposed subdivision or development is either in one of these identified geologic hazard areas or is in an area suspected of being in a geologic hazard area, unless the applicant can submit adequate evidence, prepared by a registered professional geotechnical engineer, that the proposed subdivision or development meets the following conditions:

1. Provisions have been made for the long-term health, welfare, and safety of the public from geologic hazards to life, property, and improvements;
2. The proposed development will not create an undue financial burden on the existing or future residents of

Steep Slopes and Natural Features: *Areas of particular sensitivity should be listed based on local environmental hazard assessments. In the model code example, two types of sensitive features are included: one to illustrate a natural hazard condition (steep slopes) and the other to describe an example of important local characteristics (natural Features). Local communities could identify other important visual and ecological features for protection under this section, as well as natural hazards.*

Preliminary Plat Review by Technical Experts: *Counties are required by state statutes (C.R.S. §30-28-136) to submit preliminary plats to the Colorado Geological Survey for an evaluation of those geologic factors that would have a significant impact on the proposed use of land, and to the Colorado State Forest Service and local conservation district to review of wildfire, soil suitability, and any potential flooding issues.*

the area or community as a result of damage due to geologic hazards;

3. Structures designed for human occupancy or use will be constructed to prevent danger to human life or property;
4. Permitted land uses, including public facilities serving such use, will avoid or mitigate geologic hazards at the time of initial construction; and
5. Man-made changes will not initiate or intensify adverse natural conditions within a geologic hazard area.

G. Wildfire Hazard Areas: The [*Planning Department*] shall keep on file and available to the public a set of maps clearly showing all known and identified wildfire hazard areas in the [*name of local government*], as such become available. The [*name of local government*] shall not approve any subdivision plan or site plan if the proposed subdivision or development is in an area identified as a wildfire hazard area or is in an area suspected of being in a wildfire hazard area, unless the applicant can submit adequate evidence, prepared by a qualified professional forester, that the proposed subdivision or development meets the following conditions:

1. Any development in which residential activity is to take place shall be designed to minimize significant wildfire hazards to public health, safety, and property;
2. Any development will have adequate roads for emergency service by fire trucks, firefighting personnel, and fire breaks or other means of alleviating conditions conducive to wildfire hazard;
3. Precautions required to reduce or eliminate wildfire hazards will be provided at the time of initial development;
4. All subdivision and development will adhere to the Guidelines and Criteria for Wildfire Hazard Areas published by the Colorado State Forest Service; and
5. Consideration of recommendations of the State Forest Service resulting from review of a proposed subdivision or development in a wildfire hazard area.

Hazard Areas: *Teller County uses a table format in its subdivision regulations that details design guidelines for specific objectives related to geologic, fire, flood and slope hazards. These guidelines must be met for a subdivision to be approved. The guidelines include use of building techniques, such as use of fire retarding roof and exterior wall materials to mitigate wildfire hazard, as part of a subdivision requirement.*

KEY FACTS

Administrative capacity	Experienced planner
Mapping	Mapping should be completed to identify areas subject to special standards
Regulatory requirements	Zoning and/or land development regulations
Maintenance	Minimal
Adoption required	Yes
Statutory reference	C.R.S. §30-28-133; §30-28-136; §31-23-214
Associated costs	Staff time for drafting and adoption process

EXAMPLES

Town of Pagosa Springs Land Use and Development Code	municode.com/library/co/pagosa_springs/codes/code_of_ordinances?nodeId=CH21LAUSDECO_ART6DEDEST_6.4SEARPR Section 6.4
Park County Land Use Regulations	parkco.us/189/Land-Use-Regulations Article VII, Division 6: Natural Resource Protection
San Miguel County Land Use Code	sanmiguelcounty.org/DocumentCenter/Home/View/211 Section 2-8
Summit County Subdivision Regulations	co.summit.co.us/DocumentCenter/Home/View/58 Sections 3202.02 and 8101
Teller County Subdivision Regulations and Critical Areas Regulations	co.teller.co.us/CDSD/Planning/LandUseRegs/CH 09 subdiv ADOPTED.pdf (pg. 64-66) and co.teller.co.us/CDSD/Planning/LandUseRegs/CH 06 critical areas ADOPTED.pdf

FOR MORE INFORMATION

APA's "Practice Safe Growth Audits"

planning.org/nationalcenters/hazards Safe Growth Audits located near bottom of page, under resources.

USE-SPECIFIC STANDARDS

Source: Clarion Associates

HAZARDS ADDRESSED

HOW IT WORKS

Use-specific standards are used by communities to place limitations on, or apply conditions or specific standards to, certain land uses. Use-specific standards are an effective strategy for neighborhood protection, resource protection, and risk avoidance. Use-specific standards are adopted by ordinance as part of the zoning code, but the complexity and organization of these standards varies widely across communities. As with many other zoning tools, use-specific standards can be calibrated to serve a particular purpose (such as hazard mitigation), can apply to some or all zoning districts or subareas, and can be linked to one or multiple land uses. Communities commonly apply use-specific standards to potentially problematic land uses such as liquor stores, late-night uses, pawn shops, and marijuana facilities. Such uses often come with specific challenges, such as perceptions of increased crime or traffic. Use-specific standards might require limited hours of operation, added security measures, or limiting the number of such uses within a geographic area.

For hazard mitigation purposes, use-specific standards can be applied to any use that has the potential to create or exacerbate a known hazard. One example could be to require industrial uses that store explosive materials to be set back an additional distance from residential areas. An example of the need for such setbacks occurred in April 2013 in West, Texas, when an explosion at a fertilizer storage and distribution facility resulted in 15 deaths, hundreds injured, and more than 150 buildings damaged or destroyed, due in part to the fact that the factory was located too close to residential neighborhoods, including an apartment building and nursing home.

Storage of explosive materials is one example where use-specific standards can establish safeguards against potential accidents or spills. In this example, industrial storage might be a permitted use in a particular zoning district, but the use-specific standards would indicate that storage of explosive or hazardous materials triggers additional criteria that must be met in order to proceed with that use. Those criteria might include distance requirements from residential areas, sign-off from local fire and

building safety officials, and/or additional public hearings for approval (as a conditional or special use).

Use-specific standards also can be helpful in addressing other types of hazards, beyond storage of hazardous materials; for example, setback requirements can provide buffer zones from areas prone to avalanche, flood, or landslide. They could also be used to help mitigate potential fire danger in the wildland-urban interface (WUI).

IMPLEMENTATION

A typical zoning code will describe the types of uses permitted within each zoning district and reference any additional standards that apply to that use. Communities should consider the following when developing new use-specific standards:

- Define the purpose for the use-specific standard. Is the standard necessary to protect people or property from hazards? Is it connected to other community-wide goals or policies?
- Define the areas where the use-specific standard applies. Should the additional standard apply to certain zoning districts or subareas? Should it apply to any parcel that proposes that particular land use?
- Articulate the minimum standard required to mitigate the problem. Determine whether the standard can be reviewed for compliance without a public hearing.
- Is the standard enforceable given current community resources?

Once the standards have been adopted, they should be integrated into the existing zoning regulations either in a dedicated section or throughout the applicable sections that relate to a particular use. Most codes today include a permitted land use table indicating which uses are permitted by district. That table can include cross-references for any applicable use-specific standards.

Several federal laws preempt local zoning authority when it comes to regulating specific uses, including telecommunications, signs, religious institutions, and individuals covered under the Federal Fair Housing Act. State licensing regulations may also apply to certain uses, such as group homes. Communities sometimes simply defer to federal and/or state laws when developing use-specific standards for those types of uses, but sometimes do have the ability to regulate above and beyond minimum standards established at the federal and/or state level.

WHERE IT'S BEEN DONE

Durango applies use-specific standards to dozens of allowable uses. In particular, heavy industry must comply with use-specific standards such as limited parcel areas for proposed development, additional setbacks, limitations on outdoor storage, and requirements for a truck routing plan (for hazardous materials). Durango's permitted use matrices make it clear to the reader which land uses are required to meet additional use-specific standards (*Durango Land Use and Development,* 2014).

Table 2-1-3-8
Industrial, Wholesale, and Solid Waste Processing and Recycling Uses

Land Use	Standards Reference [1]	Zoning Districts															
		Residential					Mixed-Use			Nonresidential				Rural and Open Space		Public and Planned	
		EN-#	EN-MF	RL	RM	RH	CB	MU-N	MU-A	CG	CR	BP	LI	RA	OS	PB	PD
Industrial and Wholesale Uses																	
Brewery / Distillery / Winery	§ 2-2-3-16	-	-	-	-	-	-	-	-	-	-	S	A	-	-	-	A[2]
Extraction, Coal, Gravel, Minerals, or Sand	§ 2-2-3-16	-	-	-	-	-	-	-	-	-	-	-	C	C	C	-	A[2]
Extraction, Minor Oil and Gas Facility	Division 4-4-10	-	-	L	L	L	-	-	-	L	L	L	L	L	L	L	A[2]
Extraction, Major Oil and Gas Facility	Division 4-4-10	-	-	C	C	C	-	-	-	C	C	C	C	C	C	C	C
Heavy Industry	§ 2-2-3-16	-	-	-	-	-	-	-	-	-	-	C	L	-	-	-	A[2]
Light Industry	§ 2-2-3-16	-	-	-	-	-	-	-	-	-	L	A	A	-	-	-	A[2]
Wholesale	§ 2-2-3-16	-	-	-	-	-	-	-	-	C	L	A	A	-	-	-	A[2]

Durango's use table above provides a cross-reference to additional standards applicable to each land use (column in red).

