

# COTTONWOOD HEIGHTS

## RESOLUTION 2015-48

### A RESOLUTION ADOPTING A NATURAL HAZARD MITIGATION PLAN

**WHEREAS**, each year in the United States, natural disasters such as earthquakes, tornados, hurricanes, floods, landslides, avalanches, and forest or range fires (collectively, "*natural disasters*") kill hundreds and injure thousands of people and cause billions of dollars in property damage; and

**WHEREAS**, the future occurrence of natural disasters could have a material, adverse effect on the health, safety and welfare of the residents of the city of Cottonwood Heights (the "*City*"); and

**WHEREAS**, many natural disasters are predictable, and much of the damage caused by such events can be alleviated or even eliminated through natural hazard mitigation planning, which is the process by which natural hazards that threaten communities are identified, the likely impacts of those hazards are determined, and appropriate strategies to lessen those impacts are identified, prioritized and implemented; and

**WHEREAS**, the City desires to protect the persons and property of City residents from the adverse impacts of natural disasters to the extent reasonably possible, and therefore has developed a natural hazard mitigation plan (the "*Plan*") which identifies relevant natural hazards and risks as well as the strategy the City will use to decrease its--and its residents'--vulnerability and increase its, and their, resiliency and sustainability; and

**WHEREAS**, the City's municipal council (the "*Council*") met on 28 July 2015 to consider, among other things, approving, adopting and implementing the Plan; and

**WHEREAS**, the Council has reviewed the Plan, a copy of which is attached to this resolution; and

**WHEREAS**, after careful consideration, the Council has determined that it is in the best interests of the health, safety and welfare of the City's residents to approve, adopt and implement the Plan as proposed;

**WHEREAS**, after careful consideration of the Plan and the recommendations of City's staff and advisors, the Council has determined that it is in the best interest of the health, safety and welfare of the City's residents to so approve, adopt and implement the Plan;

**NOW, THEREFORE, BE IT RESOLVED** by the city council of the city of Cottonwood Heights that the Council hereby approves, adopts and implements the Plan as proposed, pending any future amendment to or revocation of the Plan; and be it

**FURTHER RESOLVED** that all actions of the officers, agents and employees of the City that are in conformity with the purpose and intent of this resolution, whether taken before or after the adoption hereof, are hereby ratified, confirmed and approved.

This resolution, assigned no. 2015-48, shall take effect immediately upon passage and posting, or such later date as may be required by Utah statute.

**PASSED AND APPROVED** this 28<sup>th</sup> day of July 2015.



ATTEST:

COTTONWOOD HEIGHTS CITY COUNCIL

By: Kory Solonio  
Kory Solonio, Recorder

By: J. Scott Bracken  
J. Scott Bracken, Mayor Pro Tempore

VOTING:

Kelvyn H. Cullimore, Jr	Yea	<input type="checkbox"/>	Nay	<input type="checkbox"/>
Michael L. Shelton	Yea	<input checked="" type="checkbox"/>	Nay	<input type="checkbox"/>
J. Scott Bracken	Yea	<input checked="" type="checkbox"/>	Nay	<input type="checkbox"/>
Michael J. Peterson	Yea	<input checked="" type="checkbox"/>	Nay	<input type="checkbox"/>
Tee W. Tyler	Yea	<input checked="" type="checkbox"/>	Nay	<input type="checkbox"/>

DEPOSITED in the office of the City Recorder this 28<sup>th</sup> day of July 2015.

RECORDED this 2<sup>nd</sup> day of July 2015.



**Annex C:**  
**Cottonwood Heights**  
**Hazard Mitigation Plan**  
**October 2014**

---

Developed in compliance with the Disaster Mitigation Act of 2000

## Executive Summary

---

The purpose of hazard mitigation and this plan is to reduce or eliminate long-term risk to people and property from natural hazards and their effects in Cottonwood Heights, Utah. This plan has been prepared to meet the Disaster Mitigation Act of 2000 (DMA 2000) requirements in order to maintain the city's eligibility for FEMA Pre-Disaster Mitigation (PDM) and Hazard Mitigation Grant Programs (HMGP).

The process followed a methodology prescribed by FEMA. It began with the formation of a Emergency Planning Committee (EPC) comprised of key city departments and stakeholder representatives. The planning process examined the recorded history of losses resulting from natural hazards, and analyzed the future risks posed to the city by these hazards. Cottonwood Heights is vulnerable to several natural hazards that are identified, profiled, and analyzed in the plan. Floods, wildfires, and severe weather are some of the hazards that can have a significant impact on the city.

The plan identifies several mitigation goals and objectives that are based on the results of the risk assessment. The plan includes specific actions that the city can implement over time to reduce future losses from hazards. The plan also includes a review of the city's current capabilities to reduce hazard impacts. This plan has been formally adopted by the Cottonwood Heights City Council and is required to be a minimum of every five years.

# Table of Contents

## Chapters

<b>1</b>	<b>Introduction.....</b>	<b>1.1</b>
1.1	Purpose.....	1.1
1.2	Background and Scope.....	1.1
1.3	Plan Organization.....	1.2
<b>2</b>	<b>Community Profile.....</b>	<b>2.1</b>
2.1	Geography and Climate .....	2.1
2.2	History.....	2.3
2.3	Economy .....	2.4
2.4	Demographics .....	2.4
<b>3</b>	<b>Planning Process.....</b>	<b>3.1</b>
3.1	Background on Mitigation Planning Cottonwood Heights.....	3.1
3.2	Local Government Participation .....	3.2
3.3	The Planning Process .....	3.3
3.3.1	Phase 1: Organize Resources .....	3.4
3.3.2	Phase 2: Assess Risks .....	3.10
3.3.3	Phase 3: Develop the Mitigation Plan.....	3.11
3.3.4	Phase 4: Implement the Plan and Monitor Progress .....	3.11
<b>4</b>	<b>Risk Assessment.....</b>	<b>4.1</b>
4.1	Identifying Hazards.....	4.2
4.2	Profiling Hazards .....	4.5
4.2.1	Avalanche .....	4.6
4.2.2	Dam Failure .....	4.7
4.2.3	Drought .....	4.11
4.2.4	Earthquakes .....	4.16
4.2.5	Floods.....	4.21
4.2.6	Human Health Hazards: Pandemic Flu .....	4.26
4.2.7	Human Health Hazards: West Nile Virus .....	4.27
4.2.8	Landslides and Rockfalls .....	4.28
4.2.9	Severe Weather: General .....	4.30
4.2.10	Severe Weather—Extreme Temperatures.....	4.30

4.2.20	Wildfire .....	4.34
4.3	Assessing Vulnerability .....	4.36
4.4	Assessing Capabilities .....	4.37
4.4.3	Hazard-Related Policies, Regulations and Codes .....	4.38
<b>5</b>	<b>Mitigation Strategy .....</b>	<b>5.1</b>
5.1	Mitigation Strategy: Overview .....	5.1
5.2	Goals and Objectives .....	5.2
5.3	Identification and Analysis of Mitigation Actions.....	5.3
5.3.1	Prioritization Process .....	5.4
5.4	Mitigation Action Plan.....	5.6
5.4.1	Progress on Previous Mitigation Actions .....	5.6
5.4.2	Continued Compliance with NFIP .....	5.8
5.4.3	Hazard Mitigation Action Plan .....	5.9
<b>6</b>	<b>Plan Adoption.....</b>	<b>6.1</b>
<b>7</b>	<b>Implementation and Maintenance.....</b>	<b>7.1</b>
7.1	Implementation .....	7.1
	7.1.1 Role of Emergency Planning Committee in Implementation and Maintenance .....	7.2
	7.2.1 Maintenance Schedule .....	7.3
	7.2.2 Maintenance Evaluation Process .....	7.3
	7.2.3 Incorporation into Existing Planning Mechanisms .....	7.4
	7.2.4 Continued Public Involvement .....	7.5

**Tables**

---

Table 2.1 Census 2010 Demographic Characteristics for Cottonwood Heights.....2.4  
Table 3.1 Schedule of Meetings.....3.6  
Table 4.1 City of Cottonwood Heights Hazard Identification Table .....4.3  
Table 4.35 Mitigation Capabilities Overview Matrix.....4.38

**Figures**

---

Figure 2.1 Cottonwood Heights Map.....2.2



# ANNEX C: COTTONWOOD HEIGHTS

## 1 Introduction

### 1.1 Purpose

The Cottonwood Heights Hazard Mitigation Plan demonstrates the city's commitment to reducing risks from hazards and serves as a tool to help decision makers direct mitigation activities and resources. This plan was also developed to make Cottonwood Heights eligible for certain federal disaster assistance, specifically, the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program (HMGP), Hazard Mitigation Assistance (HMA) grant program, and Pre-Disaster Mitigation (PDM) program.

### 1.2 Background and Scope

Each year in the United States, natural disasters take the lives of hundreds of people and injure thousands more. Nationwide, taxpayers pay billions of dollars annually to help communities, organizations, businesses, and individuals recover from disasters. These monies only partially reflect the true cost of disasters, because additional expenses to insurance companies and nongovernmental organizations are not reimbursed by tax dollars. Many natural disasters are predictable, and much of the damage caused by these events can be alleviated or even eliminated.

Hazard mitigation is defined by FEMA as "any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event." The results of a three-year, congressionally mandated independent study to assess future savings from mitigation activities provides evidence that mitigation activities are highly cost-effective. On average, each dollar spent on mitigation saves society an average of \$4 in avoided future losses in addition to saving lives and preventing injuries (National Institute of Building Science Multi-Hazard Mitigation Council 2005).

Hazard mitigation planning is the process through which natural hazards that threaten communities are identified, likely impacts of those hazards are determined, mitigation goals are set, and appropriate strategies to lessen impacts are determined, prioritized, and implemented. This plan documents Cottonwood Heights' natural hazards mitigation planning process, identifies relevant natural hazards and risks, and identifies the strategy the city will use to decrease its vulnerability and increase its resiliency and sustainability.

The Cottonwood Heights Multi-Hazard Mitigation Plan documents the city's natural hazards mitigation planning process, identifies natural hazards and associated risks to the city, and develops a hazards mitigation strategy to lessen vulnerability and improve resiliency to natural disasters, thereby enhancing the city's long-term sustainability.

The city prepared this multi-hazard mitigation plan pursuant to the requirements of the Disaster Mitigation Act of 2000 (Public Law 106-390) and the implementing regulations set forth by the Interim Final Rule published in the Federal Register on February 26, 2002 (44 CFR §201.6), finalized on October 31, 2007, and d in 2014. Hereafter, these requirements and regulations will be referred to collectively as the DMA. While the act emphasized the need for mitigation plans and more coordinated mitigation planning and implementation efforts, the regulations established the requirements that local hazard mitigation plans must meet in order for a local jurisdiction to be eligible for certain federal disaster assistance and hazard mitigation funding under the Robert T. Stafford Disaster Relief and Emergency Act (Public Law 93-288). Because Cottonwood Heights is subject to many kinds of natural hazards, access to these programs is vital.

This plan addresses natural hazards only. Although the Emergency Planning Committee (EPC) recognizes that FEMA encourages communities to address manmade and technological as well as natural hazards, the scope of this effort was limited to natural hazards.

Information in this plan will be used to help guide and coordinate mitigation activities and decisions for local land use policy in the future. Proactive mitigation planning will help reduce the cost of disaster response and recovery to the city and its property owners by protecting critical community facilities, reducing liability exposure, and minimizing overall community impacts and disruption.

## 1.3 Plan Organization

The Cottonwood Heights Multi-Hazard Mitigation Plan is organized as follows:

- Chapter 1: Introduction
- Chapter 2: Community Profile
- Chapter 3: Planning Process
- Chapter 4: Risk Assessment
- Chapter 5: Mitigation Strategy
- Chapter 6: Plan Adoption
- Chapter 7: Plan Implementation and Maintenance

## 2 Community Profile

---

Cottonwood Heights, is located on the southeast side of the Salt Lake Valley. It is a home-rule municipality with a council-manager form of government. The elected City Council, which consists of the mayor and four council members, sets the policies for the operation of the city government and appoints the city manager, who is tasked with the administrative responsibilities of the city.

### 2.1 Geography and Climate

At an elevation of 4,900 feet above sea level, the city is located along the foothills of the Wasatch Mountains.

The climate is generally semiarid with a series of extremes occurring throughout the winter and summer seasons. Most precipitation occurs during the winter and spring months with an average annual precipitation of 9 inches of rain and 48.4 inches of snow. In winter, temperatures can plunge to minus 10°F. Winter also brings snowstorms that regularly result in a foot or more of snow

In summer, temperatures can be in the upper 90s. These hot temperatures are moderated by low humidity that can drop into the single digits at times.



Figure 2.1 City of Cottonwood Heights

## 2.2 History

Big Cottonwood Canyon was the main source of logs and lumber for the homes of the pioneers in the Salt Lake Valley, and this area became an overnight stopping point for the lumber wagons. The area also became an overnight stop for the wagons bringing granite out of Little Cottonwood Canyon for the building of the Salt Lake Temple and many other buildings. Soon there was a store, post office, brewery and tavern along Big Cottonwood Creek near the place where the Old Mill stands today.

Among the earliest settlers of the area were six colorful brothers, the “Butler Brothers” who were lumbermen – complete with wagons, teams and sawmills. There were also four McGhie brothers and their families. Legend has it that they called a town meeting to organize their community and there was one more Butler than McGhie at the meeting, therefore the community was named “Butler” rather than “McGhie”. Natives differ on this name; some say it was named “Butlerville” and other say the “ville” was just a nickname. Officially the area is called “Cottonwood Heights” by Salt Lake County, but it is still called Butler or Butlerville by some.

Lumber wasn't the only natural resource taken out of the canyon. Millions of dollars worth of gold, lead and silver have been mined. Underground water, the high cost of production and diminishing veins all contributed to the closure of the mines. The communities in the canyons are flourishing today as recreation areas. Picnic and camp areas abound.

The Butler region has been a fine area for fruit growing as well as dairy feed. There was also some poultry and (later) mink farming. These have almost entirely given way to homes and families.

One of the highlights of this area's history was the Deseret Paper Mill – the “Old Mill” situated along Big Cottonwood Creek about a mile below the mouth of the canyon. It was built in 1861 to make paper for the Deseret News. The paper was made with wood pulp taken from the canyons and rags gathered by families in the valley.

