

**CARBONDALE TREE BOARD
REGULAR MEETING
AUGUST 10, 2017
CARBONDALE TOWN HALL
511 COLORADO AVENUE
6:00 pm**

<u>TIME*</u>		<u>ITEM</u>	<u>DESIRED OUTCOME</u>
6:00	1.	Roll Call	
6:01	2.	Consent Agenda	
6:05	3.	Persons Present Not On The Agenda	
6:10	4.	Hazard Mitigation Plan	ATTACHMENT A DISCUSSION
6:30	5.	Treating Lindens Downtown w/Cambistat (a plant growth inhibitor)	ATTACHMENT B DISCUSSION
6:40	6.	UDC Discussion	DISCUSSION
7:00	7.	Adjourn	

* Please note: times are approximate

Carbondale Community Profile

Planning Team

Name	Title
Jay Harrington	Town Manager
Mark O'Meara	Utilities Director
Janet Buck	Planning Department
Gene Shilling	Police Chief
Kevin Schorzman	Public Works Director
Renae Gustine	Finance Director

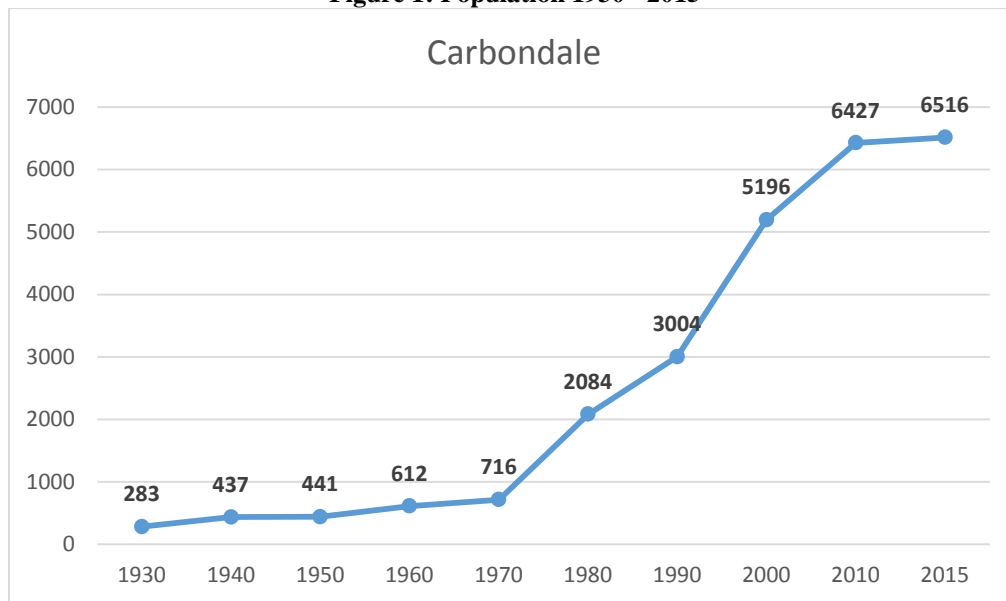
Location and geography

Carbondale is a Home Rule Municipality in Garfield County. The Town is located at the base of Mount Sopris. Carbondale covers an area of two square miles.

Population and demographics

Carbondale's population grew from about 5,196 people in 2000 to 6,516 people in 2015, an increase of 1,320 people at an average annual growth rate of 1.7 percent. Carbondale's population accounted for 11.4 percent of Garfield County's population in 2015.

Figure 1: Population 1930 - 2015



Source: US Census Bureau

The most vulnerable groups of the population during a disaster are women, children, minorities, and the poor. In comparison to the County, Carbondale's population was:

- **Slightly younger.** The median age of Carbondale was 35.3 years old in 2015, compared with the County average of 35.9 years. Carbondale's population grew younger since

2009, when the median age was 32.2 years old. Carbondale has a larger proportion of people under 20 years old (35.7 percent) than the County (28.7 percent).

- **More ethnically diverse.** Since 2009, Carbondale grew more ethnically diverse. In 2009, 23.4 percent of Carbondale's population was Hispanic or Latino (1,525). By 2015, about 40 percent of Carbondale's population was Hispanic or Latino (2,607 people). The Hispanic or Latino population in Garfield County has grown from 24 percent in 2009 to 28 percent in 2015.
- **Less likely to be in poverty.** The poverty rate in Carbondale (6.1 percent of families living below the federal poverty line) was lower than the County's poverty rate (8.3 percent) in 2015.