Source: online.encodeplus.com/regs/durango-co/doc-viewer.aspx#secid-95

Similarly, **San Miguel County** adopted use-specific standards as part of its zoning code amendments prepared for the Wright's Mesa area in 2010. The standards reflect efforts in a rural community to control the size and scale of various uses such as logging, stables, and feedlots. Many standards focus on natural protection issues such as wildlife habitat and water quality protection.

ADVANTAGES AND KEY TALKING POINTS

Developing use-specific standards to address potential hazard risks can be undertaken along with other zoning code amendments, and offer the following benefits:

- Accommodate safety and nuisance protection while allowing reasonable economic use of the property. A particular use might still be viable on a site, as long as it meets additional conditions.
- Can be tailored to a community's needs. Use-specific standards can apply to a land use in certain geographies, zoning districts, or based on adjacencies. They can also be drafted to require a higher level of scrutiny through the approval process.
- Use-specific standards encourage consistent treatment of similar uses across the board.
- Use-specific standards can accomplish multiple community goals. For example, standards can be drafted for industrial uses that protect surrounding neighborhoods from noise and air pollution, while also preserving open space and natural hazard areas.

CHALLENGES

As with any zoning code amendment, writing and passing new use-specific standards can be politically and administratively challenging. Developers may object to any new standards without a clear rationale. Other potential challenges include:

- Use-specific standards can result in the inability to develop a particular use on a landowner's parcel if it cannot meet defined standards for public safety and welfare.
- Use-specific standards can be perceived as inequitably targeting certain uses in a community.
- Developing use-specific standards requires substantial analysis (e.g., reviewing technical standards as they apply to industry standards and/or researching national best practices) to effectively accomplish the purpose without over-regulating.

MODEL CODE LANGUAGE AND COMMENTARY

Use-specific standards vary widely depending on the community, the type of use being regulated, and the issue being mitigated through the standard. Most use-specific standards are developed under one or more of the following categories:

- **Proximity** – How close can the use be located to another property or another type of land use?
- **Compatibility** – What types of standards ensure that the use will be compatible with surrounding properties, districts, or land uses?
- **Safety** – What conditions are necessary to protect the public health, safety, and welfare of the community?
- **Environmental** – What standards help the community protect its valuable natural environment and resources?
- **Aesthetics** – What types of standards are necessary to protect the overall character of the community from an aesthetic point of view?

For hazard mitigation, most use-specific standards will relate to the categories of **proximity**, **safety**, and **environmental**. Those categories are discussed below, with additional detail on how to apply hazard mitigation principles through use-specific standards. Model language is in blue shading. Commentary is located in *italics* in the column at the right. The model language used in this document is based on several existing ordinances and programs from varying communities around the state, including municipalities and counties. The language is illustrative only; consult local counsel to tailor language for your jurisdiction.

Commentary

Categories of Use-Specific Standards: *Many of the categories of use-specific standards overlap. For example, a use-specific standard aimed at distancing critical facilities from hazard areas ("proximity") could also be considered within the "safety" category.*

Proximity

The physical distance of a proposed new land use from existing land uses, particularly sensitive uses like schools, is an important consideration when local governments evaluate

applications for new development. Proximity to sensitive uses and areas is an important general consideration when communities establish use-specific standards. For example, uses known for generating noise, dust, or odors should not be located close to residential neighborhoods.

The same is true for hazard mitigation. Consider appropriate distance requirements for particular land uses as they relate to hazards or known hazard areas. Examples include:

A. Fueling stations shall be located at least [*150 feet, or appropriate distance as determined by the local fire authority*] from any [*moderate or extreme wildfire risk area – or however defined on local maps*];
B. Hazardous material storage facilities shall be located at least 500 feet from any residential zoning district or residential use;
C. Heavy industrial uses shall be set back from all property lines a minimum distance of [*150-500 feet or more – may vary for residential and non-residential*];
D. Critical facilities, such as public safety facilities, emergency medical facilities, emergency shelters, public utility or distribution plants, communication facilities, and air transportation lifelines and corridors, shall be located at least [*150 feet, or appropriate distance as determined by the local fire authority, or local flood authority*] from any [*moderate or extreme wildfire risk area, or flood hazard area – or however defined on local maps*];

Considerations for Use-Specific Standards: *When developing use-specific standards, use the local hazard mitigation plan (especially the risk assessment) to identify particular vulnerabilities to certain hazards. Then, review the table or list of land uses permitted within the community to determine which uses could potentially create, exacerbate, or be largely impacted by the potential hazards in the community. With that information, review current use-specific standards to determine if additional standards are necessary to reduce the overall risk to hazards.*

In addition, similar proximity standards can also apply to uses where large numbers of people visit at one time, or to densely populated residential development. These uses may include religious institutions, hospitals, stadiums, hotels, community centers, and schools. For example, a community may want to prohibit a hotel or school from locating in an area with steep or unstable slopes whereas a single-family home could do so with proper mitigation.

Safety

The safety of individuals is an important consideration for land use regulations. For hazard mitigation, this means keeping people out of harm's way and paying particular attention to critical facilities and vulnerable or at-risk populations.

As an example, the Colorado Water Conservation Board (CWCB) Rule 6 for regulatory floodplains in Colorado requires uses under the following categories to be given special

attention (location and/or elevation or floodproofing) through adopted floodplain regulations:

A. Critical facilities. Critical facilities can include many types of services and uses, including:

1. Public safety (police, fire, and emergency operation centers)
2. Emergency medical (hospitals, ambulance service)
3. Emergency shelters
4. Public utility plants or distribution
5. Communications (telephone, television, power, gas, internet, others)
6. Air transportation lifelines and corridors (airports, helipads)

Critical Facilities: *Critical facilities should be identified in the local hazard mitigation plan. If a local hazard mitigation plan does not exist, this section is a good starting point for consideration.*

The best practice is to locate critical facilities outside the floodplain and other high risk areas.

B. Hazardous materials facilities. These types of uses can include:

1. Chemical plants
2. Laboratories using volatile materials
3. Refineries
4. Hazardous waste storage or disposal sites
5. Above ground storage of volatile materials

C. Vulnerable populations. Vulnerable or at-risk populations may include:

1. Elderly care facilities
2. Day care homes or facilities for youth or disadvantaged
3. Institutions of learning

D. Facilities vital to restoring normal services. This includes:

1. Essential governmental operations
2. Essential structures for colleges and universities

Under the CWCB rule, uses in one or more of these categories shall be protected using one of the following:

A. Location outside the regulatory floodplain; or
B. Elevation or floodproofing the structure per the standards outlined in the Rule.

This concept could be further expanded to other hazards and other facilities and could include other mitigation for safety purposes, such as:

A. Requiring a conditional use when located within a designated wildland-urban interface area;
B. Requiring a truck routing plan for heavy industrial uses;
C. Required submittal of a geotechnical report for areas within a mapped geologic hazard area; and/or
D. Emergency ingress and egress provisions.

Conditional Use: Requiring a conditional use can ensure that the application will be subject to higher scrutiny among local government departments and other agencies such as the fire department.

Environmental

Similar to protection of life and property, use-specific standards can be used to protect the natural environment. Vulnerable natural areas such as forested land, steep slopes, riparian corridors, and open grasslands can be susceptible to devastation during or following a disaster event. For example, landslides and wildfire can lead to sedimentation and/or flooding of nearby rivers; prolonged periods of drought can lead to increased risk of wildfire in forests and grasslands; and earthquakes can trigger landslides and subsidence of already unstable slopes.

Through use-specific standards, communities can limit the impacts of development on already vulnerable environmental conditions. Consider the following standards that protect environmental areas:

Environmental Standards: Application of environmental standards that are not necessarily associated with a particular use is typically covered elsewhere in the code through sensitive area protection standards. Use-specific standards are generally created when they apply only when certain land uses are involved and would not otherwise pose environmental impacts with other land uses. For example, temporary fireworks stands near forested areas are a potential concern, whereas temporary produce stands are not.

A. Transmission lines shall avoid the following areas:
  1. Slopes greater than 20 percent;
  2. Wetlands;
  3. Forests, unless running near the fringe of a forest and minimizing cutting;
  4. Soils susceptible to erosions that could create pollution or sedimentation issues;
  5. Areas with high-water tables; and
  6. Areas of unstable soils subject to significant slippage.
B. Heavy manufacturing or hazardous manufacturing shall be subject to appropriate conditions including safeguards and performance bonds to protect the health, safety, and welfare of the residents of the community and the natural environment.
C. Industrial wastes shall be disposed of in a manner consistent with federal and state law and the requirements of the Colorado Department of Public Health and Environment. Flammable and/or explosive materials shall be stored in compliance with national, state, and local fire codes with written recommendations from the [*appropriate local fire protection district*].

Limitations on High-Water Uses: Another consideration for limiting environmental impacts is to place limitations on high-water uses (such as golf courses and car washes) during periods of drought. Many communities already have standards in place for these types of uses, so local laws and conditions should be carefully reviewed.

D. General or heavy industrial uses that include manufacturing or processing shall not be located within a [*water protection area, sensitive natural area – or other mapped water conservation area*].