One area of Cottonwood Heights is located on a large sandbar left over from the ancient Lake Bonneville that filled the Salt Lake Valley centuries ago. It is located between the two most majestic features along the Wasatch Front – Big and Little Cottonwood Canyons. This sandbar rises hundreds of feet above the valley floor. On the North it tapers gently to the valley floor allowing a gradual, nearly nondescript access from the lower to the higher ground.

Because it was high and very dry, the earliest settlements in the area were located along the Little Cottonwood Creek, which lay well below the South and West bluff sides. It was along this creek that the old Union Fort was built to accommodate the first day's travel for wagons carrying block from the quarry in Little Cottonwood Canyon to build the Salt Lake Temple.

Since water is always critical to the development of an area, the top flatland of the sandbar was too dry and desolate to attract settlers. And while the Little Cottonwood creek was the closest, it was also the least available because of the high bluff. It was apparently this problem that earned this particular portion of Cottonwood Heights its first name – “Poverty Flats.” Water was then brought

from Big Cottonwood creek down from the mouth of the canyon to enable farms and orchards to be established. Early settlers established small farms producing hay, wheat and a variety of vegetable crops. Yet, the area was most widely known for its fruit production.

While the name “Poverty Flats” continues, the undaunted families who settled here went on to produce an inordinate number of college graduates in law, business, medicine, engineering and education. The name was changed from Poverty Flats to Butlerville and then changed when the area became a part of a larger community now known as Cottonwood Heights.

Our neighborhood is in a highly unique location. We have ready access to medical facilities, fire, police and a vast variety of business establishments. We can readily access the freeway system, the major ski resorts and we are only about 15 to 20 minutes away from major events and destinations anywhere in the valley.

## 2.3 Economy

The City serves as a sub-regional market to the Greater Salt Lake Metropolitan area, providing class A office, world-class outdoor, recreational amenities and well-established residential neighborhoods.

Currently, the City’s five largest employers are Blue Cross & Blue Shield (Finance and Insurance), Home Depot (Retail Trade), Jet Blue (Leisure & Hospitality), Canyons School District (Educational Services), Overstock.com (Retail Trade), and Target (Retail Trade). The City has a high concentration of office parks with limited industry users. As with many other communities in Salt Lake County, the City has not been immune from the effects of the domestic and international economic slowdown. Economic development in the City has been very active in recent years but still struggles in the highly competitive recruitment of some major businesses.

# 2.4 Demographics

According to the U.S. Census Bureau, Cottonwood Heights 2010 population was estimated at 34,017.

<b>Demographic</b>	
<b>Gender/Age</b>	
Male	48.9%
Female	51.1%
Under 5 years	4%
65 years and over	9.9%
<b>Race</b>	
White	94.0%
Black or African American	0.7%
American Indian and Alaska native	0.3%
Asian	2.3%
Native Hawaiian or Pacific Islander	1.1%
Other	3.2%
Two or more races	2.6%
<b>Other</b>	
Average household size	2.92
Population with a disability	4.8%
Median family income, 2010	\$70,083
Per capita income, 2010	\$26,935
Families below poverty level, 2010	3.9%
Individuals below poverty level, 2010	21.1%
Median home value	\$391,300

Source: U.S. Census Bureau, 2010

Table 2.1. Census 2010 Demographic Characteristics for Cottonwood Heights

## 3 Planning Process

Requirements §201.6(b) and §201.6(c)(1):

An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

- 1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
- 2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia, and other private and nonprofit interests to be involved in the planning process; and
- 3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

[The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

### 3.1 Background

#### Mitigation Planning in Cottonwood Heights

The planning process and development of Cottonwood Heights Multi-Hazard Mitigation Plan has its roots in meetings and activities that began in 2005 and continues today.

### 3.2 Local Government Participation

The DMA planning regulations and guidance stress that each local government seeking FEMA approval of their mitigation plan must participate in the planning effort in the following ways:

Participate in the process,

Detail areas within the planning area where the risk differs from that facing the entire area, identify specific projects to be eligible for funding, and have the governing board formally adopt the plan.

For Cottonwood Heights EPC members, "participation" meant:

Attending and participating in the EPC meetings, providing available data requested of the EPC, reviewing and providing comments on the plan drafts, advertising, coordinating, and participating in the public input process.

## 3.3 The Planning Process

The planning process for Cottonwood Heights plan used the DMA planning requirements and FEMA's guidance. This guidance is structured around a four-phase process:

- Organize Resources
- Assess Risks
- Develop the Mitigation Plan
- Implement the Plan and Monitor Progress

### 3.3.1 Phase 1: Organize Resources

#### **Planning Step 1: Organize the Planning Effort**

Cottonwood Heights commitment to participate in the DMA planning process, resulted in the establishment of a team approach for development of the plan. The EPC, which was comprised of key city, county, and other local government and stakeholder representatives, developed the plan with leadership from the city's emergency manager. The list of participating EPC individuals is provided below:

#### City Staff

- Communications Specialist Emergency Management
- Finance
- Information Technology/Geographic Information Systems
- Emergency Management
- Planning - Engineering
- Police Department
- Public Works

#### Other Government and Stakeholder Representatives:

- American Red Cross
- Salt Lake County Office of Emergency Management
- Salt Lake Valley Cities and Towns
- Salt Lake County Public Health

During the planning process, the EPC communicated through face-to-face meetings, e-mail, and a file transfer protocol (FTP) site with participating agencies. Draft documents were posted on this FTP site so that the EPC members could easily access and review them.

#### **Planning Step 2: Involve the Public**

At the kick-off meeting, the EPC discussed options for public involvement and agreed to an approach using established public information mechanisms and resources within the community. Early in the process a Public Participation Plan (PPP) was developed. The purpose of the PPP was to outline the public participation requirements of the DMA and CRS program and identify ways to best engage the public.

### **Planning Step 3: Coordinate with Other Departments and Agencies**

Early in the planning process, the EPC determined that data collection, mitigation strategy development, and plan approval would be greatly enhanced by inviting state and federal agencies and organizations to participate in the process. Based on their involvement in hazard mitigation planning, their landowner status in the county, and/or their interest as a neighboring jurisdiction, representatives from the following agencies were invited to participate on the EPC:

American Red Cross  
FEMA Region VIII

### **Other Community Planning Efforts and Hazard Mitigation Activities**

Hazard mitigation planning involves identifying existing policies, tools, and actions that will reduce a community's risk and vulnerability from natural hazards. As such, this plan was coordinated with, and builds off of, other related planning efforts that help reduce hazard losses. Cottonwood Heights uses a variety of comprehensive planning mechanisms, such as a master plan, an emergency response plan, and city policies, to guide growth and development. Integrating existing planning efforts and mitigation policies and action strategies into this multi-hazard mitigation plan establishes a credible and comprehensive plan that ties into and supports other community programs.

Other documents were reviewed and considered, as appropriate, during the collection of data to support.

## **3.3.2 Phase 2: Assess Risks**

Salt Lake County led the EPC in a comprehensive research effort to identify and document all the natural hazards that have, or could, impact the city. Where data permitted, geographic information systems (GIS) were used to display, analyze, and quantify hazards and vulnerabilities. The EPC also completed a mitigation capability assessment to review and document the city's current capabilities to mitigate risk and reduce vulnerability from natural hazards. By collecting information about existing government programs, policies, regulations, ordinances, and emergency plans, the EPC can assess those activities and measures already in place that contribute to mitigating some of the risks and vulnerabilities previously identified

---

### **3.3.3 Phase 3: Develop the Mitigation Plan**

Salt Lake County facilitated brainstorming and discussion sessions with the EPC that described the purpose and the process of developing planning goals and objectives, a comprehensive range of mitigation alternatives, and a method of selecting and defending recommended mitigation actions using a series of selection criteria. This information is included in Chapter 5: Mitigation Strategy.

Based on input from the EPC regarding the draft risk assessment and the goals and activities identified in Planning Steps 6 and 7, Salt Lake County produced a complete draft of the plan. This draft was posted for EPC review and comment on the FTP site. Other agencies were invited to comment on this draft as well. EPC and agency comments were integrated into the draft, which was distributed to collect public input and comments.

### **3.3.4 Phase 4: Implement the Plan and Monitor Progress**

In order to secure buy-in and officially implement the plan, the plan was adopted by the Cottonwood Heights City Council by resolution.

The true worth of any mitigation plan is in the effectiveness of its implementation. Up to this point in the process, all of the EPC's efforts have been directed at researching data, coordinating input from participating entities, and developing appropriate mitigation actions. Each recommended action includes key descriptors, such as a lead manager and possible funding sources, to help initiate implementation. An overall implementation strategy is described in Chapter 7: Plan Implementation and Maintenance.

Finally, there are numerous organizations within the city whose goals and interests interface with hazard mitigation. Coordination with these other planning efforts is paramount to the ongoing success of this plan and mitigation in Cottonwood Heights and is addressed further in Chapter 7. A plan and maintenance schedule and a strategy for continued public involvement are also included in Chapter 7.

## 4 Risk Assessment

Requirement §201.6(c)(2): [The risk assessment shall provide the] factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.

Risk, as defined by the Federal Emergency Management Agency (FEMA), is a combination of hazard, vulnerability, and exposure. -It is the impact that a hazard would have on people, services, facilities, and structures in a community and refers to the likelihood of a hazard event resulting in an adverse condition that causes injury or damage.

The risk assessment process identifies and profiles relevant hazards and assesses the exposure of lives, property, and infrastructure to these hazards. The process allows for a better understanding of a jurisdiction's potential risk to natural hazards and provides a framework for developing and prioritizing mitigation actions to reduce risk from future hazard events.

This risk assessment followed the methodology described in the FEMA publication *Understanding Your Risks—Identifying Hazards and Estimating Losses* (FEMA 386-2, 2002), which breaks the assessment down to a four-step process:

- 1) Identify Hazards
- 2) Profile Hazard Events
- 3) Inventory Assets
- 4) Estimate Losses

Data collected through this process has been incorporated into the following sections of this chapter:

***Section 4.1: Identifying Hazards*** identifies the hazards that threaten the planning area and describes why some hazards have been omitted from further consideration.

***Section 4.2: Profiling Hazards*** discusses the threat to the planning area and describes previous occurrences of hazard events and the likelihood of future occurrences.

***Section 4.3: Assessing Vulnerability*** assesses the city's total exposure to natural hazards, considering assets at risk, critical facilities, and future development trends.

While not required by FEMA, the Emergency Planning Committee (EPC) also conducted a mitigation capability assessment, which inventoried existing mitigation activities and existing

policies, regulations, and plans that pertain to mitigation and can affect net vulnerability. The findings from this undertaking are in [Section 4.4: Mitigation Capabilities Assessment](#).

## 4.1 Identifying Hazards

Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the type...of all natural hazards that can affect the jurisdiction.

The EPC conducted a hazard identification study to determine the hazards that threaten the planning area.

### Methodology

Using existing natural hazards data and input gained through planning meetings, the EPC agreed upon a list of natural hazards that could affect Cottonwood Heights. Significance of each hazard was measured in general terms and focused on key criteria such as frequency and resulting damage, which includes deaths and injuries and property and economic damage. The natural hazards evaluated as part of this plan include those that have occurred historically or have the potential to cause significant human and/or monetary losses in the future.

### Hazards Matrix

Completed By: Larry Gardner Date: 06/26/2013

Jurisdiction: Cottonwood Heights

Hazard	Location (Geographic Area Affected)	Magnitude, Strength (Maximum Probable Extent)	Probability of Future Events	Overall Significance
Avalanche	Negligible	Weak	Unlikely	Low
Dam Failure	Negligible	Weak	Unlikely	Low
Drought	Extensive	Weak	Occasional	Low
Earthquake	Extensive	Severe	Unpredictable	High
Flood	Negligible	Moderate	Occasional	Low

Infestation				
Landslide	Negligible	Moderate	Unlikely	Low
Pandemic	Negligible	Weak	Unlikely	Low
Problem Soils	Negligible	Weak	Unlikely	Low
Radon				
Severe Weather	Significant	Moderate	Likely	Moderate
Wildfire	Negligible	Moderate	Occasional	Low

Table 4.1. Cottonwood Heights Hazard Matrix

## Definitions for Classifications

### Location (Geographic Area Affected)

- **Negligible:** Less than 10 percent of planning area or isolated single-point occurrences
- **Limited:** 10 to 25 percent of the planning area or limited single-point occurrences
- **Significant:** 25 to 75 percent of planning area or frequent single-point occurrences
- **Extensive:** 75 to 100 percent of planning area or consistent single-point occurrences

### Maximum Probable Extent (Magnitude/Strength based on historic events or future probability)

- **Weak:** Limited classification on scientific scale, slow speed of onset or short duration of event, resulting in little to no damage
- **Moderate:** Moderate classification on scientific scale, moderate speed of onset or moderate duration of event, resulting in some damage and loss of services for days
- **Severe:** Severe classification on scientific scale, fast speed of onset or long duration of event, resulting in devastating damage and loss of services for weeks or months
- **Extreme:** Extreme classification on scientific scale, immediate onset or extended duration of event, resulting in catastrophic damage and uninhabitable conditions

## Examples

Hazard	Scale/Index	Weak	Moderate	Severe	Extreme
Drought	Palmer Drought Severity Index	-1.99 to 1.99	-2.00 to -2.99	-3.00 to -3.99	-4.00 and below

Earthquake	Modified Mercalli Scale	I to IV	V to VII	VIII	IX to XII
	Richter Magnitude	2,3	4,5	6	7,8
Tornado	Fujita Tornado Damage Scale	F0	F1, F2	F3	F4, F5

**Probability of Future Events**

- **Unlikely:** Less than 1 percent probability of occurrence in the next year or a recurrence interval of greater than every 100 years.
- **Occasional:** 1 to 10 percent probability of occurrence in the next year or a recurrence interval of 11 to 100 years.
- **Likely:** 10 to 90 percent probability of occurrence in the next year or a recurrence interval of 1 to 10 years
- **Highly Likely:** 90 to 100 percent probability of occurrence in the next year or a recurrence interval of less than 1 year.

**Overall Significance**

- **Low:** Two or more criteria fall in lower classifications or the event has a minimal impact on the planning area. This rating is sometimes used for hazards with a minimal or unknown record of occurrences or for hazards with minimal mitigation potential.
- **Moderate:** The criteria fall mostly in the middle ranges of classifications and the event’s impacts on the planning area are noticeable but not devastating. This rating is sometimes used for hazards with a high extent rating but very low probability rating.
- **High:** The criteria consistently fall in the high classifications and the event is likely/highly likely to occur with severe strength over a significant to extensive portion of the planning area.