Employment and economics

Consideration of Carbondale's economy is important in recovery planning. In comparison to Garfield County, Carbondale's economy had:

- **Similar mix of industries.** Carbondale's major employment sectors, accounting for 10 percent or more of employment each, were: Construction, Retail Trade, Waste Management Services (professional, scientific, management, and administrative), Educational Services and Health Care, and Arts, Entertainment and Recreation.
- **Higher household income.** Carbondale's median household income in 2015 (\$62,770) was about \$6,200 higher than the County (\$56,590).
- **Fewer long-distance commuters.** About 37.9 percent of workers in Carbondale commute for fewer than 15 minutes, compared with 31 percent of workers in Garfield County. 35 percent of workers in Carbondale commute 30 minutes or more to work, compared to about 40 percent of the County workers. This is an indicator of the importance of the transportation infrastructure within the City and the connection to County infrastructure for the local economy.

Housing

Understanding the characteristics of Carbondale's housing stock is important to recovery planning. Housing that is in poor condition is more likely to be at-risk in recovery than housing in good condition. Some indicators of condition include housing tenure and housing age, with older renter-occupied housing is more likely to be in poor condition than newer owner-occupied housing. In comparison to Garfield County, Carbondale's housing stock was:

- **More renter-occupied.** About 41 percent of occupied housing units in Carbondale are renter occupied compared with 35 percent of occupied housing in Garfield County.

- **Newer.** Carbondale had a smaller share of housing built prior to 1970 than the County (15.3 percent compared to 19.9 percent).
- **Fewer multi-family units.** Carbondale had a smaller share of multi-family housing with five or more units per structure (9 percent) than the County average (12 percent). About 50 percent of housing in Carbondale was single-family detached, compared with 60 percent on the County's housing. Carbondale had a smaller share of mobile and manufactured housing (2.7 percent) compared to the County (10.4 percent).

Land use, development, and transportation

Several regional transportation routes run through Carbondale, including Highway 133 and Highway 82. The community also has a network of recreational trails.

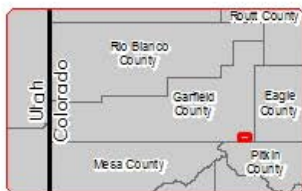
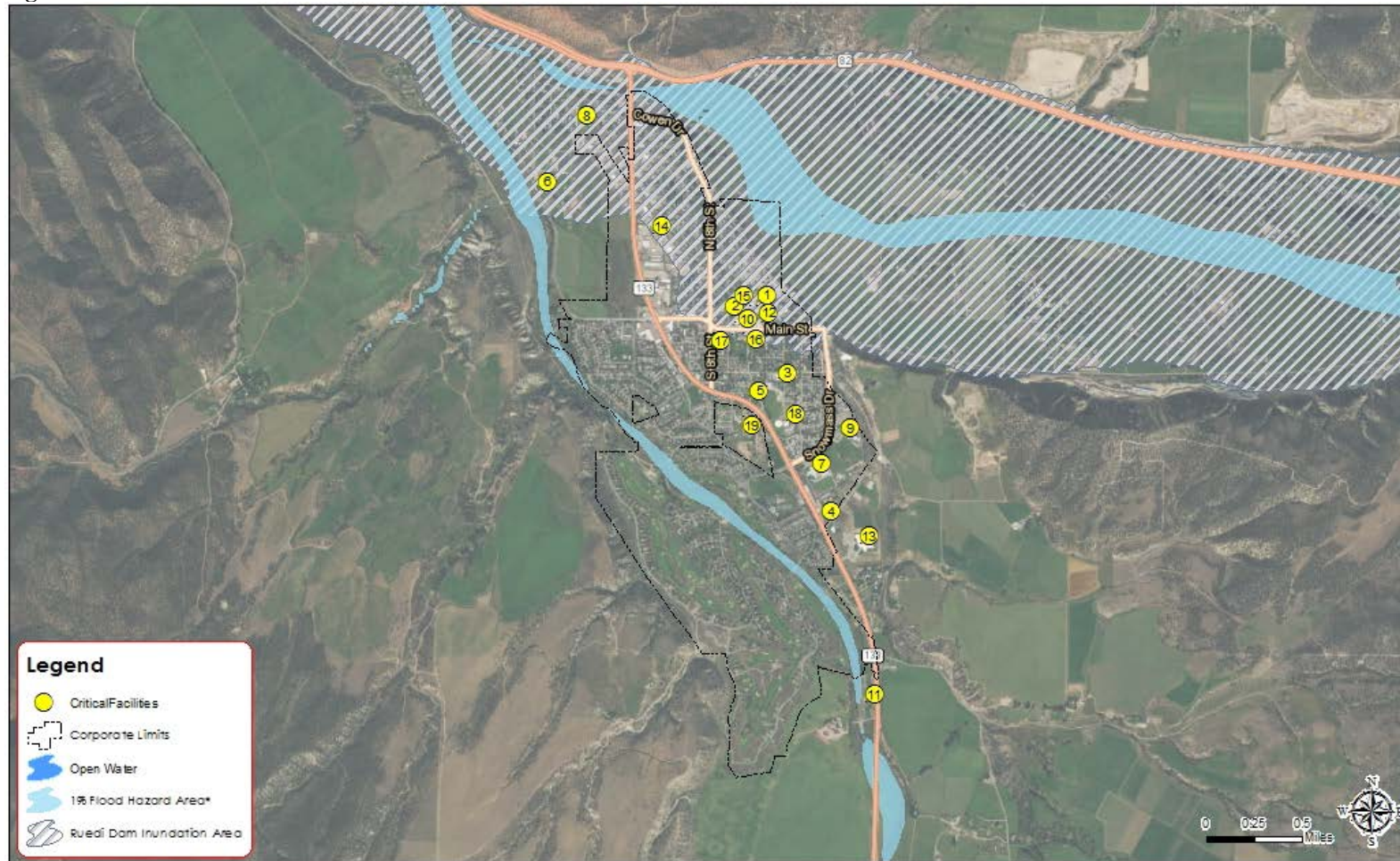
Critical facilities and infrastructure