KEY FACTS

Administrative capacity	Experienced planner
Mapping	Technical mapping potentially required if use-specific standards are tied to specific geographic areas or specific mapped hazard areas
Regulatory requirements	Zoning ordinance
Maintenance	Minimal
Adoption required	Yes
Statutory reference	Municipalities (C.R.S. § 31-23-301) and counties (C.R.S. § 30-28-111) are explicitly authorized to regulate the location and use of buildings and structures for trade, industry, residence, recreation, public activities, or other purposes
Associated costs	Staff time

EXAMPLES

City of Durango Land Use and Development Code	online.encodeplus.com/regs/durango-co/doc-viewer.aspx#secid-95 Section 2-1-3-1, Interpretation of Use/Zone Matrices
Garfield County Land Use and Development Code	garfield-county.com/community-development/land-use-code.aspx Use-specific standards, Article 7, Sections 7-601 through 7-1201
City of Longmont Land Use Code	municode.com/library/co/longmont/codes/code_of_ordinances Standards for critical facilities, Section 20.20.080
San Miguel County Land Use Code	www.sanmiguelcounty.org/DocumentCenter/Home/View/221 Wright's Mesa Code Amendments, Section 5-319 H

IMPROVING BUILDINGS AND INFRASTRUCTURE

Planning tools and strategies typically stop at the building line. This section addresses some of the tools (such as building codes) outside the typical planning realm that help communities reduce risk to hazards. Tools that improve a structure's chance of survival and protect valuable community infrastructure assets make a more resilient community. Building codes establish rules for building safely and provide engineering standards to ensure that structures located in hazard areas can withstand high winds, high waters, wildfire embers, and heavy snow load. They also protect critical infrastructure, which is the lifeline of a community during and after a major hazard event. Adopting the most current building code cycle gives a community an important boost in terms of hazard mitigation.

It is critical that land use planners work closely with building officials and emergency services personnel to coordinate the closely-related goals of planning-related regulations and building regulations. Planners can help raise and facilitate discussions of tradeoffs between competing community goals, such as historic preservation and infrastructure upgrades. Planners should strive to understand and become involved in building code issues in order to truly understand the importance of keeping the built environment resilient over time. Once buildings are erected, they may remain for many years. It is imperative that planners help educate local officials and citizens on how solid construction methodologies can help protect the community and local infrastructure from hazards.

Manufactured Housing – Location, Location, Location!

Today's manufactured homes are dramatically different in appearance from the "mobile homes" of yesteryear, with estimates that more than 90 percent of today's manufactured homes never move from their original site. Manufactured homes are now available in a variety of designs, floor plans, and amenities. In terms of hazard risk, the concern with manufactured homes is not their construction quality, but rather their location. If a manufactured home is located in the floodplain, it is at risk of being damaged by an event like the Front Range storm in 2013.

*In the **City of Evans**, 203 manufactured homes were destroyed when the South Platte River flooded in 2013. The major flooding issues resulted from the location of the homes within the floodplain. Each of the manufactured homes destroyed were constructed to the HUD 3280 Construction Standard. Following the 2013 floods, the City revised its municipal code to address development in the floodplain. Under the new code, construction in special flood hazard areas requires both manufactured housing and stick-built housing to be elevated to 36 inches above base flood elevation.*

Citations:

David Burns, Emergency Management Coordinator, City of Evans, Colorado, Personal Communication, August 2015.

References:

Manufactured Housing Institute
manufacturedhousing.org/default.asp

Colorado Department of Local Affairs, Division of Housing
Rick Hanger, Housing Technology and Standards Manager
housing.helpdesk@state.co.us

Evans Municipal Code, Chapter 16.04.200 Specific standards for construction in special flood hazard areas:
http://www.cml.org/uploadedFiles/CML_Site_Map/_Global/pdf_files/FloodAreaDev_Ordinance_Evans.pdf

Additional Example: Longmont Municipal Code, Chapter 20.20 Provisions for Flood Hazard Reduction:
municode.com/library/co/longmont/codes/code_of_ordinances?nodeId=PTIICOOR_TIT20FLRE

This section explores tools that communities can use to improve design and construction of structures and other important infrastructure in a community. Tools profiled in this section include:

- Building Code
- Critical Infrastructure Protection
- Wildland-Urban Interface Code

Residential and Community Safe Rooms

In 2014, the Natural Hazard Mitigation Association prepared the study "Hide from the Wind: Tornado Safe Rooms in Central Oklahoma" for the Federal Emergency Management Agency (FEMA), which analyzed tornado safe rooms in central Oklahoma—an area of the U.S. that has experienced the nation's highest frequency of violent tornadoes. The study sought to determine the prevalence of safe rooms (by definition, a room or space that is specially anchored and armored to provide near absolute protection during a tornado or wind storm) and provide lessons learned that can be applied to other communities at risk from these natural hazards.

One of the success stories in the study highlights Moore, Oklahoma. As of May 2014, Moore reported 5,500 registered storm shelters for its city's 23,000 residential properties; the city estimates that as many as 80 percent have been self-funded and the number of safe room installations continues to climb. A variety of financial incentives and unified messages delivered through multiple trusted sources contributed to the successful implementation of this mitigation strategy. The study also found that most people invest in safe rooms to not only protect their families but also to improve their property values. The full study includes many other case study examples and is available at: nhma.info/publications/nhma-safe-room-report.

Additional Safe Room resources from FEMA are available at fema.gov/safe-rooms and include the following:

Taking Shelter from the Storm: Building a Safe Room for Your Home or Small Business, FEMA P-320, Third Edition / August 2008. This publication provides safe room designs that show a builder/contractor how to construct a safe room for a home or small business, and includes design options for safe rooms located in the basement, in the garage, or in an interior room of a new home or small business. (fema.gov/fema-p-320-taking-shelter-storm-building-safe-room-your-home-or-small-business

BUILDING CODE

Source: Clarion Associates

HAZARDS ADDRESSED

HOW IT WORKS

Building codes are regulations governing the design, construction, alteration, and maintenance of structures. The main purpose of building codes is to protect public health and safety as they relate to the construction and occupancy of buildings and structures. Codes also provide safeguards and ensure uniformity in the construction industry. While written by national and international professional organizations, a building code becomes the law of a particular jurisdiction when formally adopted (and often amended) by the appropriate state or local governmental authority.

Statewide building codes—and adequate enforcement of codes—also play a vital role in public safety and loss prevention. They can reduce the need for public disaster aid and increase a community's resilience. Local building codes in Colorado address a number of aspects of building construction including building/dwelling construction, structural, plumbing, mechanical, electrical, and energy to name a few. While the state does not have a mandatory code, most local governments in Colorado have adopted ordinances and codes based on national and international standards. If a county or municipality does not have a building code, factory-built structures and buildings constructed on site intended for multiple occupancy are subject to building standards set forth by the state Division of Housing.

If a county has enacted a building code, it is also required to adopt and enforce a building energy code that meets or exceeds the standards in the 2003 International Energy Conservation Code. The relatively new International Green Construction Code (IGCC) was released by the International Code Council (ICC) in 2010. It was created to aid in the construction of sustainable buildings in the business and residential sectors.

In addition to the ICC and IGCC, there are other special codes designed to address specific hazards such as the Wildland-Urban Interface Code promulgated by the International Code Council. See separate tool profile on the WUI Code.

IMPLEMENTATION

To enact a building code for the first time or to modify an existing code requires formal adoption by the local governing body. To implement the code, most local governments employ a building official and/or a department overseen by the building official who conducts inspections to ensure structures are constructed in compliance with the local building code. Sometimes small or rural jurisdictions contract with the county or a private firm to provide building inspection services. In many communities there is a person on the building department staff who is familiar with local hazards and how they are mitigated through local code provisions and other ordinances (for example, a certified floodplain manager).

WHERE IT'S BEEN DONE

Boulder County has a long history of utilizing building code regulations to address wildfire hazard in their wildland-urban interface. Building code regulations were first implemented in the late 1980s when two local fires (including the Black Tiger fire that destroyed 46 structures) prompted increased awareness of wildfires and home loss, and have continued to evolve since then. Original regulations focused on roof requirements. They have expanded through a series of local amendments to include defensible space (vegetation management) and ignition-resistant materials and construction. Currently, any development that goes through the planning process is required to have a wildfire mitigation plan; prior to the building permit being issued, the plan needs to be reviewed and approved. While this regulatory approach covers new construction (including new homes, additions, and remodels), Boulder County complements this regulatory process with its Wildfire Partners program—a voluntary approach that enables existing homeowners to request an on-site property assessment and receive mitigation guidance about their home and landscape. Together, the regulatory and voluntary/educational approaches are reaching out to help both new and current residents mitigate their property against wildfire risk (*Planning Building & Zoning*, 2016).

Larimer County adopted its first building code in 1972, and today continues to adopt the most current editions of the International Building Code with local amendments. One of the more recent amendments adopted by the County is an entirely new section to promote wildfire hazard mitigation requirements for new construction. The purpose of this section is to establish minimum standards for the design and construction of new or substantially improved buildings in wildfire hazard areas for the protection of life and property. Requirements include specifications for fire-resistant construction practices in addition to the provision and maintenance of defensible space in compliance with

Development in Fort Collins, Larimer County, CO.

Source: Marek Uliasz

the guidelines prescribed by the Colorado State Forest Service. They also address standards for liquid propane gas facilities, containers, and tanks and requirements for the installation of spark arrestors for chimneys. The additional code requirements apply to all locations within the wildfire hazard area as defined in the Larimer County Wildfire Mitigation Area Map. They are enforced by the Building Official who has the authority to approve alternate materials and methods of compliance not specifically prescribed by the code so long as they are equivalent in terms of suitability, effectiveness, fire resistance, durability, and safety. These code requirements are an additional and critical component to the County's broader Wildfire Safety Program (*Building*, n.d.a).