## 4.2 Profiling Hazards

Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the...location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

For each hazard, a generic description of the hazard and associated problems is provided along with details specific to Salt Lake County and Cottonwood Heights. Information on past

occurrences and the extent or location of the hazard within or near the city and impacts, where known, are also discussed here. To assess the history of natural hazard events in Cottonwood Heights, the EPC evaluated the hazards history for both the city and county. Much of the existing data and statistics are maintained on a countywide basis; therefore, the EPC relied heavily on Salt Lake County data.

The frequency of past events was used to gauge the likelihood of future occurrences. Based on historical data, the frequency of occurrence is categorized into the following classifications:

**Highly Likely**—Near 100 percent chance of occurrence in next year or happens every year. **Likely**—Between 10 and 100 percent chance of occurrence in next year or has a recurrence interval of 10 years or less.

**Occasional**—Between 1 and 10 percent chance of occurrence in the next year or has a recurrence interval of 11 to 100 years.

**Unlikely**—Less than 1 percent chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years.

Where possible, frequency was calculated based on existing data. It was determined by dividing the number of events observed by the number of years and multiplying by 100. This gives the percent chance of the event happening in any given year (e.g., three droughts over a 30-year period equates to a 10 percent chance of a experiencing a drought in any given year).

The following sections provide profiles of the natural hazards that the EPC identified in **Section 4.1: Identifying Hazards**.

## 4.2.1 Avalanche

### **Hazard/Problem Description**

Avalanche hazards occur predominantly in the mountainous regions of Utah. The vast majority of avalanches occur during and shortly after winter storms. Avalanches occur when loading of new snow increases stress at a rate faster than strength develops, and the slope fails. Critical stresses develop more quickly on steeper slopes and where deposition of wind-transported snow is common.

Historically in Utah, avalanches have occurred during the winter and spring months between November and April. The avalanche danger increases with major snowstorms and periods of thaw. The most avalanche-prone months are, in order, February, March, and January. Avalanches caused by thaw occur most often in April.

This hazard generally affects a small number of people, such as snowboarders, backcountry skiers, and climbers who venture into backcountry areas during or after winter storms. Motorists along highways are also at risk of injury and death due to avalanches. Road and highway closures, damaged structures, and destruction of forests are also a direct result of avalanches. Recognizing areas prone to avalanches is critical in determining the nature and type of development allowed in a given area.

Avalanche hazards exist in the canyons of Salt Lake County. The avalanche hazard extent within Cottonwood Heights city limits is considered negligible.

### **Past Occurrences**

There is no history of avalanches in Cottonwood Heights.

### **Likelihood of Future Occurrences**

**Unlikely:** There is no recorded history of avalanches occurring within city limits. Except within limited areas, the topography of the city is well below the slopes of 25-50 degrees on which data indicate that 98 percent of all avalanches occur.

## **4.2.2 Dam Failure**

### **Hazard/Problem Description**

Dams are manmade structures built for a variety of uses, including flood protection, power, agriculture, water supply, and recreation. Dams typically are constructed of earth, rock, concrete, or mine tailings. Factors that influence the potential severity of a full or partial dam failure are the amount of water impounded and the density, type, and value of development and infrastructure located downstream.

Dam failures can result from any one or a combination of the following causes:

- Prolonged periods of rainfall and flooding, which result in overtopping
- Earthquake
- Inadequate spillway capacity resulting in excess overtopping flows
- Internal erosion caused by embankment or foundation leakage or piping or rodent activity
- Improper design Improper maintenance Negligent operation
- Failure of upstream dams on the same waterway

Overtopping is the primary cause of earthen dam failure.

Water released by a failed dam generates tremendous energy and can cause a flood that is catastrophic to life and property. A catastrophic dam failure could challenge local response

capabilities and require evacuations to save lives. Impacts to life safety will depend on the warning time and the resources available to notify and evacuate the public. Major loss of life could result as well as potentially catastrophic effects to roads, bridges, and homes. Associated water quality and health concerns could also be an issue.

In general, there are three types of dams: concrete arch or hydraulic fill, earth-rockfill, and concrete gravity. Each type of dam has different failure characteristics. A concrete arch or hydraulic fill dam can fail almost instantaneously: the flood wave builds up rapidly to a peak then gradually declines. An earth-rockfill dam fails gradually due to erosion of the breach: a flood wave will build gradually to a peak and then decline until the reservoir is empty. And, a concrete gravity dam can fail instantaneously or gradually with a corresponding buildup and decline of the flood wave.

#### Past Occurrences

According to historical data, there have been no dam failures in Cottonwood Heights

#### Likelihood of Future Occurrences

**Unlikely:** Based on historical data indicating that there have been no dam failures in the past that adversely impacted Cottonwood Heights, the risk of future occurrences is unlikely.

### 4.2.3 Drought

#### **Hazard/Problem Description**

Drought is a gradual phenomenon. Although droughts are sometimes characterized as emergencies, they differ from typical emergency events. Most natural disasters, such as floods or forest fires, occur relatively rapidly and afford little time for preparing for disaster response. Droughts occur slowly, over a multi-year period, and it is often not obvious or easy to quantify when a drought begins and ends.

#### Past Occurrences

Cottonwood Heights is susceptible to severe drought conditions. Historically the city as well as the county and region have experienced drought conditions.

#### Likelihood of Future Occurrences

**Likely:** According to historical data, Cottonwood Heights has experienced several periods of drought.

Given the geographic location of the planning area, it is highly probable the city will experience future drought condition.

### 4.2.4 Earthquakes

#### Hazard/Profile Description

An earthquake is caused by a sudden slip on a fault. Stresses in the earth's outer layer push the sides of the fault together. Stress builds up and the rocks slip suddenly, releasing energy in waves that travel through the earth's crust and cause the shaking that is felt during an earthquake. The amount of energy released during an earthquake is usually expressed as a Richter magnitude and is measured directly from the earthquake as recorded on seismographs. Another measure of earthquake severity is intensity. Intensity is an expression of the amount of shaking at any given location on the ground surface as felt by humans and defined in the Modified Mercalli scale (see Table 4.5). Seismic shaking is typically the greatest cause of losses to structures during earthquakes.

Modified Mercalli	Richter
I	Instrumental: detected only by seismographs 3.5
II	Feeble: noticed only by sensitive people 4.2
III	Slight: like the vibrations due to a passing train; felt by people at rest, especially on 4.3 upper floors
IV	Moderate: felt by people while walking; rocking of loose objects, including standing 4.8 houses
V	Rather strong: felt generally; most sleepers are awakened and bells ring 4.9-5.4
VI	Strong: trees sway and all suspended objects swing; damage by overturning and falling 5.5-6.0 of loose objects
VII	Very strong: general alarm; walls crack; plaster falls 6.1
VIII	Destructive: car drivers seriously disturbed; masonry fissured; chimneys fall; poorly 6.2 constructed buildings damaged
IX	Ruinous: some houses collapse where ground begins to crack, and pipes break open
X	Disastrous: ground cracks badly; many buildings destroyed and railway lines bent; 7.0-7.3 landslides on steep slopes
XI	Very disastrous: few buildings remain standing; bridges destroyed; all services (railways, 7.4-8.1 pipes and cables) out of action; great landslides and floods
XII	Catastrophic: total destruction; objects thrown into air; ground rises and falls in waves >

Source: Math/Science Nucleus.Org

Table 4.5. Earthquake Intensities with Approximate Corresponding Magnitudes

Earthquakes can cause structural damage, injury, and loss of life, as well as damage to infrastructure networks, such as water, power, communication, and transportation lines. Other damage-causing effects of earthquakes include surface rupture, fissuring, settlement, and permanent horizontal and vertical shifting of the ground. Secondary impacts can include landslides, seiches, liquefaction, fires, and dam failure.

Utah is considered a region of earthquake activity. Since earthquakes affect large areas the earthquake hazard extent within city limits is considered extensive, potentially impacting 50-100% of the planning area.

#### Past Occurrences

Utah's earthquake hazard and risk has historically been rated high.

#### Likelihood of Future Earthquake Occurrences

**Occasional:** Because the occurrence of earthquakes is probable in Utah and the historical earthquake record identifies earthquake activity along the Wasatch Mountains, it is likely, Cottonwood Heights will experience an earthquake in the future.

## 4.2.5 Floods

### Hazard/Problem Description

Floods can be among the most frequent and costly natural disaster in terms of human hardship and economic loss and can be caused by a number of different weather events. Floods can cause injuries and deaths and substantial damage to structures, landscapes, and utilities. Certain health hazards are also common to flood events. Standing water and wet materials in structures can become a breeding ground for microorganisms such as bacteria, mold, and viruses. This can cause disease, trigger allergic reactions, and damage materials long after the flood. Direct impacts such as drowning can be limited with adequate warning and public education about what to do during floods. Where flooding occurs in populated areas, warning and evacuation will be critical to reduce life and safety impacts. Communities in Salt Lake County, including Cottonwood Heights, are susceptible to various types of flood events. Cottonwood Heights has identified flood prone areas and reviews any potential development in these areas. In addition, the city works with watershed officials to mitigate obstructions during spring runoff to minimize the chance of flooding.

#### Past Occurrences

Cottonwood Heights has experienced flooding along Cottonwood Creek as recently as 2010. However, the city does not have any repetitive loss properties. It does participate in the NFIP.

The City's Community Development Director/Planning Department oversee enforcement of floodplain management requirements adopted by the City, including regulating new construction in Special Flood Hazard Areas (SFHAs); Floodplain identification and mapping, including any local requests for map updates; and Description of community assistance and monitoring activities.

#### Likelihood of Future Occurrences

**Likely:** Localized stormwater flooding at some location in Cottonwood Heights generally occurs on an annual basis. The extent of damage varies.

## 4.2.6 Human Health Hazards: Pandemic Flu

### **Hazard/Problem Description**

A pandemic is a global disease outbreak. A pandemic flu is a virulent human flu that causes a global outbreak, or pandemic, of serious illness. A flu pandemic occurs when a new influenza virus emerges for which people have little or no immunity, and for which there is no vaccine. This disease spreads easily person-to-person, causes serious illness, and can sweep across the country and around the world in very short time. The U.S. Centers for Disease Control and Prevention has been working closely with other countries and the World Health Organization to strengthen systems to detect outbreaks of influenza that might cause a pandemic and to assist with pandemic planning and preparation.

Most recently, health professionals are concerned by the possibility of an avian (or bird) flu pandemic associated with a highly pathogenic avian H5N1 virus. Since 2003, avian influenza has been spreading through Asia. A growing number of human H5N1 cases contracted directly from handling infected poultry have been reported in Asia, Europe, and Africa, and more than half the infected people have died. There has been no sustained human-to-human transmission of the disease, but the concern is that H5N1 will evolve into a virus capable of human-to-human transmission.

An especially severe influenza pandemic could lead to high levels of illness, death, social disruption, and economic loss. Impacts could range from school and business closings to the

interruption of basic services such as public transportation, health care, and the delivery of food and essential medicines. Since the hazard can affect 50-100% of the planning area it was given an extensive geographic extent rating.

#### Likelihood of Future Occurrences

**Occasional:** According to historical data, four influenza pandemics have occurred since 1918. This is an average of a pandemic approximately every 24 years or an approximate 4 percent chance of pandemic in any given year.

Although scientists cannot predict when the next influenza pandemic will occur or how severe it will be, wherever and whenever it starts, everyone around the world will be at risk. If an influenza pandemic does occur, it is likely that many age groups would be seriously affected. The greatest risks of hospitalization and death—as seen during the last two pandemics in 1957 and 1968 as well as during annual outbreaks of influenza—will be to infants, the elderly, and those with underlying health conditions. However, in the 1918 pandemic, most deaths occurred in young adults. Few people, if any, would have immunity to the virus.

### 4.2.7 Human Health Hazards: West Nile Virus

#### **Hazard/Problem Description**

The impact to human health that wildlife, and more notably, insects, can have on an area can be substantial. Mosquitoes transmit the potentially deadly West Nile virus to livestock and humans alike. West Nile virus first struck the western hemisphere in Queens, New York, in 1999 and killed four people. Since then, the disease has spread across the United States. In 2003, West Nile virus activity occurred in 46 states and caused illness in over 9,800 people.

Most humans infected by the virus have no symptoms. A small proportion develop mild symptoms that include fever, headache, body aches, skin rash, and swollen lymph glands. Less than 1 percent of those infected develop more severe illness such as meningitis or encephalitis, symptoms of which include headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, and paralysis. Of the few people who develop encephalitis, fewer than 1 out of 1,000 infections die as a result.

There is no specific treatment for the infection or a vaccine to prevent it. Treatment of severe illness includes hospitalization, use of intravenous fluids and nutrition, respiratory support, prevention of secondary infections, and good nursing care. Medical care should be sought as soon as possible for persons who have symptoms suggesting severe illness. People over 50 years of age appear to be at high risk for the severe aspects of the disease.

#### Likelihood of Future Occurrences

**Occasional:** According to the Salt Lake County Health Department, the County and the City of Cottonwood Heights will continue to be at risk to West Nile virus. However, the severity of the virus is expected to change from year to year, depending on variables such as weather patterns, the mosquito population, the bird population, and immunity in humans. The state will continue their surveillance for the disease.

### 4.2.8 Landslides and Rockfalls

#### **Hazard/Problem Description**

Landslides refer to a wide variety of processes that result in the perceptible downward and outward movement of soil, rock, and vegetation under gravitational influence. Although landslides are primarily associated with steep slopes, they may also occur in areas of generally low relief and occur as cut-and-fill failures, river bluff failures, lateral spreading landslides, collapse of waste piles, and failures associated with quarries and open-pit mines. Landslides may be triggered by both natural and manmade changes in the environment resulting in slope instability.

Human activities, such as mining, construction, and changes to surface drainage areas, also affect the landslide potential. Landslides often accompany other natural hazard events, such as floods, wildfires, or earthquakes. They can occur slowly or very suddenly and may damage or destroy structures, roads, utilities, and forested areas and can cause injuries or death.

Rockfalls are the fastest type of landslide and occur most frequently in mountains or other steep areas during early spring when there is abundant moisture and repeated freezing and thawing. The rocks may freefall or carom down in an erratic sequence of tumbling, rolling and sliding. When a large number of rocks plummet downward at high velocity, it is called a rock avalanche. Rockfalls are caused by the loss of support from underneath or detachment from a larger rock mass. Ice wedging, root growth, or ground shaking, as well as a loss of support through erosion or chemical weathering may start the fall.