Each participating jurisdiction identified critical facilities vital for disaster response, providing shelter to the public, and essential for returning the jurisdiction's functions to normal during and after a disaster. Critical facilities were identified during the original planning process and updated by the local planning team as a part of this plan update. The following table and figure provide a summary of the critical facilities for Carbondale.

Table 1: Carbondale Critical Facilities

Number	Name	Floodplain	Dam Inundation	Wildfire Hazards	Geologic Hazards
1	Carbondale Town Hall	No	Yes	Low	None
2	Colorado Mountain College Lappala Center	No	Yes	Low	None
3	Carbondale Branch Library	No	No	Moderate	None
4	Carbondale & Rural Fire Protection District	No	No	Low	None
5	Bridges High School	No	No	Moderate	None
6	Colorado Rocky Mountain School	No	Yes	Low	None
7	Carbondale Middle School	No	No	Low	None
8	Carbondale Community School	No	Yes	Low	None
9	Crystal River Elementary School	No	No	Low	None
10	Carbondale Post Office	No	Yes	Low	None
11	Crystal River Fish Hatchery	No	No	Low	None
12	Carbondale Police	No	Yes	Low	None
13	Roaring Fork High School	No	No	Low	None
14	Carbondale Public Works	No	Yes	Low	None
15	Carbondale Recreation & Community Center	No	Yes	Low	None
16	US Forest Service	No	Yes	Low	None
17	Carbondale Municipal Pool	No	No	Low	None
18	Third Street Center	No	No	Low	None
19	Ross Montessori School	No	No	Low	None

Figure 2: Carbondale Critical Facilities



Carbondale, Colorado

2017 Hazard Mitigation Plan Critical Facilities

Created by: J.C.
Date: 4/20/17
Software: ArcGIS 10.4.1
File: 151951.DOC - Garfield County
HMP Update



This map was prepared using information from record drawings supplied by J.C. and/or other applicable city, county, federal or private sources. J.C. does not guarantee the accuracy of the map or the information used to prepare this map. This is not a scaled plan.

Historic and cultural resources

Carbondale is currently studying the feasibility of a Creative Arts District.

The West Elk Loop Scenic Byway travels through the Crystal River Valley connecting Crested, Butte, Gunnison, Montrose, and Carbondale. This route is one of Colorado's 25 scenic byways and is a draw for its historical significance, as well as the outdoor recreation opportunities.

Though not officially designated, the downtown district of Carbondale is historic in nature and offers amenities that draw locals and tourists to the downtown. The Town has several historic preservation ordinances to maintain the historic quality of this neighborhood.

Administrative structure

In 2002, voters approved the Town Charter and Carbondale became a Home Rule Municipality. Carbondale is guided by a 7-member Board of Trustees that consists of a mayor and six members, all with staggered four-year terms. The Board of Trustees is vested with policy making and legislative authority.