Boulder, Larimer, and Weld Counties (Flood Mitigation). While most communities in Colorado have adopted building codes based on international standards that include minimum flood-resistant design standards, the State of Colorado requires each to adopt an amendment to these provisions in compliance with its own "Rules and Regulations For Regulatory Floodplains In Colorado" (2011) as established by the Colorado Water Conservation Board (CWCB). These rules include higher regulatory standards that exceed most codes and minimum standards of the National Flood Insurance Program (NFIP), and communities have the option to adopt even higher standards through their own local ordinances and building code amendment process.

One common approach to higher regulatory standards is the adoption of **freeboard**: an additional margin of safety expressed in feet above a predicted water surface elevation, typically defined as the Base Flood Elevation (BFE) on a FEMA Flood Insurance Rate Map (FIRM). In 2011 CWCB amended its rules to require one foot of freeboard for all new or substantially changed structures in floodplains. A number of communities in Colorado had already amended their local building codes and relevant ordinances to meet or exceed this standard, and the risk reduction benefits of doing so were realized following the September 2013 floods. For example most communities in the hard hit counties of Boulder, Larimer, and Weld had amended their codes to include a freeboard requirement – and many include a two foot freeboard. A 2015 FEMA study determined that $183 million in losses were avoided in these three counties during the 2013 flood event through these more stringent regulatory practices (*Reducing Losses*, 2015).

ADVANTAGES AND KEY TALKING POINTS

Benefits of implementing a building code include:

- Protecting the public health and safety and the safety, protection, and sanitation of new structures.
- Protecting financial investments and property values. If construction does not comply with current recommended codes the structure may be at greater risk for damage and loss.
- Property insurers may not cover work done without permits and inspections.
- Ensuring that structures have the physical integrity to endure hazard conditions.

CHALLENGES

The biggest challenge for a community considering adoption of a building code for the first time (or adding additional requirements to address hazards like wildfire) is gaining public support. Other challenges include:

- To properly administer and enforce a building code requires someone with training, preferably ICC certification.
- Adding additional building requirements for hazard mitigation purposes such as a WUI code or high-wind requirement may be difficult for a community to support—especially for communities with a lower risk to hazards or a short history of hazard events.

KEY FACTS

Administrative capacity	Building officials with requisite training and certification
Mapping	Not required
Regulatory requirements	Local Building Code
Maintenance	Yes
Adoption required	Yes
Statutory reference	Counties C.R.S. § 30-28-201; Municipalities C.R.S. § 31-15-601
Associated costs	Staff time, generally offset by building permit fees. Cost of training workshops sponsored by the Colorado Chapter of ICC

EXAMPLES

Boulder County Building Department	bouldercounty.org/property/build/pages/buildingpermitreqs.aspx
Larimer County Building Department	larimer.org/building
Colorado Energy Code	colorado.gov/pacific/dola/colorado-energy-codes-0

FOR MORE INFORMATION

International Construction Code

iccsafe.org

Colorado Chapter of the International Code Council

coloradochaptericc.org

International Fire Code

iccsafe.org/codes-tech-support/codes/2015-i-codes/ifc

International Green Construction Code

iccsafe.org/codes-tech-support/international-green-construction-code-igcc/international-green-construction-code

Insurance Institute for Business and Home Safety

disastersafety.org

Federal Alliance for Safe Homes (FLASH)

flash.org

International Wildland-Urban Interface Code

publicecodes.cyberregs.com/icod/iwuic/2012

ICC 600-2014: Standard for Residential Construction in High-Wind Regions

shop.iccsafe.org/icc-600-2014-standard-for-residential-construction-in-high-wind-regions-1.html

National Fire Protection Association

Standard for Fire Protection Infrastructure for Land Development in Wildland, Rural, and Suburban Areas: nfpa.org/1141

CRITICAL INFRASTRUCTURE PROTECTION


Source: CASFM

HAZARDS ADDRESSED

HOW IT WORKS

A **Critical Infrastructure Protection Plan** is a strategy to make critical infrastructure more resilient. What qualifies as "critical infrastructure" is defined locally, but generally refers to infrastructure that is necessary to providing vital community and individual functions. It can include both buildings (e.g., schools, town halls, hospitals), and also physical facilities such as roads, storm drains, potable water pipes, or a sewer collection system. Critical infrastructure must be designed, located, and sufficiently protected to remain operational during hazard events and emergencies, including floods, wildfires, high winds, and severe weather. Key infrastructure assets can be owned, operated, and maintained by either public agencies (e.g., roads, bridges, water and sewer systems, school facilities, etc.) or the private sector (e.g., hospitals, utilities, etc.). A diminished or vulnerable critical infrastructure system will greatly impede a whole community's ability to withstand or recover sooner from hazard events.

To make these facilities more resilient requires taking actions that removes risk to physical infrastructure. In terms of buildings, examples include: relocation; elevation of the building above the base flood elevation (BFE); dry proofing and wet floodproofing; fire-resistant building materials; and, in some cases, engineered solutions such as levees and floodwalls. In terms of hardening capital facilities, examples include: double sleeving water pipes, elevating roadways prone to flooding above BFE, expanding the capacity of road culverts, removing physical impediments that restrict water flow in rivers and floodplains, and elevating heating and air conditioning equipment and generators.

IMPLEMENTATION

Each local community must identify and analyze its own critical infrastructure in relation to known hazards and develop a comprehensive strategy. The results should include a list of prioritized capital

improvements and associated costs and potential funding sources. The strategy should be incorporated into the local hazard mitigation plan's list of mitigation projects, the local comprehensive plan, and the capital improvement program/plan. It is especially important to develop plans for the long-term maintenance of critical infrastructure, since FEMA (and potentially other agencies) may not provide funding for repair unless the damage is related to a specific disaster event.

WHERE IT'S BEEN DONE

Similar to many growing communities in the semi-arid climate of Colorado, the **City of Aurora** faces an increasingly complex future with regard to its water supply and infrastructure planning. Uncertainties related to a host of future conditions including population growth, aging infrastructure, climate change, and extreme events present clear risks to the provision of safe drinking water to its citizens far into the future. As part of developing its 2015 *Integrated Water Master Plan* (IWMP), Aurora Water, the City's water utility, applied a scenario-based planning process in which the potential impacts of these and other factors to its assets were quantified using performance metrics of reliability and resilience. In so doing the City developed a risk management framework to identify key risks inherent to the entire Aurora Water infrastructure system – from watershed supply to storage, treatment, distribution, and delivery. This systematic approach considered the future frequency and severity of drought, wildfire, and floods among other threats and was used to evaluate and rank all the system vulnerabilities to serve as the basis for decisions regarding future capital projects, programs, and policies. Typical of most utilities, Aurora Water's refined Capital Improvement Program outlines projects over the next 20 years. However, despite uncertain future conditions, the planning horizon for their IWMP extends to 2070 with updates planned on a three to five-year basis.

The Erie Municipal Airport, owned and operated by the **Town of Erie**, is located only three miles from its central business district and has long been recognized as critical to the economic well-being of the community. More recently, it was identified by the Town's mitigation planning team as a critical "transportation and lifeline" facility, defined as essential in providing utility or direction either during the response to an emergency or during the recovery operation.

The airport lies in a valley created by Coal Creek, a perennial stream that borders the airport on two sides. One of the facility's most vital infrastructure assets is the Coal Creek crossing, a bridge and culvert system which provides vehicular access to the airport and connects the runway to a maintenance facility, several businesses, and private hangars. The crossing is also viewed as critical to the success of a proposed Airport Business Park adjacent to the airport. For years, the decaying culvert required frequent clearing and significant repairs just to keep it operational during small storms. In response to these mounting maintenance costs, combined with the recognition of the crossing's high vulnerability to larger flood events which could cause the airport to shut down, the Town replaced the culvert through the assistance of FEMA's Pre-Disaster Mitigation (PDM) program. The construction of two parallel precast concrete box culverts was completed in 2011 for just over $400,000, and soon thereafter the project proved its cost-effectiveness in the wake of the September 2013 flood which resulted in no damage or service interruptions. "The structure worked per its design," said Russell Pennington, Deputy Director of Public Works for the Town of Erie. "It's a great asset to the town and the airport." (*Best Practices*, 2014, p. 8)

Garfield County initiated a long-term *Critical Facilities Protection Plan* (CFPP) in 2015. The County identified the need for such a plan in its local hazard mitigation plan. The County Community Development Department joined with its Emergency Management Department in developing its CFPP. The CFPP is expected to be adopted by the County Commission and integrated into the Garfield County Comprehensive Plan.

ADVANTAGES AND KEY TALKING POINTS

The speed at which a community is able to recover is linked closely to the resilience of its critical infrastructure and ability to avoid damage from disaster. The following steps need to be taken:

- Have a critical facilities protection plan (CFPP) in place prior to any disaster event.
- Establish an on-going program to implement recommended actions in the CFPP.
- Build support for funding of the CFPP by educating the general public and key stakeholder groups.
- Implement the CFPP to achieve long-term savings to the local government, as well as state and federal governments.

CHALLENGES

- Gaining funding support to implement the CFPP can be a struggle when a community has not experienced a disaster for some time.
- Another challenge is avoiding funding competition among agencies responsible for certain infrastructure elements.
- Some critical facilities may also be classified as historic structures, which may introduce additional challenges in terms of upgrading the structures to be more resilient.