#### Past Occurrences

There has been no loss of life or recent damage from landslides and rockfalls in the city limits.

#### Likelihood of Future Occurrences

**Occasional:** The eastern edge of the city has the potential for future occurrences. Minor landslides will likely continue in susceptible areas as a result of post-fire conditions or when heavy precipitation occurs.

## 4.2.9 Severe Weather: General

Severe weather conditions can occur each year in Salt Lake County and Cottonwood Heights.

## 4.2.10 Severe Weather—Extreme Temperatures

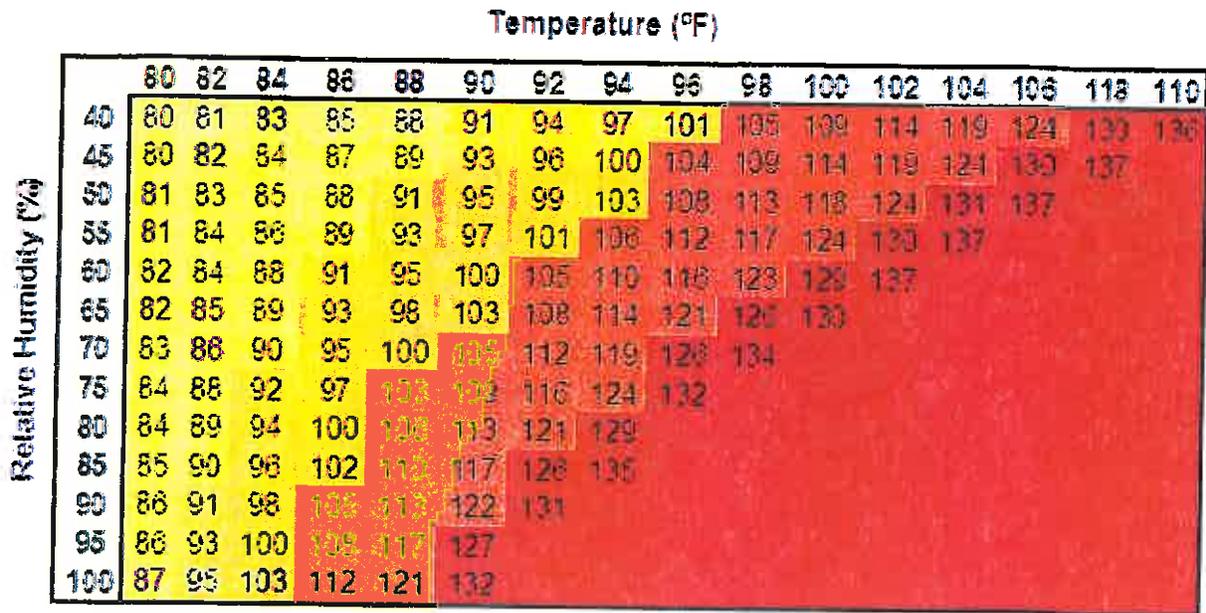
### **Hazard/Problem Description**

Extreme temperature events, both hot and cold, can have severe impacts on human health and mortality, natural ecosystems, agriculture, and the economy. Since extreme temperatures affect large areas the hazard extent within city limits is considered extensive, potentially impacting 100% of the planning area.

### **Extreme Heat**

According to information provided by FEMA, extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks. Heat kills by taxing the human body beyond its abilities. In a normal year, about 175 Americans succumb to the demands of summer heat. According to the National Weather Service (NWS), among natural hazards, only the cold of winter—not lightning, hurricanes, tornadoes, floods, or earthquakes—takes a greater toll. In the 40-year period from 1936 through 1975, nearly 20,000 people were killed in the United States by the effects of heat and solar radiation. In the heat wave of 1980, more than 1,250 people died.

Heat disorders generally have to do with a reduction or collapse of the body's ability to shed heat by circulatory changes and sweating or a chemical (salt) imbalance caused by too much sweating. When heat gain exceeds the level the body can remove, or when the body cannot compensate for fluids and salt lost through perspiration, the temperature of the body's inner core begins to rise and heat-related illness may develop. Elderly persons, small children, chronic invalids, those on certain medications or drugs, and persons with weight and alcohol problems are particularly susceptible to heat reactions, especially during heat waves in areas where moderate climate usually prevails. Figure 4.16 illustrates the relationship of temperature and humidity to heat disorders.



Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity

Caution     
  Extreme Caution     
  Danger     
  Extreme Danger

Source: National Weather Service, 2004

Figure 4.16. Relationship of Temperature and Humidity to Heat Disorders

Note: Since HI values were devised for shady, light wind conditions, exposure to full sunshine can increase HI values by up to 15°F. Also, strong winds, particularly with very hot, dry air, can be extremely hazardous.

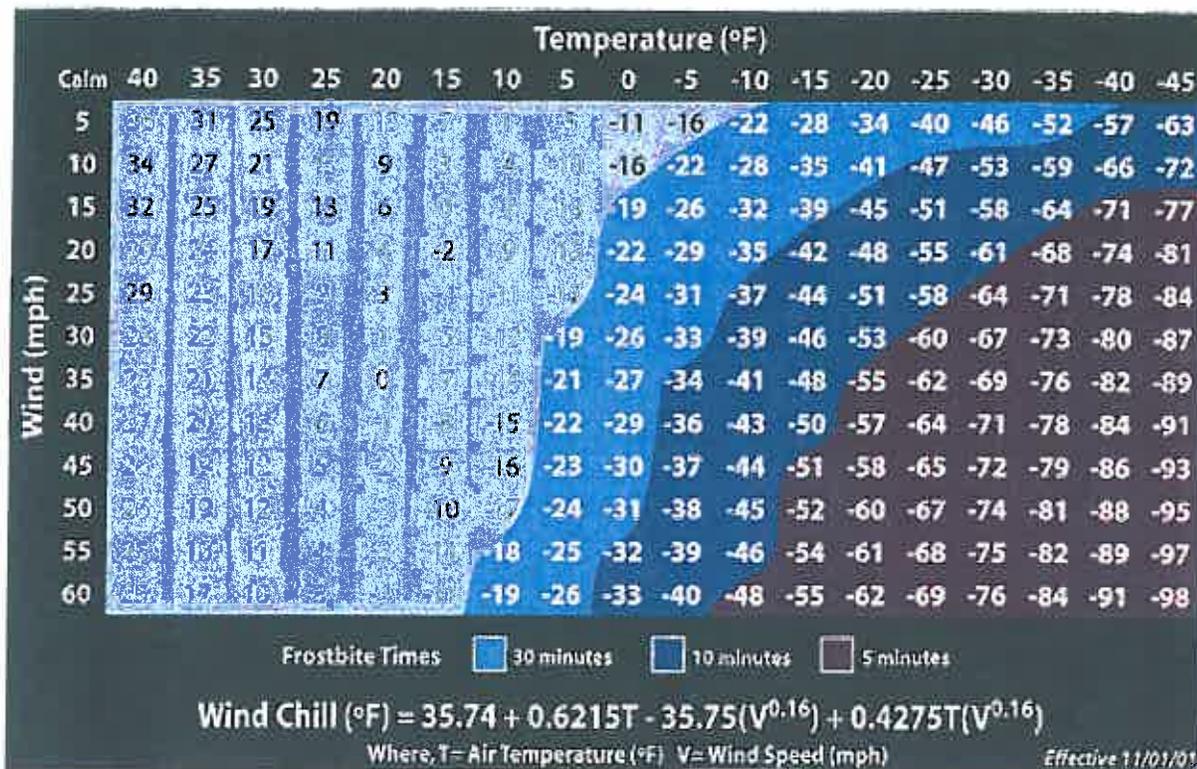
The NWS has in place a system to initiate alert procedures (advisories or warnings) when the Heat Index is expected to have a significant impact on public safety. The expected severity of the heat determines whether advisories or warnings are issued. A common guideline for the issuance of excessive heat alerts is when the maximum daytime high is expected to equal or exceed 105°F and a nighttime minimum high of 80°F or above is expected for two or more consecutive days.

### Extreme Cold

Extreme cold often accompanies a winter storm or is left in its wake. Prolonged exposure to the cold can cause frostbite or hypothermia and can become life-threatening. Infants and the elderly are most susceptible. Pipes may freeze and burst in homes or buildings that are poorly insulated or without heat.

In 2001, NWS implemented an d Wind Chill Temperature index (see Figure 4.17). This index was developed to describe the relative discomfort/danger resulting from the combination of wind

and temperature. Wind chill is based on the rate of heat loss from exposed skin caused by wind and cold. As the wind increases, it draws heat from the body, driving down skin temperature and eventually the internal body temperature.



Source: National Weather Service, [www.nws.noaa.gov/om/windchill/index.shtml](http://www.nws.noaa.gov/om/windchill/index.shtml)  
 Figure 4.17. National Weather Service Wind Chill Chart

The NWS will issue a Wind Chill Advisory for the Salt Lake County area when wind and temperature combine to produce wind chill values of 18°F below zero to 25°F below zero.

Past Occurrences

Each winter and summer it can be expected that Cottonwood Heights will experience several days of extreme heat or cold events.

Likelihood of Future Occurrences

**Highly Likely:** Given the history in Salt Lake County and Cottonwood Heights, extreme temperature events will continue to occur annually.

## 4.2.11 Wildfire

### **Hazard/Problem Description**

Wildfire and urban wildfire are an ongoing concern for Salt Lake County and Cottonwood Heights. Generally, the fire season extends from spring to late fall. Fire conditions arise from a combination of hot weather, an accumulation of vegetation, and low moisture content in air and fuel. These conditions, especially when combined with high winds and years of drought, increase the potential for wildfire to occur. The wildfire risk is predominantly associated with the wildland-urban interface, areas where development is interspersed or adjacent to landscapes that support wildland fire. A fire along this wildland-urban interface can result in major losses of property and structures. Significant wildfires can also occur in heavily populated areas. Rangeland and grassland fires are a concern in the eastern portion of Cottonwood Heights County, including areas of the city, due to increased residential development in semi urban and rural areas.

Generally, there are three major factors that sustain wildfires and predict a given area's potential to burn. These factors are fuel, topography, and weather.

**Fuel**—Fuel is the material that feeds a fire and is a key factor in wildfire behavior. Fuel is generally classified by type and by volume. Fuel sources are diverse and include everything from dead tree needles and leaves, twigs, and branches to dead standing trees, live trees, brush, and cured grasses. Also to be considered as a fuel source are manmade structures, such as homes and associated combustibles. The type of prevalent fuel directly influences the behavior of wildfire. Light fuels such as grasses burn quickly and serve as a catalyst for fire spread. In addition, -ladder fuels can spread a ground fire up through brush and into trees, leading to a devastating crown fire that burns in the upper canopy and cannot be controlled. The volume of available fuel is described in terms of fuel loading. Certain areas in and surrounding Salt Lake County are extremely vulnerable to fires as a result of dense vegetation combined with a growing number of structures being built near and within rural lands.

**Topography**—An area's terrain and land slopes affect its susceptibility to wildfire spread. Both fire intensity and rate of spread increase as slope increases due to the tendency of heat from a fire to rise via convection. The arrangement of vegetation throughout a hillside can also contribute to increased fire activity on slopes.

**Weather**—Weather components such as temperature, relative humidity, wind, and lightning also affect the potential for wildfire. High temperatures and low relative humidity dry out the fuels that feed the wildfire creating a situation where fuel will more readily ignite and burn more intensely.

Potential losses from wildfire include human life; structures and other improvements; natural and cultural resources; quality and quantity of the water supply; assets such as timber, range and crop land, and recreational opportunities; and economic losses. Smoke and air pollution from

wildfires can be a severe health hazard. In addition, catastrophic wildfire can lead to secondary impacts or losses, such as future increased flooding and landslides debris flows during heavy rains

#### Past Occurrences

Wildfires are of significant concern throughout Utah. According to Utah Division of Wildland Resources, vegetation fires occur on an annual basis; most are controlled and contained early with limited damage. For those ignitions that are not readily contained and become wildfires, damage can be extensive. There are many causes of wildfire, from naturally caused lightning fires to human-caused fires linked to activities such as smoking, campfires, equipment use, and arson.

#### Likelihood of Future Occurrences

**Likely:** Based on historical data, Salt Lake County does experience wildfires every year. Cottonwood Heights is at risk to future fires.

## 4.3 Assessing Vulnerability

### Requirement §201.6(c)(2)(ii):

[The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.

### Requirement §201.6(c)(2)(ii)(A):

The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas.

### Requirement §201.6(c)(2)(ii)(B):

[The plan should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate.

### Requirement §201.6(c)(2)(ii)(C):

[The plan should describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

With Cottonwood Heights hazards have been identified and profiled, the EPC will now be conducting a detailed vulnerability assessment to describe the impact that each hazard would have on the Cottonwood Heights. The vulnerability assessment quantifies, to the extent feasible, assets at risk to natural hazards and estimates potential losses.

## 4.4.1 Cottonwood Heights Mitigation Capabilities

### **Emergency Management**

Emergency preparedness is part of the city's strategy to protect life and property from disasters. The Emergency Manager (EM) coordinates the activities of public, private and volunteer agencies in emergency planning, mobilizing, and direction of emergency preparedness personnel in mitigation, preparing for, responding to and recovery from disasters or emergencies. The EM develops plans, programs, and training for response to emergencies in Cottonwood Heights. The EM obtains assistance and resources from federal, state, local, public, and private sources.

### **Department of Public Works**

The Public Works Department sustains and improves the quality of life in Cottonwood Heights and provides many basic services. The department oversees the city's water resources, maintains the city's infrastructure, completes a variety of street, sewer, and construction projects each year; and keeps roadways safe for passage. The department also serves as first responders in emergency situations where Public Works services are required.

### **Police Department**

The Cottonwood Heights Police Department (CHPD) has adopted a policing philosophy that is built around the provision of service, as represented by proactive problem solving through the establishment of community partnerships. This philosophical shift from the traditional 911-driven, pure reactive approach to the delivery of police services emphasizes community-based, prevention-oriented policing.

### **Capability Assessment Worksheet - Salt Lake County Mitigation Plan**

Local mitigation capabilities are existing authorities, policies, programs, and resources that reduce hazard impacts or that could be used to implement hazard mitigation activities.