The Town has the following departments:

- Administration
- Building Department
- Finance
- Municipal Court
- Parks & Recreation
- Planning Department
- Police
- Public Works

Community organizations & programs

There are several community organizations and programs in Carbondale that could assist in implementing mitigation measures:

- Kiwanis Club
- Roaring Fork Conservancy
- Rotary Club
- Chamber of Commerce
- Homeowners Associations
- Neighborhood Watch Groups

Additionally, the City has established several boards and commissions to guide decision making and implementation of its programs and services:

- Bike, Pedestrian, and Trails Commission
- Board of Adjustment
- Board of Trustees
- Environmental Board
- Historic Preservation
- Parks & Recreation Commission
- Planning & Zoning Commission
- Public Arts Commission

Hazard Prioritization

This section expands on Garfield County's Natural Hazards Mitigation Plan by addressing Carbondale's unique risks to the following hazards:

- Wildfire
- Landslide, Mud/Debris Flow, Rockfall
- Drought
- Hazardous Materials
- Severe Wind
- Flood

Wildfire

Carbondale experiences a somewhat lower risk of wildfire than the County overall because the Town is surrounded by rivers and well-irrigated agricultural land. Due to that natural boundary, the Town serves as an evacuation location for other communities in Garfield County.

Mitigation success:

Some of the recent mitigation actions that the Town has taken include:

- The Town facilitated several community meetings to discuss wildfire mitigation with homeowners.
- Carbondale and the Carbondale Rural and Fire Protection District have a joint Emergency Operations Plan. This facilitates efficient response to hazards in the area.
- The Town of Carbondale implemented a permit system that allows homeowners along the Crystal River to remove vegetation to create a defensible wildfire zone along the riparian habitat.

Landslide, Mud/Debris Flow, Rockfall

The following geographic areas and related vulnerabilities experience local landslide and debris flow risk that is greater than the risk described in the County's Risk Assessment:

- The Highway 82 corridor runs through Carbondale. Highway 82 and Highway 133 are both critical transportation routes that are susceptible to landslides.
- Debris flows could endanger access to the Nettle Creek filtration plant. The road has washed out historically, and the distribution line may align in some areas with the section(s) of road that could wash out.

Mitigation success:

Some of the Town's recent mitigation actions include:

- In 2009, the Bowles Gulch debris channel was re-built and the debris basin was enlarged in the River Valley Ranch community.

Drought

The local planning team is primarily concerned with the potential impacts on water quality and quantity during extended drought periods. Carbondale has made several efforts to proactively address water quality/quantity issues within the community.

Mitigation success:

- Purchased additional capacity at Ruedi Reservoir for water supply redundancy.
- Utilized a raw water ditch system for irrigation.
- Completed Source Water Protection Plan in 2015.
- Completed Municipal Water Efficiency Plan in 2015.
- Piloted an early warning system for quantity and quality issues in water/wastewater system.

Hazardous Materials

Several hazardous materials transfer routes (most notably I-70 and the rail line) bisect the County; spills or accidents along these lines, which also run near the Colorado River, could result in contamination of the source of drinking water for many communities in the County. Of specific concern in Carbondale is the Amerigas site, which is a propane storage facility. The Grand Avenue Bridge was also identified as a location of concern.

Severe Wind

Past severe wind events have resulted in damages to the urban forest. Downed tree limbs can result in power outages and provide ladder fuel for wildfires.

Mitigation success:

- Generators are installed at water and wastewater facilities.
- Carbondale has arborists on staff and educates the public on proper tree maintenance.

Flood

In general, the County's Risk Assessment adequately describes the risk from flood within the areas surrounding the Town of Carbondale, given the data currently available. This includes impacts due to a catastrophic failure at the Ruedi Reservoir dam and the vulnerability of drinking water sources.

In Carbondale, a separate municipal district manages irrigation and storm water ditches.

Mitigation success:

- Carbondale Public Works has accomplished many culvert upgrades and improvements throughout the Town.
- Membrane Water Filtrations Plants - The Water/Wastewater Department operates three water plants with three differing treatment technologies utilized. The technologies used are membrane filtration, Mixed Media filtration and disinfection only on true ground water. Water production annual daily average is 1.1 gallons per day to 2.6 million gallons per day (mgd). The water system has treatment plant capacity of producing up to 4 mgd. The distribution system consists of 28 miles of pipe, one pump station, three storage tanks; the total storage capacity is 2.7 million gallons.
- Dry wells throughout Carbondale mitigate urban flooding problems.
- Prior to construction within any area of special flood hazard, a development plan must also be approved. Any construction must meet certain parameters in the zoning code. A special hazard zone is identified by FEMA in a report entitled "The Flood Insurance

Study” for the town dated February 5, 1986 and an accompanying flood insurance rate map.