KEY FACTS

Administrative capacity	Planner, public works official, engineer, finance office, emergency manager
Mapping	As needed
Regulatory requirements	N/A
Maintenance	Minimal
Adoption required	Yes
Statutory reference	N/A
Associated costs	Staff time to file for grant(s) – cost can be recovered out of grant(s); to prepare Critical Facilities Protection Plan requires staff time

EXAMPLES

City of Aurora Water Department	auroragov.org/LivingHere/Water/index.htm

Town of Erie Emergency Preparedness	erieco.gov/369/Emergency-Preparedness
Garfield County Emergency Management Department	garfield-county.com/emergency-management

FOR MORE INFORMATION

Colorado Department of Local Affairs – Financial Assistance

colorado.gov/pacific/dola/financial-assistance-0

U.S. Office of Infrastructure Protection

dhs.gov/national-infrastructure-protection-plan

Silver Jackets Program

silverjackets.nfrmp.us

Colorado Silver Jackets Program – (under development)

silverjackets.nfrmp.us/State-Teams/Colorado

National Institute of Standards and Technology

Disaster-Resilient Buildings, Infrastructure, and Communities: nist.gov

National Renewable Energy Laboratory

nrel.gov/tech_deployment/drr_nj_ny

WILDLAND-URBAN INTERFACE CODE (WUI CODE)


Source: M. Mowery

HAZARDS ADDRESSED

Wildfire

HOW IT WORKS

A wildland-urban interface (WUI) code is specifically designed to mitigate the risks from wildfire to life and property. The standards within a WUI code will vary according to the scope that a community is willing to adopt and enforce. Typically, however, a WUI code includes the following topics:

- **Structure density and location**: number of structures allowed in areas at risk from wildfire, plus setbacks (distance between structures and distance between other features such as slopes).
- **Building materials and construction**: roof assembly and covering, eaves, vents, gutters, exterior walls, windows, non-combustible building materials, and non-combustible surface.
- **Vegetation management:** tree thinning, spacing, limbing, and trimming; removal of any vegetation growing under tree canopies (typically referred to as “ladder fuels”), surface vegetation removal, and brush clearance; vegetation conversion, fuel modifications, and landscaping.
- **Emergency vehicle access:** driveways, turnarounds, emergency access roads, marking of roads, and property address markers.
- **Water supply:** approved water sources and adequate water supply.
- **Fire protection**: automatic sprinkler system, spark arresters, and propane tank storage.

A WUI code must also state where it applies. The method to determine applicability is at the discretion of the jurisdiction and may be tied to one or more of the following:

1. All new construction, remodels, and retrofits (including subdivisions and planned unit developments).
2. Broadly defined area at risk to wildfire, such as a WUI boundary map and/or definition.
3. Designated overlay zone other than a WUI (such as a hillside overlay zone).

4. Parcel map that shows individual hazard ratings as determined by the jurisdiction.
5. Hazard rating based on professional site assessment.

A WUI code can also specify under what conditions additional standards may be required. For example, if a site visit determines that the hazard rating is above a certain threshold (e.g., high, very high, or extreme), the jurisdiction may require increased defensible space, an automatic sprinkler system, and a secondary emergency access in addition to the base level WUI code requirements.

IMPLEMENTATION

A WUI code often works in conjunction with other codes, such as the jurisdiction's fire code and building code. References to these other codes should be included in the WUI code. The local authority responsible for a WUI code is typically the local fire district/department, land use department, or building department. To be successful, the adopting jurisdiction should ensure there is enough internal capacity to enforce the code.

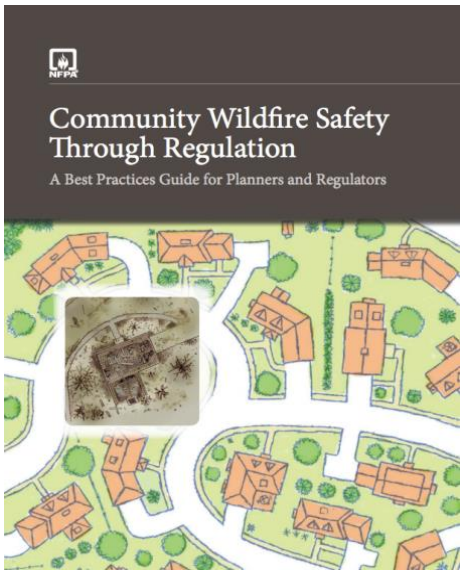
Model WUI codes can be useful in providing jurisdictions with examples of language for required mitigation and guidance. It is rare that jurisdictions adopt model WUI codes in full; rather, they adopt them in part and/or with local amendments. WUI codes also work best in concert with other voluntary and outreach programs that encourage resident awareness and education.

WHERE IT'S BEEN DONE

In 2012, **Colorado Springs** updated their WUI mitigation requirements by adopting an appendix for the Hillside Overlay Zone that required additional fuels management, fire protection systems, roof coverings, and other hardened structure features.

Some communities and counties in Colorado have adopted either their own WUI code or parts of the International Code Council's Wildland-Urban Interface model code (IWUIC). For example, in 2011 **Pueblo County** adopted most of the IWUIC (2009 edition) as part of their uniform fire code (adopted as the "Fire Codes of Pueblo County").

Many other jurisdictions, including **Boulder County**, **Eagle County**, and **Summit County** have integrated wildfire hazard mitigation requirements into their land use regulations and building codes to specify when new construction, additions, or retrofits require additional mitigation. *For more examples related to wildfire, see additional examples in the Building Code and Site-Specific Hazard Assessment tools.*



This 24-page guide by NFPA provides information on community wildfire safety specifically for planners and regulators.

Source: nfpa.org/safety-information/for-consumers/outdoors/wildland-fires/reports-case-studies-and-guides

ADVANTAGES AND KEY TALKING POINTS

Implementing a WUI code promotes safer development by ensuring that life and property are uniformly protected from wildfire risk. In addition, WUI codes:

- Provide a robust, comprehensive, and consolidated

set of regulations for developers, contractors, and residents.
- Complement existing building and fire codes to ensure that additional standards are met.
- Are based on scientific findings on the effectiveness of ignition loss reduction.
- While some WUI code requirements may require more upfront financial investment through the building and construction process, codes can reduce long term spending on suppression and rebuilding because features are built to a higher standard and increase a structure's survivability.
- WUI codes promote safer development that protects life and property.

CHALLENGES

WUI codes can also bring a number of challenges, although many of these can be overcome if the community is committed to the process:

- May bring additional costs to construction, although this varies by jurisdiction.
- Typically WUI codes only apply to new development and improvements or repairs, leaving existing development still at risk.
- Adoption can be controversial; successful WUI code adoptions engage a number of stakeholders and the public long before the adoption process began.
- Enforcement can be challenging and requires adequate internal staff capacity to effectively implement.

KEY FACTS

Administrative capacity	Experienced planner; coordination with local fire authority and building department
Mapping	WUI map or hazard ratings required for applicability
Regulatory requirements	N/A
Maintenance	Yes. Periodic updating encouraged for maps and technical standards
Adoption required	Yes. Can be integrated into zoning code
Statutory reference	N/A
Associated costs	Varies; may require consultant

EXAMPLES

Boulder County WUI Code	bouldercounty.org/property/build/pages/default.aspx
City of Colorado Springs WUI Code	dora.state.co.us/taskforce/FieldTrip/WUI%20Mitigation%20Ordinance.pdf
Eagle County WUI Code	eaglecounty.us/Building/Wildfire/Overview
Pueblo County WUI Code	pueblo.org/government/county/code/title8/chapter8-16

Town of Jackson and Teton County, WY WUI Code	tetonwyo.org/fire/topics/contractors-page/252358
Kittitas County, WA WUI Code	co.kittitas.wa.us/firemarshal/wildland-urban-interface.aspx

FOR MORE INFORMATION

International Code Council Wildland-Urban Interface Code (IWUIC)

model WUI code: publicecodes.cyberregs.com/icod/iwuic/2012/index.htm

National Fire Protection Association

Community Wildfire Safety Through Regulation: A Best Practices Guide for Planners and Regulators: nfpa.org/safety-information/for-consumers/outdoors/wildland-fires/reports-case-studies-and-guides

Standard for Fire Protection Infrastructure for Land Development in Wildland, Rural, and Suburban Areas: nfpa.org/1141

Standard for Reducing Structure Ignition Hazards from Wildland Fire: nfpa.org/1144

ENHANCING ADMINISTRATION AND PROCEDURES

Aside from adopting tools that focus on how and where development takes place, and the degree to which mitigation must occur, communities can also effectively mitigate hazards by adopting carefully crafted administrative procedures. For example, one of the tools highlighted below discusses the importance of establishing comprehensive application submittal requirements to ensure that all interested parties understand the potential hazard-related risks of new development. Making sure local governments obtain reliable and sufficient information early in the review process allows planners and local officials to make informed decisions and ensure safe growth and development.

This section explores two administrative and procedural tools that communities can use to mitigate hazards. Tools profiled include:

- Application Submittal Requirements
- Post-Disaster Building Moratorium

Many of the other tools in this chapter also require the development of effective administrative procedures in order to be fully effective.

Source: Shutterstock, welcomia

APPLICATION SUBMITTAL REQUIREMENTS

Source: Town of Frisco

HAZARDS ADDRESSED

HOW IT WORKS

Application submittal requirements are the materials that must be submitted to a local government (usually the planning department) to initiate the development review process. Requirements vary from community to community and by type of project. Building a small addition to an existing building may require little more than filling out a brief application, while developing a large new mixed-use project typically requires complex supporting materials that identify uses proposed, the site layout, and building design, among other features. Other requirements might include letters from adjacent property owners demonstrating support of a project and certification of sufficient infrastructure capacity from local utility providers. Submittal requirements are important because they determine what baseline information will be available to help staff and officials make informed decisions about how the community grows.