**Completed By:** Dawn Black

**Date:** Oct 30, 2013

**Jurisdiction:** Cottonwood Heights

**Participants (Name, Title):**

James Short, Assistant Building Official

Planning and Regulatory Capabilities

Planning and regulatory capabilities are the plans, policies, codes, and ordinances that prevent and reduce the impacts of hazards. Use these questions to identify gaps in community growth guidance plans. Identify possible improvements that could be made to reduce vulnerability in future development.

Please identify the following your jurisdiction has in place.

Building Code, Permitting, and Inspections	Yes/No	
Building Code(s) that reference hazards: 2012 IBC, 2012 IMC, 2012 IPC, 2012 IRC, 2011 NEC	Yes	Version/Year. Are building codes adequate? 2011, 2012 – Yes
Site plan review requirements		Do site reviews consider natural hazards? Yes

1. Does the building code contain provisions to strengthen or elevate construction to withstand hazard forces? \_\_\_\_\_

Please indicate which of the following your jurisdiction has in place that reference natural hazards.

Land Use Planning and Ordinances	Yes/No	Is the ordinance an effective measure for reducing hazard impacts? Are there any weaknesses or gaps in the ordinance to be addressed to better improve hazard risk reduction?
Zoning ordinance(s)		To some degree
Subdivision ordinance(s)		Yes
Natural hazard specific ordinances (stormwater, steep slope, wildfire)		Yes
Floodplain ordinance		Yes

Flood insurance rate maps, other floodplain studies		Yes
Policies for acquisition of land for open space and public recreation uses		N/A
Other		

2. Does the future land-use map clearly identify natural hazard areas?

Yes

3. Do land-use policies and zoning ordinances discourage development or redevelopment within natural hazard areas?

Uses control measures and restrictions

4. Do zoning ordinances prohibit development within, or filling of, wetlands, floodways, and floodplains?

Yes

The following regulatory tools are used by communities to implement hazard mitigation activities. Please indicate which of the following plans your jurisdiction has in place.

Plans	Yes/No Year	Does the plan address hazards? Does the plan identify projects to include in the mitigation strategies? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan		Yes
Capital Improvements Plan		No
Economic Development Plan		No
Local Emergency Operations Plan		Yes revised December 2012
Recovery Plan		
Continuity of Operations Plan		Yes

Transportation Plan		
Stormwater Management Plan		Yes
Community Wildfire Protection Plan		
Other plans or hazard studies (brownfields, redevelopment, disaster recovery, climate change adaptation)		
How can these building codes, planning and zoning ordinances, and other community plans be expanded and improved to reduce risk?		
Yes		

5. Are goals and policies in the comprehensive plan related to the local hazard mitigation plan? Please specify.

In concept

6. Do economic development or redevelopment strategies include provisions for mitigating natural hazards?

Specify: No

7. Do subdivision regulations restrict the subdivision of land within or adjacent to natural hazard areas?

Yes

8. Do capital improvement or other plans limit expenditures on projects that would encourage development in areas vulnerable to natural hazards?

No

9. Do infrastructure policies limit extension of existing facilities and services that would encourage development in areas vulnerable to natural hazards?

Yes

10. Does the capital improvement or other plan provide funding for hazard mitigation projects?

No

11. Do transportation plans limit access to hazard areas?

Yes

12. Are transportation systems designed to function under disaster conditions (e.g. evacuation)?

**Administrative and Technical**

Identify whether your community has the following administrative and technical capabilities. These include staff and their skills and tools that can be used for mitigation planning and to implement specific mitigation actions. If there are public resources at the next higher level of government that provide technical assistance or resources, indicate in your comments.

Staff	Yes/No FT/PT	Are staff trained on hazards and mitigation?
Planning Commission		No
Zoning Administrator	Yes	
Chief Building Official	Yes	Jody Hilton
Floodplain Administrator		Yes
Emergency Manager		Yes
Community Planner		Yes
Civil Engineer		Yes
GIS Coordinator		No
Others with understanding of natural hazards or with technical hazard assessment skills		
<b>Administration</b>	<b>Yes/No</b>	<b>Describe capability</b>
Maintenance programs to reduce risk (tree trimming, clearing drainage systems, etc)	Yes	City Engineer
Mutual aid agreements	Yes	
<b>Technical</b>	<b>Yes/No</b>	<b>Has capability been used to assess/mitigation risk in the past? if so, were needs for improvement</b>
Warning systems/services (Reverse 911, outdoor warning signals)	Yes	Reverse 911
Hazard data and information	Yes	

Grant writing	Yes	
HAZUS or other GIS analysis tools	Yes	
Other		
How can staff, administration or technical capabilities be expanded or improved to reduce risk? Hazard mitigation training.		

**Public Education and Outreach**

Identify education and outreach programs and methods already in place that could be used to implement mitigation activities and communicate hazard-related information.

Program/Organization	Yes/No	Could the program help implement future mitigation activities?
Local citizen groups, non-profit organizations	Yes	
Ongoing public education or information program (e.g. responsible water use, fire safety, household preparedness)	Yes	
Natural disaster or safety related school programs	N/A	
StormReady certification	No	
Firewise Community certification	No	
Public-private partnership initiatives addressing disaster-related issues	No	
Other		
How can public education and outreach capabilities be expanded or improved to reduce risk? Firewise program has been introduced to citizens and will have training Spring of 2014.		

# 5 Mitigation Strategy

[The plan shall include] a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.

## 2009 Wasatch Front Mitigation Strategies Status

### 2009 Mitigation Strategies Progress and Summary

The following mitigation strategies were formulated by the Salt Lake County Mitigation Strategies Working Group for inclusion in the 2009 *Wasatch Front Region Natural Hazard Pre-Disaster Mitigation Plan*, which was adopted by the City of South Jordan on October 6, 2009. The following summary highlights the City of South Jordan's efforts to implement those goals where applicable and practical as part of the County's overall mitigation planning efforts.

For actions not completed or implemented by the City of South Jordan, a short description is provided as to why it was not relevant or if it is included as part of the updated plan.

Category	Goal / Objective	Action	Status	Comments
All Hazards	1 – Improve and maintain communications capabilities for emergency operations 1.1 – Improve communication capabilities	1 – Conduct an inventory and assessment of communications equipment and systems and identify needs	Completed	Cottonwood Heights continues to enhance communications by outfitting mobile command center
All Hazards	1 – Improve and maintain communications capabilities for emergency operations 1.1 – Improve communication capabilities	2 – Conduct Training and awareness activities on communication equipment, tools, and systems	On going	Monthly radio checks with key staff. Radio club implementation at all planned special events to improve communicaitons
All Hazards	1 – Improve and maintain communications capabilities for emergency operations 1.1 – Improve communication capabilities	3 – Establish agreements to share communications equipment between agencies involved in emergency operations	Not complete	

Category	Goal / Objective	Action	Status	Comments
All Hazards	1 – Improve and maintain communications capabilities for emergency operations 1.1 – Improve communication capabilities	4 – Establish notification capabilities and procedures for emergency personnel	Completed	Multiple avenues to reach staff are in place
All Hazards	1 – Improve and maintain communications capabilities for emergency operations 1.2 – Maintain communications capabilities for critical facilities	1 – Evaluate vulnerability of critical communications systems	On going	Change in Emergency Managers has delayed completion
All Hazards	1 – Improve and maintain communications capabilities for emergency operations 1.2 – Maintain communications capabilities for critical facilities	2 – Establish redundancy for dispatch centers and other critical communications	On going	Mobile command center will have redundant systems for communication within city
All Hazards	1 – Improve and maintain communications capabilities for emergency operations 1.3 – Conduct communications Strategic Planning	1 – Establish a coordinating group to address long-term communication needs and implementation strategies	On going	
All Hazards	1 – Improve and maintain communications capabilities for emergency operations 1.3 – Conduct communications Strategic Planning	2 – Acquire, upgrade, and/or integrate communications equipment and systems as determined by coordinating group	On going	As grant funding is available communications systems are enhanced
All Hazards	2 – Improve awareness and analysis of hazards 2.1 – Improved Quality and Access to digital geographic (GIS) hazards data	1 – Establish a coordinating group to address geographic data issues	On going	GIS specialist is assigned to lead this effort
All Hazards	2 – Improve awareness and analysis of hazards 2.1 – Improved Quality and Access to digital geographic (GIS) hazards data	2 – Examine current data availability and sharing capabilities, evaluate needs, and identify shortcomings	On going	

Category	Goal / Objective	Action	Status	Comments
All Hazards	2 – Improve awareness and analysis of hazards 2.1 – Improved Quality and Access to digital geographic (GIS) hazards data	3 – Update and expand data on hazards, critical facilities, and critical infrastructure according to assessed needs	On going	
All Hazards	2 – Improve awareness and analysis of hazards 2.1 – Improved Quality and Access to digital geographic (GIS) hazards data	4 – Provide centralized access to geographic data to emergency planners and responders	On going	
All Hazards	2 – Improve awareness and analysis of hazards 2.2 – Improve and expand hazard monitoring capabilities	1 – Integrate existing hazard monitoring networks in emergency operations centers. Utilize sensors such as weather stations, stream gages, seismograph stations, road conditions, etc.	On going	City relies on multiple agencies for this information
All Hazards	2 – improve awareness and analysis of hazards 2.2 – Improve and expand hazard monitoring capabilities	2 – Identify and implement additional hazard monitoring capabilities.	On going	
All Hazards	3 – Ensure critical facilities can sustain operations for emergency response and recovery 3.1 – Prevent damage to critical facilities and infrastructure	1 – Utilize GIS to identify facilities and infrastructure at risk	On going	
All Hazards	3 – Ensure critical facilities can sustain operations for emergency response and recovery 3.1 – Prevent damage to critical facilities and infrastructure	2 – Assess critical facilities for hazard exposure, structural weaknesses, power, communications and equipment resources and redundancy, and adequate emergency procedures	On going	Grant funding dependent
All Hazards	3 – Ensure critical facilities can sustain operations for emergency response and recovery 3.1 – Prevent damage to critical facilities and infrastructure	3 – Implement improvements to address identified in assessment	On going	New City Hall will include features to sustain emergency operations

Category	Goal / Objective	Action	Status	Comments
All Hazards	4 – Improve response capabilities through mutual-aid agreements 4.1 – Utilize mutual-aid agreements in accordance with National Incident Management System (NIMS) requirements	1 – Compile inventory of mutual-aid agreements and memoranda of understanding (MOU) and identify deficiencies	On going	New Emergency Manager is identifying MOU's for renewal
All Hazards	4 – Improve response capabilities through mutual-aid agreements 4.1 – Utilize mutual-aid agreements in accordance with National Incident Management System (NIMS) requirements	2 – Pursue and implement needed mutual-aid agreements	On going	
All Hazards	5 – Increase citizen safety through improved hazard awareness 5.1 – establish a comprehensive public education program	1 – Provide education regarding all natural hazards through live trainings, as well as web-based, print and broadcast media	On going	This is one of 5 strategic goals for the emergency operations program
All Hazards	5 – Increase citizen safety through improved hazard awareness 5.1 – Establish a comprehensive public education program	2 – Incorporate information about cascading effects of hazards in education programs	On going	Community events incorporate EM into program
All Hazards	5 – Increase citizen safety through improved hazard awareness 5.1 – Establish a comprehensive public education program	3 – Develop education programs to target specific groups including homeowners, developers, schools and people with special needs	On going	Community events incorporate EM into program
All Hazards	5 – Increase citizen safety through improved hazard awareness 5.1 – Establish a comprehensive public education program	4 – Utilize maps and similar products on County EM website and other media to educate public on areas at risk to hazards	On going	Community events incorporate EM into program
All Hazards	5 – Increase citizen safety through improved hazard awareness 5.1 – Establish a comprehensive public education program	5 – Coordinate with existing public education programs such as the American Red Cross, Utah Living with Fire, be Ready Utah, the National Weather Service, etc.	On going	Community events incorporate EM into program

Category	Goal / Objective	Action	Status	Comments
All Hazards	6 – Improve public safety through preventative regulations 6.1 – Minimize hazard impacts through the adoption of appropriate prevention measures	1 – Establish and enforce appropriate planning, zoning, and building code ordinances	On going	
All Hazards	6 – Improve public safety through preventative regulations 6.1 – Minimize hazard impacts through the adoption of appropriate prevention measures	2 – Ensure current hazard ordinances are available for viewing online	On going	Updated city webpage will have easy access to information
Dam Failure	1 – Include dam failure inundation in future County and City planning efforts 1.1 – Review current State dam safety information on all identified high hazard dams in the County	1 – Include dam inundation maps in current County, City and Special Service District Emergency Operations Plans	NA	This is an unlikely event in Cottonwood Heights
Dam Failure	1 – Include dam failure inundation in future County and City planning efforts 1.1 – Review current State dam safety information on all identified high hazard dams in the County	2 – Utilize inundation maps to identify potential evacuation areas and routes	NA	
Drought	1 – Reduce and prevent hardships associated with water shortages 1.1 – Limit unnecessary consumption of water throughout the County	1 – Continue to encourage water conservation utilizing and promoting outreach material from all water districts in the County	On going	City promotes green activities including water conservation
Drought	1 – Reduce and prevent hardships associated with water shortages 1.1 – Limit unnecessary consumption of water throughout the County	2 – Emergency Managers will coordinate with local water districts/public utilities to support ongoing conservation efforts	On going	
Drought	1 – Reduce and prevent hardships associated with water shortages 1.1 – Limit unnecessary consumption of water throughout the County	3 – Investigate feasibility of implementing an incentive program to encourage the use of low-flow appliances and fixtures in homes and businesses	Not completed	

Category	Goal / Objective	Action	Status	Comments
Drought	1 – Reduce and prevent hardships associated with water shortages 1.1 – Limit unnecessary consumption of water throughout the County	4 – Implement water-saving devices and practices in public facilities	On going	
Drought	1 – Reduce and prevent hardships associated with water shortages 1.1 – Limit unnecessary consumption of water throughout the County	5 – Repair, maintain and improve water distribution infrastructure to prevent loss from leakage, breaks, etc.	On going	
Drought	1 – Reduce and prevent hardships associated with water shortages 1.1 – Limit unnecessary consumption of water throughout the County	6 – Coordinate public safety water use, such as hydrant testing	On going	
Drought	1 – Reduce and prevent hardships associated with water shortages 1.1 – Limit unnecessary consumption of water throughout the County	7 – Provide information on landscaping alternatives for persons subject to green area requirements	On going	
Drought	1 – Reduce and prevent hardships associated with water shortages 1.2 – Address agricultural water shortages in the County	1 – Set up livestock water rotation in areas of agricultural use	NA	
Drought	1 – Reduce and prevent hardships associated with water shortages 1.3 – Encourage development of secondary water systems	1 – Coordinate with water districts to plan for, develop and/or expand secondary water	On going	
Earthquake	1 – Reduce earthquakes losses to infrastructure 1.1 – Encourage retrofit and rehabilitation of highly susceptible infrastructure	1 – Identify structures at risk to earthquake damage	On going	
Earthquake	1 – Reduce earthquakes losses to infrastructure 1.1 – Encourage retrofit and rehabilitation of highly susceptible infrastructure	2 – Research feasibility of an incentive program for retrofitting privately-owned buildings, particularly unreinforced masonry	On going	