Carbondale Public Works has developed redundancies in the water treatment and water well system to ensure that the resilience of this critical utility. Water sources are:

- Nettle Creek, located primarily in Pitkin County, is a primary gravity fed source into town mixed media filtration 2 mgd
- Crystal well (ground water) –secondary pumped source ground water, disinfection only 1 mgd
- Roaring Fork Wells (surface water under the influence of surface water) –secondary pumped source, membrane (Low Pressure Memcor CMF) 1 mgd

The National Flood Insurance Program (NFIP)

Carbondale participates in the NFIP by adopting and enforcing floodplain management ordinances to reduce future flood damage. In exchange, the NFIP makes federally-backed flood insurance available to homeowners, renters, and business owners in these communities. Preliminary Flood Insurance Study (FIS) Flood Insurance and Rate Maps (FIRM) are effective as of October 15, 1985. There are no repetitive loss properties in Carbondale.

Table 2: Carbondale NFIP Statistics

Jurisdiction	Policies In-Force	Total Coverage	Total Premiums	Closed Losses	Total Payments
Carbondale	9	\$3,150,000	\$3,719	0	N/A

Additional Concerns

Climate Change

Climate change is a significant concern to the Town of Carbondale. The local planning team has witnessed an intensification of hazard events over the years and climate change is likely the cause.

Climate change has the potential to have significant impacts on the community, the nearby ski resorts, and adjacent rivers. Specific concerns include impacts to the local economy, ecosystem, and water supply due to reduced snowpack and streamflow.

Vulnerable Populations

Carbondale has a few groups that may be more vulnerable during hazard events. The local planning team is concerned with the mobility of these groups in the event of an evacuation, as well as effective communication during a hazard event. These groups include:

- The elderly population in the senior care facilities
- Children in the several schools located in or near Carbondale
- The Spanish speaking population

Capability Assessment

Table 3: Carbondale Capability Assessment

Survey Components/Subcomponents		Yes/No
Planning & Regulatory Capability	Comprehensive Plan	Yes
	Capital Improvements Plan	Yes
	Economic Development Plan	Yes
	Emergency Operational Plan	Yes (County)
	Floodplain Management Plan	No
	Storm Water Management Plan	No – in development
	Zoning Ordinance	Yes
	Subdivision Regulation/Ordinance	Yes
	Floodplain Ordinance	Yes
	Building Codes	Yes
	National Flood Insurance Program	Yes
	Community Rating System	No
	Other (if any)	
Administrative & Technical Capability	Planning Commission	Yes
	Floodplain Administration	Yes
	GIS Capabilities	Yes
	Chief Building Official	Yes
	Civil Engineering	Yes
	Local Staff Who Can Assess Community's Vulnerability to Hazards	Yes
	Grant Manager	Yes
	Mutual Aid Agreement	Yes
	Other (if any)	
Fiscal Capability	Capital Improvement Plan/ 1 & 6 Year plan	Yes
	Applied for grants in the past	Yes
	Awarded a grant in the past	Yes
	Authority to Levy Taxes for Specific Purposes such as Mitigation Projects	Yes
	Gas/Electric Service Fees	Yes
	Storm Water Service Fees	Yes
	Water/Sewer Service Fees	Yes
	Development Impact Fees	Yes
	General Obligation Revenue or Special Tax Bonds	Yes
	Other (if any)	
Education & Outreach Capability	Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes

Survey Components/Subcomponents		Yes/No
	Ex. CERT Teams, Red Cross, etc.	
	Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes
	Natural Disaster or Safety related school programs	No
	StormReady Certification	No
	Firewise Communities Certification	No
	Tree City USA	Yes
	Other (if any)	
Overall Capability		Limited, Moderate, High
Does the jurisdiction have the financial resources needed to implement mitigation projects?		Moderate
Does the jurisdiction have the staff/expertise to implement projects?		Moderate
Does the jurisdiction have the community support to implement projects?		High
Does the jurisdiction have the time to devote to hazard mitigation?		Moderate

Plan Integration

The following provides a summary of the community planning mechanisms that were analyzed using guidance from FEMA's 2014 *Plan Integration Guide*.