Concerning natural hazards, submittal requirements are an excellent opportunity for a community to obtain baseline information about where potentially hazardous conditions may exist on a site—for example, where there are steep slopes, or the boundaries of the floodplain. If hazardous materials are going to be stored or used on the site, the applicant could be required to notify the local government of the type and amount of such materials. Communities may also require development applicants to submit evidence that appropriate mitigation techniques will be employed to offset risk to existing hazards. This evidence can take the form of specialized reports prepared by certified professionals, such as trained foresters or licensed geologists and/or engineers.

IMPLEMENTATION

To develop or amend application submittal requirements, it is important to work closely with other local government agencies or departments that will be reviewing applications for development. Predictability is the key. When a developer knows exactly what is required for a submittal package, it

helps them allocate resources and ultimately meet their bottom line. Problems can arise when the community asks for information that is unanticipated and was not requested as part of the original application.

Application submittal requirements typically specify, at a minimum, the type and format of plans required, the number of copies of required documents, applicable fees, proof of ownership, and required signatures. Although some communities include submittal requirements in their zoning and development ordinances, this information is best left outside the ordinances and put online and in the planning department offices, allowing them to be updated over time without ordinance amendments. Keeping administrative material outside the code also makes for a simpler, more user-friendly code.

The types of information typically requested to inform the evaluation of development proposals include a map of the proposed development area and a description of existing site characteristics, including geologic, vegetative, topographical, and environmental conditions. If the site is a known or suspected hazard area, communities often require an assessment of whether site characteristics may create a hazard risk, and an analysis of the intensity and character of existing and proposed development and its relationship to the hazard.

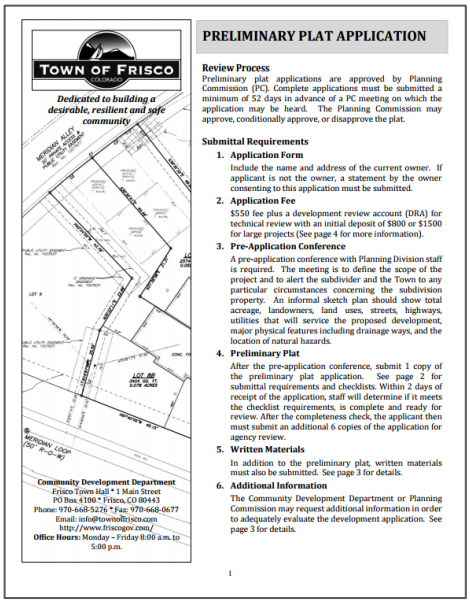
WHERE IT'S BEEN DONE

Frisco hosts application submittal requirements on a dedicated page on the Town's website. Each procedure includes a form that describes the review and approval process, outlines the application materials required, and includes an online standard PDF form that can be filled out digitally.

For example, for preliminary plats, the department can request geologic investigation reports and soil-type interpretations. These can be used to ensure that future development is feasible within or proximate to known hazard areas.

Frisco's approach makes it clear to developers and other property owners what the expectations are for completing an application. The dedicated webpage is a one-stop-shop; it includes forms for building permits, business-related licenses and permits, planning permits, and water billing forms (*Frisco Forms & Permits*, n.d.).

Estes Park also asks for hazard information to be included in most development applications. The application forms with basic submittal requirements are included on the website, and an appendix to the development code lists all submittal requirements for various types of planning activities. For a subdivision preliminary plat, a map of existing conditions is required with an application and must identify floodplains, topography (including detailed slope analysis), and areas of geologic and wildfire hazards. The development code Section 7.7 is referenced to further



TOWN OF FRISCO

Dedicated to building a desirable, resilient and safe community

Community Development Department
Frisco Town Hall * 1 Main Street
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Phone: 970-668-5276 * Fax: 970-668-0677
Email: info@townoffrisco.com
http://www.friscogov.com/
Office Hours: Monday – Friday 8:00 a.m. to 5:00 p.m.

PRELIMINARY PLAT APPLICATION

Review Process
Preliminary plat applications are approved by Planning Commission (PC). Complete applications must be submitted a minimum of 52 days in advance of a PC meeting on which the application may be heard. The Planning Commission may approve, conditionally approve, or disapprove the plat.

Submittal Requirements

1. **Application Form**
   Include the name and address of the current owner. If applicant is not the owner, a statement by the owner consenting to this application must be submitted.
2. **Application Fee**
   $550 fee plus a development review account (DRA) for technical review with an initial deposit of $800 or $1500 for large projects (See page 4 for more information).
3. **Pre-Application Conference**
   A pre-application conference with Planning Division staff is required. The meeting is to define the scope of the project and to alert the subdivider and the Town to any particular circumstances concerning the subdivision property. An informal sketch plan should show total acreage, landowners, land uses, streets, highways, utilities that will service the proposed development, major physical features including drainage ways, and the location of natural hazards.
4. **Preliminary Plat**
   After the pre-application conference, submit 1 copy of the preliminary plat application. See page 2 for submittal requirements and checklists. Within 2 days of receipt of the application, staff will determine if it meets the checklist requirements, is complete and ready for review. After the completeness check, the applicant then must submit an additional 6 copies of the application for agency review.
5. **Written Materials**
   In addition to the preliminary plat, written materials must also be submitted. See page 3 for details.
6. **Additional Information**
   The Community Development Department or Planning Commission may request additional information in order to adequately evaluate the development application. See page 3 for details.

Town of Frisco preliminary plat application submittal requirements information sheet .

Source: Town of Frisco

describe the requirements for mapping those hazards and implementing proper mitigation techniques (*Development Code*, 2015).

ADVANTAGES AND KEY TALKING POINTS

The key benefit to requiring hazard information with development applications is that any issues can be addressed up front, rather than after the project has been through a round of designs. Other benefits include:

- Requiring hazards information with an application submittal makes it clear that minimizing risks to hazards is a priority in the community.
- Benefits property owners over time by reducing potential property damage by minimizing risks to hazards.
- Requiring the applicant to provide evidence of appropriate mitigation relieves staff and local decision-government makers from making judgments that they may not otherwise be trained to make. It also minimizes liability since communities can require evidence to be prepared by licensed professionals (geologists, engineers, foresters, etc.).
- Early identification of potential hazard issues can be dealt with during development review, avoiding awkward opposition during the public hearing process.

CHALLENGES

The amount and type of information required for development applications can be a point of contention among the development community. Developers that work in several jurisdictions are quick to compare the requirements to another community where "development is much easier." Communities that are relatively demanding with applications may run the risk of discouraging development. Planners should ask themselves whether the required information will be used in the decision-making process and is necessary to adequately make a determination of compliance.

Additionally, technical reports and studies can be expensive to produce, so staff should make sure these are necessary for developments during a pre-submittal process. Applicants should not be expected to make large investments in documenting hazard areas and mitigation techniques before they have a sense of whether the project is viable.

MODEL CODE LANGUAGE AND COMMENTARY

Commentary

For any type of development project, most communities have standard rules that control the format and contents of applications. For example, communities specify the type and format of plans required, along with the number of copies needed for supporting documents like maps. Applicants must indicate which local code requirements are applicable to their project, and how they meet the criteria for approval. Applications must be accompanied by required fees, proof of ownership, and contain authorized signatures. Application submittal requirements are typically found with each specific procedure in the zoning ordinance. However, they are often

located outside the zoning ordinance and included in an administrative manual or on the local government website. That allows staff to update the application submittal requirements without amending the ordinance.

In addition to these general requirements, applications for projects in hazard-prone areas should be required to include additional materials and/or complete additional steps that are tailored to local conditions and the natural hazard being regulated. These may include:

- Attendance at a pre-application meeting;
- Completion of a site visit;
- Preparation of a site-specific natural hazards map;
- Submission of technical reports; and
- Development of a mitigation plan.

The following sections describe each of these elements and provide standard language that can be considered by Colorado local governments. Model language is in blue shading. Commentary is located in *italics* in the column at the right. The model language used in this document is based on several existing ordinances and programs from varying communities around the state, including municipalities and counties. The language is illustrative only; consult local counsel to tailor language for your jurisdiction.

Ideally, submittal requirements should be developed collaboratively by all agencies that will be involved in the ultimate review of the application. Agencies such as the local fire district or flood management agency should be consulted in the initial development of the community's application requirements for projects in hazard-prone areas.

Pre-application Meeting

The language below is a good example of where hazard area maps are called out specifically. This shows the applicant that hazard mitigation and avoidance are critical to the development review process.

A pre-application meeting is required prior to submitting an application for development. Prior to the pre-application meeting, the applicant should consult the official hazard area maps available in the Planning Department to identify any potential hazard areas on the proposed development site.

A. The applicant shall submit a brief description of the existing land use of the site and of the proposed land use and an informal sketch of the existing site prior to the pre-

Pre-Application Meeting: *The pre-application meeting is an important tool to make sure the applicant is aware that natural hazards may affect the subject property and to identify gaps in the hazard-related information currently available in official maps and reports. Not all hazards can be mapped, but those commonly mapped include flood hazards, wildfire hazards, geologic hazards (landslides, rockfall, and subsidence), avalanche areas, fault zones (earthquake), and hazardous material areas. Applicants can also find hazard maps in the Local Hazard Mitigation Plan, or sometimes in the Comprehensive Plan.*

The meeting also is an opportunity for the applicant and staff to discuss the specific local ordinance requirements that will apply to the development.

application meeting. The sketch shall show the total acreage of the site, land owners, land uses, streets, highways, utilities, major physical features (rock outcroppings, drainages, etc.), and the location of natural hazards.