Category	Goal / Objective	Action	Status	Comments
Earthquake	1 – Reduce earthquakes losses to infrastructure 1.1 – Encourage retrofit and rehabilitation of highly susceptible infrastructure	3 – Complete seismic rehabilitation/retrofitting projects of public buildings at risk	On going	New city hall will meet 2014 requirements
Earthquake	1 – Reduce earthquakes losses to infrastructure 1.2 – Improve public education regarding earthquake risks to unreinforced masonry buildings	1 – Provide educational materials to unreinforced masonry home and business owners	On going	
Earthquake	1 – Reduce earthquakes losses to infrastructure 1.3 – Improve Seismic Hazard understanding and seismic resistance of CUWCD Red Butte Dam in Salt Lake County.	1 – Procure Engineering Consultant to perform the nonstructural design and geotechnical assessment and review.	Not completed	
Flooding	1 – Protection of life and property before, during and after a flooding event 1.1 – Provide 100% availability of the National Flood Insurance Program	1 – Assist Cities with NFIP application	On going	
Flooding	1 – Protection of life and property before, during and after a flooding event 1.1 – Provide 100% availability of the National Flood Insurance Program	2 – Encourage Communities to actively participate in NFIP	On going	
Flooding	1 – Protection of life and property before, during and after a flooding event 1.2 – Encourage appropriate flood control measures, particularly in new developments	1 – Determine potential flood impacts and identify areas in need of additional flood control structures	Completed	
Flooding	1 – Protection of life and property before, during and after a flooding event 1.2 – Encourage appropriate flood control measures, particularly in new developments	2 – Address identified problems through construction of debris basins, flood retention ponds, energy dissipaters or other flood control structures	Completed	

Category	Goal / Objective	Action	Status	Comments
Flooding	1 – Protection of life and property before, during and after a flooding event 1.3 – Provide maintenance, repairs and improvements to drainage structures, storm water systems and flood control structures	1 – Establish maintenance and repair programs to remove debris, improve resistance and otherwise maintain effectiveness of storm water and flood control systems	On going	
Flooding	2 – Reduce threat of unstable or inadequate flood control structures 2.1 – Reduce potential for failure of flood control structures	1 – Identify and assess structures for deficiencies	On going	
Flooding	2 – Reduce threat of unstable or inadequate flood control structures 2.1 – Reduce potential for failure of flood control structures	2 – Modify structures as needed to address deficiencies	On going	
Severe Weather	1 – Reduce threat of loss of life or property due to extreme weather events 1.1 – Maintain status as a StormReady Community	1 – Maintain Hazardous Weather Operations Plan according to StormReady requirements	On going	
Severe Weather	1 – Reduce threat of loss of life or property due to extreme weather events 1.1 – Maintain status as a StormReady Community	2 – Maintain Contact with NWS prior to re-application in 2010	On going	
Severe Weather	1 – Reduce threat of loss of life or property due to extreme weather events 1.2 – Increase awareness of information services provided by NWS	1 – Meet with NWS representative on an annual basis to receive information on new services and alerts available	On going	
Severe Weather	1 – Reduce threat of loss of life or property due to extreme weather events 1.2 – Increase awareness of information services provided by NWS	2 – Assist NWS in making other agencies and departments aware of available resources	On going	

Category	Goal / Objective	Action	Status	Comments
Severe Weather	1 – Reduce threat of loss of life or property due to extreme weather events 1.3 – Encourage safe practices in avalanche prone areas	1 – Assist Forest Service Utah Avalanche Forecast Center and other organizations in promoting avalanche hazard awareness for backcountry users	NA	
Severe Weather	1 – Reduce threat of loss of life or property due to extreme weather events 1.4 – Examine the vulnerability of patrons at large event venues to extreme weather events	1 – Work with NWS to develop large event venue weather safety and evacuation procedures	On going	
Slope Failure	1 – Reduce or eliminate the threat of slope failure damage 1.1 – Reduce the threat of slope failures following wildfires	1 – Develop protocol for working with State and Federal agencies in reducing the impact of post-fire debris flow hazard	On going	State Wildfire Pre-attack plan
Slope Failure	1 – Reduce or eliminate the threat of slope failure damage 1.2 – Monitor historic landslide areas	1 – Coordinate with the Utah Geological Survey and other agencies to understand current slope failure threats/potential	NA	
Slope Failure	1 – Reduce or eliminate the threat of slope failure damage 1.3 – Address landslide hazards in new subdivisions	1 – Utilize recommendations provided by the State Geological Hazards Working Group to address land-use and planning for new developments	On going	
Wildland Fire	1 – Community education on wildfire hazard 1.1 – Reduce risk from wildfire through education programs	1 – Increase public awareness through “Firewise” program	On going	Spring efforts will include information for residents and businesses
Wildland Fire	1 – Community education on wildfire hazard 1.1 – Reduce risk from wildfire through education programs	2 – Educate homeowners on the need to create defensible space near structures in WUI	On going	

Category	Goal / Objective	Action	Status	Comments
Wildland Fire	2 – Improve safety from wildfire hazards through planning, protective actions and improved fire response capabilities 2.1 – Assist homeowners with creating defensible space near structures in WUI areas	1 – Designate and promote county-wide annual initiative for clearing fuels	On going	
Wildland Fire	2 – Improve safety from wildfire hazards through planning, protective actions and improved fire response capabilities 2.1 – Assist homeowners with creating defensible space near structures in WUI areas	2 – Provide waste removal, such as chipping of green waste by public works, following designated fuel clearing day/week	On going	As funding allows these strategies can be implemented
Wildland Fire	2 – Improve safety from wildfire hazards through planning, protective actions and improved fire response capabilities 2.2 – Improve evacuation capabilities for WUI areas	1 – Work with experts and communities to develop or update evacuation plans	Completed	Wildfire pre-attack plan has designated routes
Wildland Fire	2 – Improve safety from wildfire hazards through planning, protective actions and improved fire response capabilities 2.2 – Improve evacuation capabilities for WUI areas	2 – Evaluate transportation network and address needed improvements to facilitate evacuation and emergency response	Completed	
Wildland Fire	2 – Improve safety from wildfire hazards through planning, protective actions and improved fire response capabilities 2.3 – Improve addressing system in WUI areas to facilitate emergency response	1 – Identify all facilities, businesses, and residences, particularly in the canyons, and assign addresses according to current county addressing standards	Completed	

Category	Goal / Objective	Action	Status	Comments
Wildland Fire	2 – Improve safety from wildfire hazards through planning, protective actions and improved fire response capabilities 2.3 – Improve addressing system in WUI areas to facilitate emergency response	2 – Incorporate improved addresses in fire-dispatch and other databases	Completed	
Wildland Fire	2 – Improve safety from wildfire hazards through planning, protective actions and improved fire response capabilities 2.4 – Complete wildfire protection projects	1 – Reduce fuels around publically owned structures	Completed	
Wildland Fire	2 – Improve safety from wildfire hazards through planning, protective actions and improved fire response capabilities 2.4 – Complete wildfire protection projects	2 – Implement fire breaks and other protective measures	On going	
Wildland Fire	2 – Improve safety from wildfire hazards through planning, protective actions and improved fire response capabilities 2.4 – Complete wildfire protection projects	3 – Assess existing water flow capabilities, both public and private, and address deficiencies	On going	
Wildland Fire	2 – Improve safety from wildfire hazards through planning, protective actions and improved fire response capabilities 2.4 – Complete wildfire protection projects	4 – Assist communities in developing Community Wildfire Protection Plans or similar plans	On going	
Wildland Fire	2 – Improve safety from wildfire hazards through planning, protective actions and improved fire response capabilities 2.5 – Encourage proper development practices in the WUI	1 – Adopt the Utah Wildland-Urban Interface Code	Under discussion	

Category	Goal / Objective	Action	Status	Comments
Wildland Fire	2 – Improve safety from wildfire hazards through planning, protective actions and improved fire response capabilities 2.5 – Encourage proper development practices in the WUI	2 – Define wildland-urban interface and develop digital maps of the WUI	Completed	

### Mitigation Strategies

The following mitigation strategies were formulated by the Salt Lake County Mitigation Strategies Working Group on November 20, 2007, at Holladay City Hall. The Working Group sought to refine and expand on efforts already in place. Additional information was provided in October, 2008 by the Central Utah Water Conservancy District in regards to the Red Butte Dam in Salt Lake County that was developed through the course of an ongoing Hazard Mitigation Planning effort, which began in July, 2007 and is scheduled to be completed in February, 2009. Information on Working Group members can be found in Part IV. "Emergency Services" for the purpose of this section is defined as County and City emergency management and may include relevant emergency response agencies.

Cottonwood Heights will identify responsible authorities within the city or partnerships with other entities and a timeframe for implementation of mitigation strategies during FY2015/16. Development of cost estimates and funding sources will also be identified during FY2015/16.

**Problem Identification:** One of the pivotal aspects of disaster response is communication. Without effective communication, relief and rescue operations become chaotic and disorganized, as evidenced by the 2005 Hurricane Katrina event. During that event, communication systems often were inoperable, incompatible or merely went unused because of lack of training (Peterson 2005).

**Goal 1** – Improve and maintain communications capabilities for emergency operations

**Objective 1.1** (Priority HIGH): Improve communications capabilities

**Action 1:** Conduct an inventory and assessment of communications equipment and systems and identify needs.

Comments: Satellite Phones — We have communications redundancy through VECC.

Action 2: Conduct training and awareness activities on communications equipments, tools, and systems.

VECC provides monthly communications drills. This activity is ongoing.

Action 3: Establish agreements to share communications equipment between agencies involved in emergency operations.

P.C. communications agreements with VECC in place.

Action 4: Establish notification capabilities and procedures for emergency personnel.

Ongoing — Department Policy

**Objective 1.2** (Priority HIGH): Maintain communications capabilities for critical facilities

Action 1: Evaluate vulnerability of critical communications systems.

Internet, landlines and cellphones highly vulnerable.

Action 2: Establish redundancy for dispatch centers and other critical communications systems.

Yes — dispatch redundancy

**Objective 1.3** (Priority HIGH): Conduct Communications Strategic Planning

Action 1: Establish a coordinating group to address long-term communication needs and implementation strategies.

No

Action 2: Acquire, upgrade, and/or integrate communications equipment and systems as determined by coordinating group.

No

**Problem Identification:** Without sufficient knowledge of hazards affecting a jurisdiction, effective and efficient mitigating actions cannot be properly applied. Information on critical and high value infrastructure is also important. Advances in mapping technology and observational techniques have given a significantly clearer vision of hazards and vulnerability. This technology is only effective if utilized with up-to-date data.

**Goal 2** – Improve awareness and analysis of hazards

**Objective 2.1** (Priority MEDIUM): Improved quality and access to digital geographic (GIS) hazards data

Action 1: Establish a coordinating group to address geographic data issues.

No

Action 2: Examine current data availability and sharing capabilities, evaluate needs, and identify shortcomings.

Ongoing — not specific to mitigation

Action 3: Update and expand data on hazards, critical facilities, and critical infrastructure according to assessed needs.

Data exists, needs not assessed

Action 4: Provide centralized access to geographic data to emergency planners and responders.

Ongoing

**Objective 2.2** (Priority MEDIUM): Improve and expand hazard monitoring capabilities.

Action 1: Integrate existing hazard monitoring networks in emergency operations centers. Utilize sensors such as weather stations, stream gauges, seismograph stations, road conditions, etc.

No

Action 2: Identify and implement additional hazard monitoring capabilities.

Unknown

**Problem Identification:** Certain infrastructure must be able to withstand the most extreme hazard event expected in order to provide coordinated response operations, shelter, and evacuation, if necessary. Some examples of critical infrastructure include police stations, fire stations, schools, water systems, emergency operations centers and major transportation routes.

**Goal 3** – Ensure critical facilities can sustain operations for emergency response and recovery

**Objective 3.1** (Priority HIGH): Prevent damage to critical facilities and infrastructure.

Action 1: Utilize GIS to identify facilities and infrastructure at risk.

No

Action 2: Assess critical facilities for hazard exposure, structural weaknesses, power, communications and equipment resources and redundancy, and adequate emergency procedures.

Unknown

Action 3: Implement Improvements to address needs identified in assessment.

Unknown

**Problem Identification:** Hazardous events often overcome the resources of any one jurisdiction. An effective measure which ensures adequate response to a hazardous event is mutual-aid agreements specifying resources and assistance from adjoining jurisdictions or state and federal agencies.

**Goal 4** – Improve response capabilities through mutual-aid agreements

**Objective 4.1** (Priority MEDIUM): Utilize mutual-aid agreements in accordance with National Incident Management System (NIMS) requirements.

Action 1: Compile inventory of current mutual-aid agreements and memoranda of understanding (MOU) and identify deficiencies.

Public Safety Mutual Aid

Action 2: Pursue and implement needed mutual-aid agreements.

Points of Distribution MOU with schools.

**Problem Identification:** One of the most cost-effective means of mitigating hazards is through public education. This allows citizens to make informed choices to themselves mitigate hazards affecting them. Education can be especially effective when tied to grant programs.

**Goal 5** – Increase citizen safety through improved hazard awareness

**Objective 5.1** (Priority HIGH): Establish a comprehensive public education program.

Action 1: Provide education regarding all natural hazards through live trainings, as well as web-based, print and broadcast media.

Ongoing

Action 2: Incorporate information about cascading effects of hazards in education programs.

Unknown

Action 3: Develop education programs to target specific groups including homeowners, developers, schools and people with special needs.

Firewise and Weather Watcher programs

Action 4: Utilize maps and similar products on County EM website and other media to educate public on areas at risk to hazards.