The 2017 Climate Action Plan outlines strategies that work toward the goal of carbon neutrality. Strategies included in the plan, such as energy efficiency improvements and the installation of renewable energy systems, add to the overall resilience of Carbondale. The Climate Action Plan states that Carbondale must prepare for the future impacts of climate change.

The 2013 Carbondale Comprehensive Plan includes numerous strategies that support the goals of the hazard mitigation plan. These strategies include, but are not limited to:

- Identify key riparian areas for acquisition and conservation
- Develop river trails where terrain and access allow, that are carefully designed to support water quality through reductions in sedimentation and erosion
- Continue participating in regional watershed planning and projects
- Employ naturalized storm water treatment techniques such as naturalized detention, bio-swales, rain gardens, trees, terracing and porous pavements

The Town of Carbondale's Unified Development Code includes subsections devoted specifically to flood, geologic, and wildfire hazard areas. The Code limits development within these areas unless the developer can show the hazard impacts will be properly mitigated.

The Town of Carbondale's 2015 Source Water Protection Plan identifies potential risks to surface water and groundwater quality within the watershed, promotes management practices to

protect and enhance the drinking water supply, and provides for a comprehensive action plan in case of an emergency that threatens or disrupts the community water supply.

In 2015, Carbondale completed a Municipal Water Efficiency Plan that evaluates current water supplies, forecasts future water needs, and contains strategies to further water conservation.

The Water and Wastewater Master Plan provides Carbondale with a plan for required water and wastewater infrastructure improvements for the next 20 years. These improvements will reduce the impacts of future hazard events such as flooding and drought.

Crystal River Management Plan identifies the need for water conservation strategies to mitigate impacts during drought periods. The plan also identifies the need to limit development in the floodplain to reduce the impact on ecosystems.

The Town of Carbondale has several planning mechanisms that incorporate hazard mitigation. Carbondale will continue to incorporate mitigation into existing and future planning mechanisms as opportunities are identified in order to further the sustainability and resilience of the community.

Mitigation Action Items

Short and long-term action items identified through the planning process are an important part of the mitigation plan. Action items are detailed recommendations for activities that local departments, citizens and others could engage in to reduce risk.

New and Ongoing Actions:

Action and Description	Hazards Addressed	Goals	Estimated Cost	Potential Funding	Timeline	Priority	Lead Agency	Status
Underground Utilities: Install underground utilities throughout town, and upgrade and install fiber optic cables	All Hazards	3	\$2M per mile	Carbondale General Fund, 1 percent Funds from Holy Cross	Ongoing	High	Public Works	This is an ongoing effort of Carbondale Utilities and Public Works. Utilities are buried for new projects and existing utilities are buried as funds are available.
Improve Communication Systems: Improve communications among facilities controlled by various entities to facilitate response and recovery after an event	All Hazards	2,3	Varies by Project	Carbondale General Fund	Ongoing	High	Police, Town Manager	This is an ongoing effort. Building Code requires repeaters in each building. Every department is required to have smartphones for redundancy.
NFIP Participation: Continue compliance with the National Flood Insurance Program (NFIP) through the enforcement of local floodplain ordinances	Flooding	1,5	Staff Time	Carbondale General Fund	Ongoing	High	Floodplain Administrator	Carbondale is currently in good standing in the NFIP.
Assess Resilience of Treatment Plants: Assess the resilience of the wastewater treatment plant and water intake plants and develop improvements accordingly as part of the capital facilities plans for water and wastewater infrastructure	All Hazards	1	Varies by Project	Carbondale General Fund, Colorado Department of Public Health and Environment	Ongoing	Medium	Utilities	2016 Water and Wastewater Master Plan addresses the needs of the water and wastewater infrastructure. Implementation of these projects and continual improvements to these systems will be an ongoing effort.