B. At the pre-application meeting, planning staff will assist the applicant to determine if a hazard area exists on the property and explain the relevant procedures for review if a hazard area is identified.

C. At the pre-application meeting, planning staff will provide the applicant with a list of the documents, maps, and technical reports required for the application.

D. Following the pre-application meeting, a site visit may be scheduled for planning staff to meet with the applicant at the proposed development site.

Site Visit

When hazards are identified on a development site, a site visit shall be conducted by planning staff to verify the information on the official hazard maps, review the information required for the application process, and discuss mitigation requirements with the applicant.

Site Visit: *Technical staff knowledgeable in the natural hazard may be referenced and included in a site visit to provide more detailed information about mitigation and requirements.*

Site Natural Hazards Map

For all development proposals or land use activities on a site where a natural hazard is identified at the pre-application meeting and confirmed during the site visit, a site map prepared by a licensed geologist or engineer depicting the extent and severity of all identified natural hazards shall be submitted by the applicant to the Planning Department. The site map shall show the extent and severity of the hazard(s) at the particular site. Maps shall be produced at a scale sufficient to determine the nature, extent and severity of the natural hazard. If needed, cross-sections can be used to portray the hazard conditions.

Technical Specialists Should Prepare Maps: *A professional engineer and/or geologist should prepare all maps and technical reports describing and evaluating natural hazards. It is typical for the type of engineer to be specified in the code (e.g., geotechnical engineer for reports on a geologic hazard area). For wildfire hazard reports, a professional forester is usually required to prepare the documents.*

Technical Reports

The local ordinance should specify the types of technical reports and documentation that are necessary to determine the extent of potentially hazardous conditions on the site, the exposure of the site to off-site hazards that could damage land uses on the site, and the risk of causing damage to adjacent properties because of disturbance to the site. The information contained in such reports should be presented clearly and be based on technical site-specific data and surveys. The report should address the potential effects of the hazards on the

proposed development in terms of risk and potential damage. Below is a generalized example of the type of technical reports that could be required for review of development in a natural hazard area.

Technical reports prepared by professional engineers and/or geologists are required for all development applications on a site in an identified natural hazard area. Reports and studies required to evaluate the development in the context of known natural hazards will be determined by the Planning Director in conjunction with the Building Official and Fire District Official. Technical reports may be forwarded to professional experts for review and recommendation. The following information may be required based on the pre-application meeting, the site characteristics, type of development proposed, surrounding land use, and environmental conditions.

A. Geologic Hazard Report

1. An index map showing the general location of the development area and its relationship to surrounding topographic features.
2. A map showing the location, nature, and density of the proposed development or land use activity. The map should be at a scale sufficiently detailed to meet the objectives to evaluate the scope of the geologic hazard in relation to the development.
3. On-site soils investigation if in a soils hazard area.
4. Geologic hazard map showing geologic, hydrologic, soil, and topographic features relating to the geologic hazard and geologic cross-sections if needed.
5. Site history describing any prior grading, soil instability, or slope failure.
6. A site evaluation explaining all maps and technical data and describing the suitability of the site to accommodate the proposed development or land use activity.

B. Wildfire Hazard Report

1. A map showing the extent and severity of the wildfire hazard at the particular site.
2. A site map showing existing vegetation on the site.
3. A site evaluation describing the potential for wildfire on the site and the potential for wildfire to spread from the site to surrounding property and vegetation.

C. Flood Hazard Report

1. A report detailing all hydrologic and hydraulic calculations used in preparing maps and plans, or an acceptable floodplain study report prepared by a

Technical Reports: *Some communities include a list of very specific technical data requirements in the zoning code itself. Another, more common approach is identify technical reports in a general way in the zoning ordinance and remove specific details (such as scale requirements for maps) to an administrative manual, user's guide, or handouts outside the code. This allows the technical specifications to be updated and kept current by staff without having to make frequent ordinance amendments.*

Smaller communities with limited staff can work with local subject matter experts or other jurisdictions (such as the County or the Colorado Geologic Survey) to determine whether technical reports should be required as part of a development application.

recognized agency such as the Federal Insurance Administration or Colorado Water Conservation Board (CWCB).

2. Elevation (in relation to mean sea level) of the lowest floor (including basement) of all new and substantially improved structures.
3. Elevation (in relation to mean sea level) to which any nonresidential structure shall be floodproofed.
4. A certificate from a registered Colorado Professional Engineer or architect that the nonresidential floodproofed structure shall meet the floodproofing criteria contained in the development standards section of this code.

Mitigation Plan

A mitigation plan identifies specific recommendations for the development of a site in a natural hazard area to reduce the risk from the identified natural hazard. These may include building construction techniques and building material specifications. They may direct site layout and installation of landscaping and vegetation or other on-site mitigation measures (such as placement of water cisterns in wildfire hazards). Mitigation plans are usually prepared as part of the technical reports described above. The site plan and accompanying development agreements for the proposed development must incorporate the mitigation plan in order for the development to be permitted.

Mitigation Plans: *Mitigation plans should be made part of the development approval, either through recordation of the plan or inclusion of the plan requirements in required site plans or development agreements. Or they may end up being included in other approval instruments, such as a condition of approval in a Board of County Commissioners or City Council resolution.*

Examples of mitigation plans vary widely by community, by type of hazard, and by type of development. Reviewing authorities frequently require additional site-specific mitigation techniques to be added to a mitigation plan prior to approving the development. Below are two examples of the type of information that could be required in a mitigation plan.

A. Wildfire Hazard Mitigation Plan

When new development or land use activity is proposed within a wildfire hazard area, the applicant shall be required to submit a mitigation plan addressing how the development or subdivision will either avoid or mitigate the hazard, as more fully set forth below.

1. Mitigation plans shall be prepared by a professional forester according to generally accepted wildland-urban interface protection standards.

2. The mitigation plan shall recommend how to design, manage, and maintain the proposed development or land use activity to adequately mitigate wildfire hazard, including any mitigation for construction activities. The plan shall describe how the recommendations reduce wildfire hazard levels.
3. The plan shall address site vegetation as well as existing and proposed on-site structures, access and emergency fire access.
4. Mitigation methods may include, but are not limited to:
    a. Specific requirements for construction, location and density of structures and lots;
    b. Provision of defensible space;
    c. Specific requirements for alteration to the vegetative features of the land; and
    d. Specific requirements for emergency access and water system capacity.

B. Geologic Hazard Mitigation Plan

When new development or land use activity is proposed within a geologic hazard area, the applicant shall be required to submit a mitigation plan addressing how the development or land use activity will either avoid or mitigate the hazard, as more fully set forth below. Licensed professional engineers and/or geologists who are experienced in the engineering specialty (e.g., soils, slope stability) may submit mitigation plans for steep slope and alluvial soils hazards.

1. The mitigation plan shall be prepared by a professional geologist and shall recommend how to design, manage, and maintain the proposed development or land use activity to adequately mitigate the geologic hazard(s), including any mitigation for construction activities.
2. The plan shall address how the recommendations reduce geologic hazard risks both on and off-site.
3. Alternatives and solutions to abate and/or minimize the adverse geologic hazard conditions on structures, utilities, and roads shall be included in the plan.
4. Mitigation methods may include, but are not limited to:

Other Sources for Mitigation Information: *If the community does not have adopted mitigation or development standards for natural hazard areas, other recognized sources can be referenced. Several communities rely on standards and guidelines published by the Colorado State Forest Service and Colorado Geological Survey for development standards in wildfire and geologic hazard areas.*

a. Avoidance of run-out zones in rock fall hazard areas;
b. Specific requirements for construction, location, density of structures and/or lots;
c. Specific requirements for construction of roads; and
d. Specific requirements for grading and alteration to the physical characteristics of the land.
e. Mitigation techniques recommended by the Colorado Geological Survey and as published in *"Guidelines and Criteria for* Identification *and Land Use Controls of Geologic Hazard and Mineral Resource Areas, 1974."*

KEY FACTS

Administrative capacity	Minimal experience but good communication about procedures and review requirements will improve quality of submittal documents received
Mapping	Applications may include a general site map showing known hazard areas (e.g., floodplain)
Regulatory requirements	Land use regulations and/or development permits such as building permits
Maintenance	Forms and submission requirements should be updated as new federal, state or local regulations are adopted
Adoption required	Not required but authorizing a responsible agency or department to develop submittal requirements and forms defines authority and minimizes gaps
Statutory reference	N/A
Associated costs	Minimal staff time

EXAMPLES

Town of Estes Park Estes Valley Development Code	municode.com/library/co/estes_valley/codes/development_code?nodeId=CH7._GENERAL_DEVELOPMENT_STANDARDS_S7.7GEWIHAAR Section 7.7
Town of Frisco Flood Hazard Areas and Forms and Permits	friscogov.com/wp-content/uploads/2011/03/TownCode_97-Flood-Hazard-Areas.pdf and friscogov.com/forms-permits

Jefferson County Land Development Regulations	jeffco.us/planning-and-zoning/regulations/land-development-regulation/ Section 25
Larimer County Land Use Code	municode.com/library/co/larimer_county/codes/code_of_ordinances?nodeId=PTIILAUSCO_8.0STALDE Section 8.3.8
Summit County Zoning Regulations	co.summit.co.us/DocumentCenter/Home/View/59 Section 4204.02

POST-DISASTER BUILDING MORATORIUM

Source: FEMA/Patsy Lynch

HAZARDS ADDRESSED

HOW IT WORKS

A post-disaster moratorium on repairing or rebuilding structures temporarily restricts building activity following a major disaster. Communities have the authority to implement such restrictions post-event. The authorization to enact a moratorium can also be found within a comprehensive recovery ordinance that is adopted prior to a hazard event. Such ordinances typically establish the framework for a variety of post-disaster tasks, such as debris management, stabilization of damaged buildings, identification of other life/safety risks, repair of damaged infrastructure, and mitigation options and funding to rebuild to different standards or to potentially relocate certain uses (Boyd, Hokanson, Johnson, Schwab, & Topping, 2014). A sample model ordinance can be found on the APA website (see additional resources below).