Cottonwood Heights provides city maps with exit routes and earthquake, liquefaction areas.

Action 5: Coordinate with existing public education programs such as the American Red Cross, Utah Living with Fire, Be Ready Utah, the National Weather Service, etc.

Ongoing

**Problem Identification:** Sometimes hazards require mandated mitigation in the form of ordinances, codes, laws or regulations. Zoning ordinances and building codes are the most common form of mitigation.

**Goal 6** – Improve public safety through preventative regulations

**Objective 6.1** (Priority HIGH): Minimize hazard impacts through the adoption of appropriate prevention measures.

Action 1: Establish and enforce appropriate planning, zoning, and building code ordinances.

Ongoing

Action 2: Ensure current hazard ordinances are available for viewing online.

Floodplain Hazard Regulations

## Dam Failure

**Problem Identification:** The failure of dams and irrigation impoundments will result in a severe impact on residents and infrastructure in Salt Lake County.

**Goal 1** – Include dam failure inundation in future planning efforts.

**Objective 1.1** (Priority MEDIUM): Review current State dam safety information on all identified high hazard dams in the County.

Action 1: Include dam inundation maps in current County, City and Special Service District Emergency Operations Plans.

N/A

Action 2: Utilize inundation maps to identify potential evacuation areas and routes.

Yes

## Drought

**Problem Identification:** Because the Great Salt Lake Valley is a desert climate, there have always been periods of intermittent drought. Measures must be taken to conserve water and to address water shortages for both culinary and agricultural use.

**Goal 1** – Reduce and prevent hardships associated with water shortages

**Objective 1.1** (Priority HIGH): Limit unnecessary consumption of water throughout the County

Action 1: Continue to encourage water conservation utilizing and promoting outreach material from all water districts in the County.

Ongoing with provider

Action 2: Emergency Managers will coordinate with local water districts/public utilities to support ongoing conservation efforts.

Ongoing

Action 3: Investigate feasibility of implementing an incentive program to encourage the use of low-flow appliances and fixtures in homes and businesses.

N/A

Action 4: Implement water-saving devices and practices in public facilities.

N/A

Action 5: Repair, maintain and improve water distribution infrastructure to prevent loss from leakage, breaks, etc.

N/A

Action 6: Coordinate public safety water use, such as hydrant testing.

N/A

Action 7: Provide information on landscaping alternatives for persons subject to green area requirements.

N/A

**Objective 1.2** (Priority HIGH): Address agricultural water shortages in the County

Action 1: Set up livestock water rotation in areas of agricultural use.

N/A

**Objective 1.3** (Priority MEDIUM): Encourage development of secondary water systems

Action 1: Coordinate with water districts to plan for, develop and/or expand secondary water systems.

N/A

## Earthquake

**Problem Identification:** Numerous geologic hazards exist in the Salt Lake City metropolitan area which can constrain land use. Active fault zones pose the threat of large earthquakes. The major earthquake risk present throughout the Salt Lake County metropolitan area confronts planners with a variety of safety and economic issues that must always be considered prior to land use development.

**Goal 1** – Reduce earthquakes losses to infrastructure

**Objective 1.1** (Priority HIGH): Encourage retrofit and rehabilitation of highly susceptible infrastructure

Action 1: Identify structures at risk to earthquake damage.

Unknown

Action 2: Research feasibility of an incentive program for retrofitting privately-owned buildings, particularly unreinforced masonry.

Unknown

Action 3: Complete seismic rehabilitation/retrofitting projects of public buildings at risk.

Unknown

**Objective 1.2** (Priority MEDIUM): Improve public education regarding earthquake risks to unreinforced masonry buildings

Action 1: Provide educational materials to unreinforced masonry home and business owners.

Unknown

**Objective 1.3** (Priority MEDIUM): Improve seismic hazard understanding and seismic resistance of Central Utah Water Conservancy District's (CUWCD) Red Butte Dam in Salt Lake County. Perform geotechnical assessment and review of Red Butte Dam to determine seismic hazard risk of slope failure on the outlet control structure and cyclic softening failure in the dam foundation soils. Perform a structural engineering analysis and design of nonstructural bracing/anchoring of piping and ancillary equipment in Red Butte Dam's flow control structure." Improve public education regarding earthquake risks to unreinforced masonry buildings

Action 1: Procure an Engineering Consultant to perform the nonstructural design and geotechnical assessment and review. CUWCD staff will procure contractor and/or install nonstructural bracing per consultant's design.

Complete

## Flooding

**Problem Identification:** Although located in a semi-arid region, Salt Lake City is subject to flash flooding due to heavy rainfall and rapid snowmelt. The Jordan River's four major northern tributaries (City, Red Butte, Emigration and Parley's Creeks) are diverted into storm sewers beneath the city. These storm sewers have sufficient capacity to handle the excessive runoff, but must be continually maintained to prevent debris from accumulating. Public works agencies have built debris basins, installed stream-bank protection, and regularly dredge stream channels to reduce flood hazards. The Federal Emergency Management Agency (FEMA) has rated floodplains along the Jordan River and its tributaries for expected flood heights and areas susceptible to 100-year flood-frequency inundation have been delineated on County-wide FEMA Flood Insurance Rate Maps (FIRMs). Salt Lake County ordinances require the lowest flood grades (including basements) in new construction to be a minimum of 1 foot (0.3 m) above the appropriate FEMA flood elevation.

**Goal 1** – Protection of life and property before, during and after a flooding event

**Objective 1.1** (Priority MEDIUM): Provide 100% availability of the National Flood Insurance Program (NFIP).

Action # 1: Assist cities with NFIP application.

Ongoing/Working with SL County Flood Control

Action # 2: Encourage communities to actively participate in NFIP.

Ongoing

**Objective 1.2** (Priority MEDIUM): Encourage appropriate flood control measures, particularly in new developments.

Action 1: Determine potential flood impacts and identify areas in need of additional flood control structures.

Ongoing

Action 2: Address identified problems through construction of debris basins, flood retention ponds, energy dissipaters or other flood control structures.

Ongoing

**Objective 1.3** (Priority HIGH): Provide maintenance, repairs and improvements to drainage structures, storm water systems and flood control structures.

Action: Establish maintenance and repair programs to remove debris, improve resistance and otherwise maintain effectiveness of storm water and flood control systems.

Ongoing

**Goal 2** – Reduce threat of unstable or inadequate flood control structures

**Objective 2.1** (Priority HIGH): Reduce potential for failure of flood control structures.

Action 1: Identify and assess structures for deficiencies.

Ongoing

Action 2: Modify structures as needed to address deficiencies.

Ongoing

## Severe Weather

**Problem Identification:** Severe weather over northern Utah can have a dramatic impact on regional commerce, transportation and daily activity and is a major forecast challenge for local meteorologists. The region is characterized by intense vertical relief with the Great Salt Lake and surrounding lowlands located near 4,300 ft above mean sea level (MSL) while the adjoining Wasatch Mountains to the east reach as high as 11,000 ft MSL. This relief has major impact on winter storms and results in large contrasts in average annual precipitation.

**Goal 1:** Reduce threat of loss of life or property due to extreme weather events

**Objective 1.1 (Priority LOW):** Maintain status as a StormReady Community

Action 1: Maintain Hazardous Weather Operations Plan according to StormReady requirements.

N/A

Action 2: Maintain contact with NWS prior to re-application in 2010.

N/A

**Objective 1.2 (Priority MEDIUM):** Increase awareness of information services provided by NWS.

Action 1: Meet with NWS representative on an annual basis to receive information on new services and alerts available.

Representative at monthly county LEPC meetings Have invited him o emergency planning meetings. Conducted weather watcher training 2012. \_\_

Action 2: Assist NWS in making other agencies and departments aware of available resources.

Ongoing

**Objective 1.3 (Priority MEDIUM):** Encourage safe practices in avalanche prone areas.

Action: Assist Forest Service Utah Avalanche Forecast Center (FSUAC) and other organizations in promoting avalanche hazard awareness for backcountry users.

N/A

**Objective 1.4** (Priority HIGH): Examine the vulnerability of patrons' at large event venues to extreme weather events.

Action: Work with the NWS to develop large event venue weather safety and evacuation procedures.

N/A

## Slope Failure

**Problem Identification:** Slope instability has not been a major problem in the Salt Lake area. Yet, as development moves higher into the foothills and nearby canyons, slope stability is becoming a major issue affecting future development. Types of slope instability in the Salt Lake area include rock fall, debris flow and debris flood, rotational and transitional slumps, and earth flows. During the unusually wet springs of 1983 and 1984, numerous slope failures in the Wasatch Range resulted in debris flows and floods that caused extensive damage to urban areas north of Salt Lake City (Anderson and others, 1984). Similar failures occurred in canyons adjacent to Salt Lake City, but none reached developed areas.

In Salt Lake County, 56 percent of all slope failures have occurred on hillsides where slopes range between 31 and 60 percent. That statistic prompted Salt Lake County in 1986 to lower the maximum allowable buildable slope from 40 percent to 30 percent. Even so, 23 percent of observed slope failures have occurred on slopes of 30 percent or less.

**Goal 1** – Reduce or eliminate the threat of slope failure damage

**Objective 1.1** (Priority MEDIUM): Reduce the threat of slope failures following wild fires.

Action 1: Develop protocol for working with State and Federal agencies in reducing the impact of post-fire debris flow hazard.

N/A

**Objective 1.2** (Priority MEDIUM): Monitor historic landslide areas.

Action 1: Coordinate with Utah Geological Survey and other agencies to understand current slope failure threats/potential.

N/A

---

**Objective 2.1** (Priority HIGH): Address landslide hazards in new sub-divisions.

---

Action 1: Utilize recommendations provided by State Geologic Hazards Working Group to address land-use and planning for new developments.

N/A

## Wildland Fire

**Problem Identification:** Utah's typical fire season is the dry period from May through October. Lightning causes the largest numbers of wildfires.

Recent large western states wildfires; the 1991 Oakland Hills fires, 1994 Tye fire in Washington, the 1993 and 2007 Southern California fire sieges are examples of the growing fire threat which occurs in the Wildland/Urban Interface (WUI). The WUI is defined as the area where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. Since 1985, approximately 9,000 homes have been lost to urban/wildland interface fires across the United States.

In 1990, Salt Lake County created a wildland program shortly after a wildland fire threatened Emigration Canyon, a major urban interface area at the county's eastern boundaries. The fire began in the Affleck Park day use picnic area, possibly the result of an unattended campfire. The fire quickly spread to the west and up the side of the mountain, with only one ridge between it and Emigration Canyon. The incident lasted for five days, in which time 5,500 acres were burned. Fortunately, no one was injured and no structures were lost.

**Goal 1** – Community education on wildfire hazard

**Objective 1.1** (Priority HIGH): Reduce risk from wild fire through education programs

Action 1: Increase public awareness through "Fire Wise" program.

Working with Salt Lake County—UFA Riley Pilgrim with Firewise Program

Action 2: Educate homeowners on the need to create defensible space near structures in WUI.

Firewise Representative spoke with community group 10.3.2013. Will return April 2014 to begin training with citizens.

**Goal 2** – Improve safety from wildfire hazards through planning, protective actions and improved fire response capabilities

**Objective 2.1** (Priority HIGH): Assist homeowners with creating defensible space near structures in WUI areas.

Action 1: Designate and promote county-wide annual initiative for clearing fuels.

N/A

Action 2: Provide waste removal, such as chipping of green waste by Public Works, following designated fuel clearing day/week.

Ongoing

**Objective 2.2** (Priority HIGH): Improve evacuation capabilities for WUI areas.

Action 1: Work with experts and communities to develop or update evacuation plans.

Ongoing

Action 2: Evaluate transportation network and address needed improvements to facilitate evacuation and emergency response.

N/A

**Objective 2.3** (Priority HIGH): Improve addressing system in WUI areas to facilitate emergency response.

Action 1: Identify all facilities, businesses, and residences, particularly in the canyons, and assign addresses according to current county addressing standards.

Ongoing

Action 2: Incorporate improved addresses in fire-dispatch and other databases.

Ongoing

**Objective 2.4** (Priority HIGH): Complete wildfire protection projects

Action 1: Reduce fuels around publicly owned structures.

N/A

Action 2: Implement fire breaks and other protective measures.

N/A

Action 3: Assess existing water flow capabilities, both public and private, and address deficiencies.

N/A

Action 4: Assist communities in developing Community Wildfire Protection Plans or similar plans.

Will begin April 2014

**Objective 2.5** (Priority HIGH): Encourage proper development practices in the WUI.

Action 1: Adopt the Utah Wildland-Urban Interface Code (Code addresses proper road accessibility, availability of water flow for fire response, etc.)

N/A

Action 2: Define wildland-urban interface and develop digital maps of the WUI.

Fire Map available online

## Know Evacuation Routes

Cottonwood Heights' snow removal priority list can also be utilized for and serves well as a map of designated evacuation routes. They are well-maintained and prioritized according to access, size and traffic capabilities. Below is the snow removal policy.