Continuity of Operations Plan: Develop a Continuity of Operations Plan for the Town of Carbondale	All Hazards	1,2,3,4,5	\$15,000	Carbondale General Fund, Colorado DHSEM	2-4 years	Medium	Town Manager, Garfield County Emergency Manager	Carbondale has conducted several in-house trainings. However, a continuity of operations plan has not been developed.
Collaborate Mapping Efforts: Collaborate with regional, state, and federal agencies, and private industry to increase the extent of data available for hazard mapping, especially landslide and debris flow and wildfire hazards	All Hazards	1,2,3,4,5	Staff Time	Carbondale General Fund	Ongoing	Medium	Planning	Carbondale currently shares GIS data with Garfield County and other agencies. Collaboration with these agencies will be an ongoing effort.
Evaluate Property Loss along Crystal River: Evaluate historic and potential future property loss along Crystal River and its tributaries to determine whether mitigation or property acquisition is warranted	Flooding	2,5	Varies by project and property	Carbondale General Fund, FMA, CDHSEM	Ongoing	Medium	Floodplain Administrator, Planning Department. Supporting Agencies: Property Owners, Building Department, Utilities	Not yet started.
Dry Wells: Construct additional dry wells and other measures to mitigate surface water runoff	Flooding	5	\$500-\$5,000+ Depending on size	Carbondale General Fund	Ongoing	Medium	Public Works	Carbondale installs dry wells when funds are available.
Evaluate and Improve Bridges: Continue to evaluate and improve bridges in Carbondale in collaboration with CDOT and County	All Hazards	1,2	Unknown, depends on the project	Carbondale General Fund, CDOT	Ongoing	Low	Public Works, Town Manager	There are currently no problems with the two bridges within Carbondale. The city will continue the ongoing inspection of bridges.
Prevent Tree Damage: Continue to educate the	Severe Wind,	4,5	Staff Time	Carbondale General	Ongoing	Low	Public Works. Supporting	Carbondale has an arborist on staff and a tree board.

public about the role of proper tree pruning and stability in preventing damage during windstorms; continue to perform annual maintenance pruning on trees that are on town property	Winter Storms, Wildfire			Fund			Agencies: Contractors, property owners.	
Coordinate with Fire Protection District: Coordinate with Carbondale and Rural Fire Protection District to review development codes and improve opportunities to mitigate wildfires near residential communities	Wildfire	1,5	Staff Time	Carbondale General Fund	Ongoing	Low	Building Department. Supporting Agencies: Carbondale and Rural Fire Protection District.	Carbondale coordinated with Fire Protection District to complete an update to the fire code. Identifying opportunities for wildfire mitigation projects is an ongoing effort.

Completed Actions:

Action and Description	Hazards Addressed	Goals	Funding	Lead Agency	Status
Review Comprehensive Plans: Review Comprehensive Plan and development codes for opportunities to more effectively reduce risks to new development; integrate mitigation action items into updated comprehensive plan and zoning code and identify opportunities to integrate actions	All Hazards	1,5	Carbondale General Fund	Board of Trustees, Planning Commission	Carbondale updated their Comprehensive Plan in 2013 and their Unified Development Code in 2016.
Wildfire Mitigation Permitting: Implementing a permit system that will allow homeowners along the Crystal River the ability to remove vegetation to create a defensible wildfire zone along the riparian habitat	Wildfire	1,5	Carbondale General Fund	Building Department. Supporting Agencies: Carbondale and Rural Fire Protection District	Completed in 2013.

Removed Actions:

Action and Description	Hazards Addressed	Reason for Removal
72-Hour Kits: Continue to encourage citizens to prepare and maintain 72-hour kits	All Hazards	This action will be led by County Emergency Management.
Landslide Mitigation: Coordinate with CDOT on landslide mitigation along Highway 82 and 133	Landslides	Carbondale will continue to collaborate with CDOT on mitigation projects near the town. However, this effort will be led by CDOT.
Firewise: Implement Firewise Program	Wildfire	This action will be led by the Carbondale Rural and Fire Protection District.

Reduce Growth and Increase Health with Cambistat®

Fact Sheet

Slowing Growth for a Healthier Tree

Large trees add beauty, character, and value to the landscape, and they are highly desired by many homeowners. While it is appealing to think most trees in the landscape will eventually grow large and provide these benefits, this may not always be in the best interest of your tree and property.

There are two main reasons why:

1. The size of a mature tree is often underestimated, and many trees are planted too close to houses, garages, power lines, and other structures. This type of interference may cause damage to the property and require additional maintenance to correct.
2. Large trees require more water, minerals, and soil volume for roots than smaller trees, and these resources may not be available in sufficient quantity in smaller urban sites. If these resources are limited tree health will eventually suffer.

What does Cambistat do?

Cambistat is a tree growth regulator that reduces canopy growth by 40-70% over a three year period. Reducing the amount of tree growth can help you:

- Safely maintain the visual appeal of the landscape.
- Reduce the amount of live wood pruning required.
- Prevent premature overcrowding of competing trees.
- Maintain a smaller, more appropriate tree size when there is a restricted root zone.
- Maintain vista views with less frequent pruning.
- Extend the time in between pruning events.
- Minimize intrusion by power companies.