The moratorium may include provisions to address critical issues regarding rebuilding that will be faced by communities in a post-disaster environment. Such provisions should:

- 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

IMPLEMENTATION

Post-disaster moratoria on repairing or rebuilding structures are generally implemented through ordinances adopted by local governments. They can be adopted after a disaster; however, the best practice is to adopt before a disaster occurs and include triggers that will indicate when the procedures will need to go into place and how long the moratorium should last.

WHERE IT'S BEEN DONE

Following the 2013 floods, **Jamestown** implemented a moratorium on rebuilding and all new permits. The intent of this temporary moratorium was to allow the Town more time to evaluate the physical impacts the flood had on the Town, and to help inform where and under what conditions rebuilding could occur. This temporary suspension of permitting also allowed the Town Board more time to study and consider any necessary changes to the Town's construction and development policies. The moratorium was in place for four months from September 25, 2013, until January 21, 2014 (*Flood Recovery Information*, 2016).

The Town also created a *Rebuilding and Restoration Guide* (2014) that served as a valuable resource to its citizens following the disaster. The guide provided answers to citizens on all elements related to rebuilding.

Boulder County has integrated procedures for establishing a post-disaster rebuilding moratorium into its Land Use Code. The Code contains an entire section titled "Procedures Following Disasters."

Evans issued an emergency ordinance (Ord. 571-13) that imposed a building and development moratorium after the 2013 floods. The moratorium applied to the special flood hazard area and any additional areas flooded during the September floods, for a period of six months.

ADVANTAGES AND KEY TALKING POINTS

The benefits of enacting a post-disaster moratorium include:

- Allowing a community to pause or slow down the permitting and rebuilding process to help ensure appropriate post-disaster rebuilding (and determining what is appropriate ahead of any disaster event).
- Ensuring that community goals for recovery and redevelopment are being met.
- Allowing for necessary mitigation, code changes, and/or policy changes to be fully evaluated and/or implemented before rebuilding takes place.

CHALLENGES

Despite the many benefits, key challenges associated with implementing a post-disaster moratorium on rebuilding and redevelopment are negotiating the political, economic, and developmental pressures associated with such an ordinance.

There will be pressures to rebuild as quickly possible following a major disaster in order to allow citizens to return to the community and to reestablish the economic vitality of the community. Anything seen as an impediment to a quick recovery will likely not be looked upon favorably by

disaster victims and the community as a whole. It takes tremendous political will and clear messaging to community members to enact a post-disaster policy such as a moratorium on rebuilding.

MODEL CODE LANGUAGE AND COMMENTARY

While post-disaster moratoria should be tailored to the needs of the individual community, there are some basic components found in most ordinances, including:

- Purpose
- Duration
- Procedures and Permitting

The following sections describe each of the common elements in more detail and provide standard language that can be considered by Colorado local governments. Model language is in blue shading. Commentary is located in *italics* in the column at the right. The model language used in this document is based on several existing ordinances and programs from varying communities around the state and the nation, including municipalities and counties. The language is illustrative only; consult local counsel to tailor language for your jurisdiction.

Purpose

The purpose of this ordinance is to:

A. Authorize the implementation of a building moratorium when the following actions or findings occur:

1. The [*municipality or county*] is declared a disaster area by the Governor of Colorado or the President of the United States;

2. The [*City Council, Board of County Commissioners, or equivalent*] declares a local state of emergency; or

3. The [*municipality or county*] is unable to maintain acceptable levels of service following an event as determined by the [*City Council, Board of County Commissioners, or equivalent*].

Commentary

Establishing a Framework: *Adopting moratoria on development activity can be controversial in the wake of a disaster. Community sentiment often leans toward a "return to normalcy," which would include immediate rebuilding efforts. It is best to establish a clear framework for development permit activities before a disaster occurs to allow for thoughtful planning of hazard areas and to ensure that appropriate measures are taken to avoid repetitive losses.*

A proactive ordinance anticipates the steps that should be taken following any major disaster event within the community and can be incorporated directly into a community's land use and development code. A reactive ordinance is adopted immediately following a disaster event and can be more specific to a specific event and a defined hazard area where such event occurred.

Purpose: *Additional information can be included in the purpose and intent statement, such as a description of specific vulnerabilities to natural and/or human-caused hazards. Communities may also consider authorizing a task force or advisory committee that oversees recovery and rebuilding operations. If such entity is established, that should be included in the purpose statement.*

B. Foster appropriate response during and after a disaster, which often require extraordinary actions.
C. Modify development approval procedures to allow property owners to build, repair, or rebuild in a timely, safe, and responsible manner.

Duration

Any moratorium imposed shall be subject to review by the [*City Council, Board of County Commissioners, or equivalent*] at the earliest possible time, but no later than [*90 days*] after it begins. At that time, the [*City Council, Board of County Commissioners, or equivalent*] shall extend, terminate, or modify the moratorium.

Procedures and Permitting

This section describes the procedures for development permits following a major hazard event.

A. Public Notice
Notice of any moratorium shall be posted in the defined location for all other public notices and shall identify the geographic area for which the moratorium is in effect and the review and permitting procedures impacted by such moratorium.

B. Suspension of Development Activity

1. The [*City Council, Board of County Commissioners, or equivalent*] shall have the authority to temporarily suspend the issuance of land use and development permits they administer under the land use code, building code, and any other ordinance where suspension of such permit is deemed necessary and reasonable to protect the public health, safety, and welfare of the community.
2. The suspension of permits may also include applications currently under review. If an application under review is suspended, the applicable review timeframes shall also be suspended until the development activity suspension has been terminated.

C. Deconstruction or Demolition of Damaged Structures
Any deconstruction or structure demolition requires the appropriate permit from the [*building official, planning director, city/county engineer, city/county manager, or equivalent*]. The [*building official, planning director, city/county engineer, city/county manager, or equivalent*] may waive any or

Duration: *The moratorium duration may vary depending on the scale of the disaster. Communities typically do not exceed six months for a moratorium. Local governments should aim to keep the duration as short as possible and consult with their attorneys whether an extended moratorium would be potential grounds for a takings claim.*

Procedures and Permitting: *Communities may also consider adopting regulations for debris removal and hazard abatement through a separate ordinance. Following a major hazard event, debris removal by the local government can be slowed by property owners taking the position that such debris has value. It is important for communities to act decisively to remove debris and mitigate any conditions in the public right-of-way that could be a safety concern.*

Public Notice: *It is important to define a geographic area, zone, or other boundary for which the imposing moratorium applies. For example, a special flood hazard area, a designated burn area, or a larger area if warranted based on the extent of a disaster.*

Suspension of Development Activity: *Some communities may elect to adopt a tiered approach to development activities restricted under a moratorium. For example, the Hillsborough County, Florida ordinance establishes different timelines following a disaster for destroyed structures, major damaged structures, minor damaged structures, new development, previously issued building permits, development orders, and site plan reviews.*

all permitting requirements depending on the type of work and the extent of the disaster.

D. Emergency Repairs

Emergency repairs necessary to prevent imminent danger to life or property is exempt from this section except that the property owner shall notify the [*building official, planning director, city/county engineer, city/county manager, or equivalent*] within [*72 hours/one week/10 days/other timeframe*] of the work conducted and shall apply for any required permit as deemed necessary by the [*building official, planning director, city/county engineer, city/county manager, or equivalent*].

KEY FACTS

Administrative capacity	Adoption of the ordinance does not require significant administrative capacity but implementation of the ordinance does, including coordination with the Building Official and Attorney
Mapping	Mapping may potentially be needed to help determine areas where the moratorium should be implemented for a given disaster event
Regulatory requirements	Local ordinance
Maintenance	Not typically required, unless moratorium is continued for an additional and specific period of time
Adoption required	Yes
Statutory reference	In 2007, the Colorado Supreme Court upheld the authority for local governments to adopt emergency ordinances to temporary zoning control under the Land Use Control Enabling Act, citing Droste v. Pitkin County Commissioners (Colo. 2007)
Associated costs	None directly tied to local government other than staff time required for implementation

EXAMPLES

Boulder County Land Use Code	bouldercounty.org/property/build/pages/lucode.aspx Article 19
City of Evans Moratorium Following 2013 Floods	cml.org/Issues/Public-Safety/Emergency-Management/Emergency-Ordinance-Imposing-Moratorium-on-Building/Development,-Flood-(City-of-Evans)/

Town of Jamestown Temporary Moratorium for Building Permits and Floodplain Permits Following 2013 Floods	bouldercounty.org/doc/landuse/jamestown2013ordinance2.pdf See also the Rebuilding and Restoration Guide: jamestownco.org/files/2013/12/Rebuilding-and-Restoration-Guide-3.01.pdf
Hillsborough County, FL Ordinance to Guide Redevelopment and Mitigation Following a Disaster or Storm Event	hillsboroughcounty.org/DocumentCenter/Home/View/1051

FOR MORE INFORMATION

American Planning Association: Planning for Post-Disaster Recovery: Next Generation
planning.org/research/postdisaster