Additional Cambistat Benefits

As a result of growth reduction, some favorable changes occur that enhance the durability of your tree to the stresses associated with living in an urban yard. These include:

- Stimulate fine root production
- Improve drought and heat resistance
- Higher tolerance to certain diseases

Slower Growing Trees

A common myth about trees is that a faster growing tree is healthier than a slower growing tree. The truth is that slower growing trees will outlive trees that grow faster, especially in situations such as yards where space and resources are limited. The chart below shows some important differences between a tree growing relatively faster or slower.



untreated

3 years after **treatment**

untreated

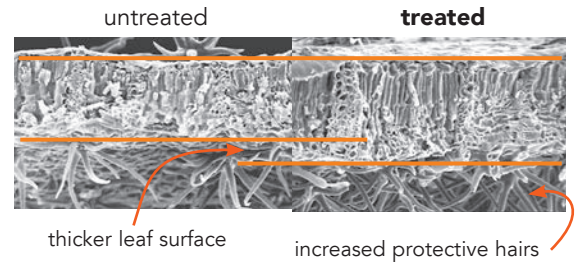
3 years after **treatment**

Research has shown Cambistat increases fine root density in trees

Cambistat Treated Tree



ATTACHMENT B



Slower Growth is Beneficial

Tree Characteristic	Tree Growth Rate Comparison	
	Faster Growth	Slower Growth
Resource Demand	Higher	Lower
Sensitivity to Resource Availability	Higher	Lower
Stored Energy Reserves	Lower	Higher
Root : Shoot Ratio	Lower	Higher
Sensitivity to Stress or Damage	More Sensitive	Less Sensitive
Overall Tree Durability	Less Durable	More Durable

An Integrated Approach

When caring for urban trees it is important to make a thorough evaluation of the site to accurately diagnose all stressing agents and tailor your recommendation to the specific circumstances. These must be dealt with so that your tree can live to its fullest potential. Utilize your arborist for a comprehensive maintenance program.

Benefits of Cambistat for Urban Trees

Cambistat is a soil applied product that is absorbed through the roots. Cambistat gently slows the growth of trees, allowing the tree to redirect some of its energy from canopy growth to defense chemicals, fibrous root production, and other uses. The resulting reallocation of energy makes your tree healthier and more durable.

Drought is a major cause of tree death and decline in the urban landscape. Research shows Cambistat increases drought resistance by helping the tree reduce water losses during dry, hot periods.

Cambistat changes some important physical traits of leaves. Leaves of treated trees tend to be greener (higher concentrations of chlorophyll) than untreated and have an enhanced protective barrier (thicker leaf surface and denser surface hairs).



1989 treated



1994



2001





1111 Village Road Carbondale, CO 81623

June 06, 2017

Town of Carbondale

511 Colorado Avenue
Carbondale, CO 81623

Job Site

Various Locations
Carbondale, CO 81623

Proposed By: Jennifer Grimes
Job Name: Town of Carbondale Linden
Cambistat 2017

PROPOSAL

We have thoroughly reviewed your property and recommend the following Plant Health Care services.

#	Item	Description	Cost
1	Linden	Tree Growth Regulator All linden trees on Main Street from Weant to 3rd St, North and South Side. Soil drench of a plant growth regulator to reduce growth by 30%-70% over a three year period. In addition to growth reduction, this application is useful in treating root damaged trees, slowing the decline of large specimens, increasing drought tolerance and improving health and color of trees growing in stressful environments.	\$620.00
Sub Total:			\$620.00
Tax:			\$0.00
Total:			\$620.00

Notes:

If you would like these services scheduled, please sign and return this signed proposal by fax, postal service, or email to office@myaspentree.com.

Commercial Applicators are licensed through the Colorado Department of Agriculture. Aspen Tree Service cannot be responsible for damage to any unmarked underground utilities, including irrigation lines as a result of our soil injection services. Customer agrees to indemnify and hold harmless ATS for any damage to property or person caused by tree or limb failure, not directly related to work being performed by ATS and their employees.

Upon signing, the customer warrants that all trees, plant material and property upon which work is to be performed are either owned by the customer or that written permission will be obtained from the owner, ATS is to be held harmless from all claims for damages resulting from the customer's failure to obtain such permissions.

Customer Signature

Date