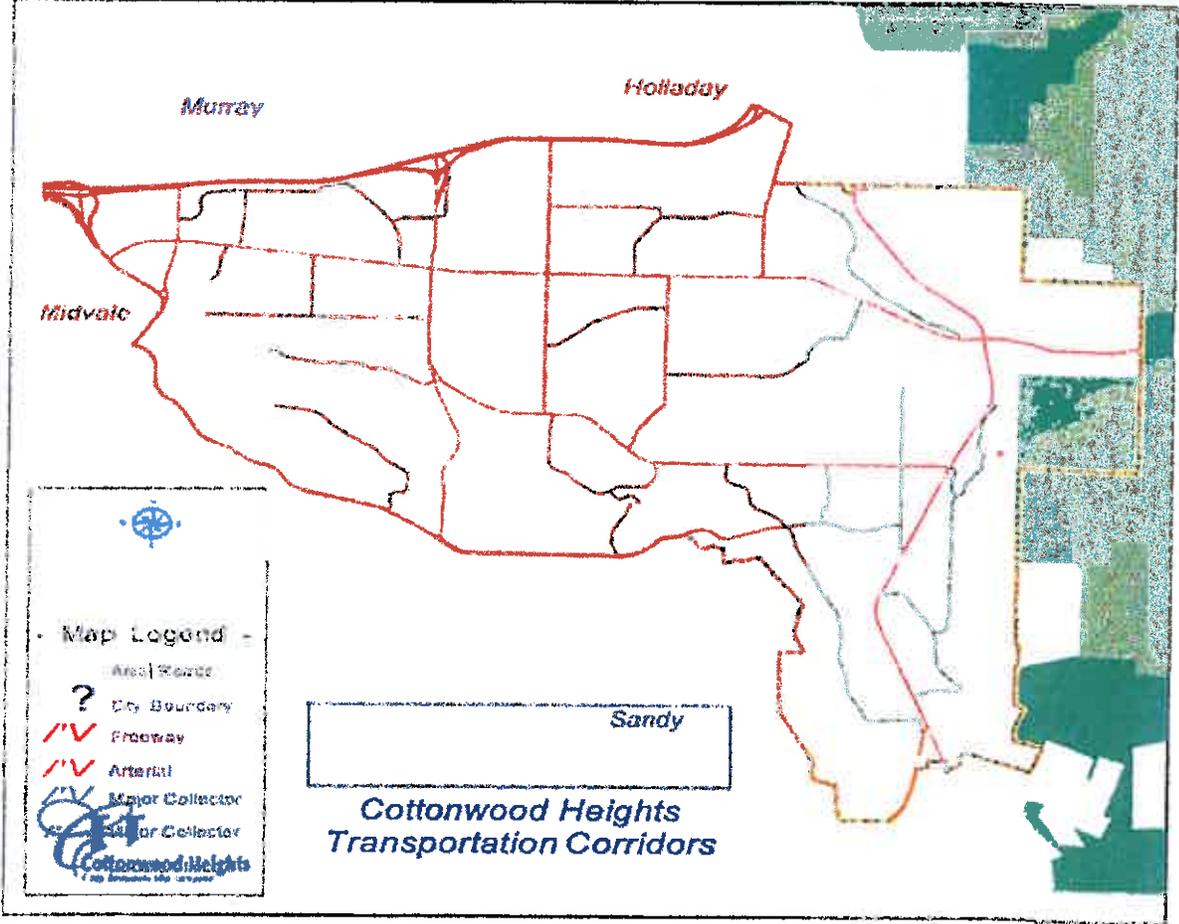
This policy is intended for streets located within the boundaries of Cottonwood Heights. The city maintains more than 320 lane miles of arterial, secondary and residential streets that have been divided into four (4) priorities:

**PRIORITY 1, Major Arterials**- Fort Union Boulevard, Highland Drive, Creek Road, Bengal Boulevard, Union Park, 1300 East, 2700 East, and 3000 East. These streets are first priority

because they are essential to the movement of public safety vehicles in the city and will be cleared first in any storm event or disaster.

**PRIORITY 2, Minor Arterials** - 2300 East, Park Centre Drive, 7200 South, Danish Road, Oak Creek Drive, 2325 East, Nantucket Drive, 3500 East, Nye Drive, 1700 East, Whitmore Way, Portsmouth Avenue, and Big Cottonwood Canyon Road. Streets in this priority are based on volume and the need to provide access to schools, bus routes and other essential services.

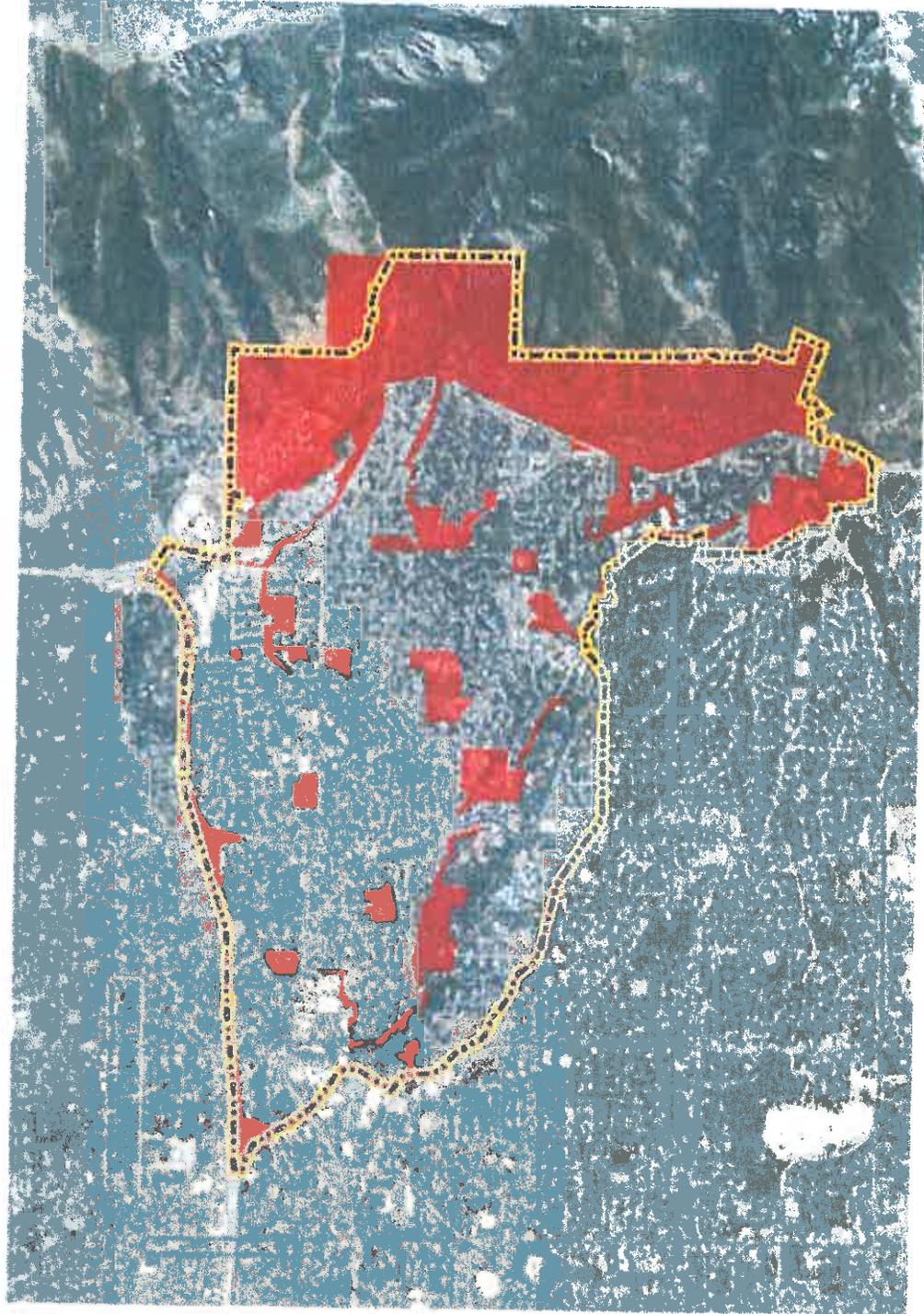
**PRIORITY 3 and 4, Collector Roads and Local Residential Roads**- These priorities cover all additional collector and local streets. Priority 3 will include street networks that serve areas that are major traffic volume generators and areas with trouble spots such as busy intersections and roads on steep slopes or other critical features.



# Cottonwood Heights Public Map Gallery

## Restricted Fires Area

Areas where fires and fireworks are restricted in Cottonwood Heights



About

### Layers

- Addresses
- Cottonwood Heights
- Fire Restricted Areas

### Legend

- Cottonwood Heights
- Cottonwood Heights
- Fire Restricted Areas
- FireRestrictedAreas

## Integration of data, information, and mitigation goals and action plans:

Cottonwood Heights will integrate mitigation strategies into its building codes, the planning commission, and the actions of the City Council and other relevant agencies by education by the Emergency Manager during daily, weekly, and monthly city and public meetings.

## 6 Plan Adoption

Requirement §201.6(c)(5): [The local hazard mitigation plan shall include] documentation that the plan has been formally approved by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, county commissioner, Tribal Council).

The purpose of formally adopting this plan is to secure buy-in from the City of Cottonwood Heights, raise awareness of the plan, and formalize the plan's implementation. The adoption of this plan completes Planning Step 9 of the 10-step planning process: Adopt the Plan. The Cottonwood Heights City Council, will adopt this multi-hazard mitigation plan by passing a resolution.

---

## 7 Plan Implementation & Maintenance

---

Requirement §201.6(c)(4):

[The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

Implementation and maintenance of the plan is critical to the overall success of hazard mitigation planning. This is Planning Step 10 of the 10-step planning process. This chapter provides an overview of the overall strategy for plan implementation and maintenance and outlines the method and schedule for monitoring, updating, and evaluating the plan. The chapter also discusses incorporating the plan into existing planning mechanisms and how to address continued public involvement.

### 7.1 Implementation

This plan is designed to be implemented over time so that the city's vulnerability to natural hazards can be reduced. The city is making progress towards this goal as discussed in Chapter 5. This plan contains many worthwhile mitigation actions, and while some are already completed or underway, the EPC will need to decide which new actions to focus on. Two factors will help with making that decision: the priority assigned the actions in the planning process and funding availability. Low or no-cost projects can sometimes most easily demonstrate progress toward successful plan implementation. Implementation will also be accomplished through adherence to the schedules identified for each action in Chapter 5.

Another important implementation mechanism that is highly effective and low-cost is incorporation of the hazard mitigation plan recommendations and their underlying principles into other city and county plans and mechanisms, such as the Comprehensive Flood and Stormwater Utility Master Plan and the Salt Lake County Comprehensive Plan. The city has and continues to implement policies and programs to reduce losses to life and property from natural hazards. This plan builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implementing projects, where possible, through these other program mechanisms.

Mitigation is most successful when it is incorporated into the day-to-day functions and priorities of government and development. This integration is accomplished by constant, pervasive, and energetic efforts to network, identify, and highlight the multi-objective, win-win

benefits to each program, the Cottonwood Heights community, and its stakeholders. This effort is achieved through the routine actions of monitoring agendas, attending meetings, and promoting a safe, sustainable community. Additional mitigation strategies could include

consistent and ongoing enforcement of existing policies and vigilant review of city and county programs for coordination and multi-objective opportunities.

Simultaneous to these efforts, it is important to maintain a constant monitoring of funding opportunities that can be leveraged to implement some of the more costly recommended actions. This will include creating and maintaining a bank of ideas on how any required local match requirements of state or federal grants can be met. When funding does become available, the EPC will be in a position to capitalize on the opportunity. Funding opportunities to be monitored include special pre- and post-disaster funds, capital improvement budgeted funds, state or federal earmarked funds, and grant programs, including those that can serve or support multi-objective applications.

### **7.1.1 Role of Emergency Planning Committee in Implementation and Maintenance**

With adoption of this plan, the Emergency Planning Committee (EPC) will be tasked with plan implementation and maintenance. The EPC agrees to:

- Act as a forum for hazard mitigation issues;
- Disseminate hazard mitigation ideas and activities to all participants;
- Pursue the implementation of high-priority, low/no-cost recommended actions;
- Keep the concept of mitigation in the forefront of community decision making by identifying plan recommendations when other community goals, plans, and activities overlap, influence, or directly affect increased community vulnerability to disasters;
- Maintain a vigilant monitoring of multi-objective cost-share opportunities to help the community implement the plan's recommended actions for which no current funding exists; Monitor and assist in implementation and of this plan;
- Report on plan progress and recommended changes to the Cottonwood Heights City Council; and
- Inform and solicit input from the public.

The EPC will not have any powers over city staff; it will be purely an advisory body. Its primary duty is to see the plan successfully carried out and to report to the community governing board and the public on the status of plan implementation and mitigation opportunities for the city. Other duties include reviewing and promoting mitigation proposals, considering

stakeholder concerns about hazard mitigation, passing concerns on to appropriate entities, and posting relevant information on the city website.

## 7.2 Maintenance

Plan maintenance implies an ongoing effort to monitor and evaluate plan implementation and to the plan as progress, roadblocks, or changing circumstances are recognized.

### 7.2.1 Maintenance Schedule

In order to track progress and the mitigation strategies identified in the action plan, the city will revisit this plan annually and after a significant hazard event or disaster declaration. The Emergency Manager for Cottonwood Heights is responsible for initiating this review and will consult with members of the EPC. The review may occur in concert with CRS review and recertification. The suggested time frame for the annual review is in the spring, prior to flood and wildfire season. This will also position the city for grant and CRS review cycles that occur in the fall. A five-year written to be submitted to the state and FEMA Region VIII, unless disaster or other circumstances (e.g., changing regulations) require a change to this schedule.

This plan will be re-approved by the state and FEMA, and re-adopted within a five-year cycle as per Requirement §201.6(c)(4)(i) of the Disaster Mitigation Act of 2000. Efforts to begin the should begin no later than January 2019. The city will inquire with the Utah Office of Emergency Management (UOEM) and FEMA for funds to assist. Funding sources may include the Emergency Management Performance Grants, Pre-Disaster Mitigation, Hazard Mitigation Grant Program (if a presidential disaster has been declared), and Flood Mitigation Assistance grant funds. Should a Pre-Disaster Mitigation planning grant be sought, the application should be submitted in 2014, as there is a three year performance period to expend the funds, plus there is no guarantee that the grant will be awarded the when initially submitted. This allows time to resubmit the grant in 2015 or 2016 if needed. The next plan is anticipated to be completed and reapproved by UOEM and FEMA Region VIII by November 2019.

### 7.2.2 Maintenance Evaluation Process

Evaluation of progress can be achieved by monitoring changes in vulnerabilities identified in the plan. Changes in vulnerability can be identified by noting:

Decreased vulnerability as a result of implementing recommended actions, Increased vulnerability as a result of failed or ineffective mitigation actions, and/or Increased vulnerability as a result of new development (and/or annexation).

Changes to this plan will follow the most current FEMA, UOEM and Salt Lake County planning guidance and consider the following:

- Consider changes in vulnerability due to project implementation, Document success stories where mitigation efforts have proven effective, Document areas where mitigation actions were not effective,
- Document any new hazards that may arise or were previously overlooked, Incorporate new data or studies on hazards and risks,
- Incorporate new capabilities or changes in capabilities,
- Incorporate growth and development-related changes to city inventories, and incorporate new project recommendations or changes in project prioritization. Document continued public involvement,
- Document changes to the planning process, which may include new or additional stakeholder involvement,
- Include a public involvement process to receive public comment on the d plan prior to submitting the d plan to UOEM/FEMA, and
- Include readoption by all participating entities following UOEM/FEMA approval.

In order to best evaluate any changes in vulnerability as a result of plan implementation, the EPC will follow the following process:

A representative from the responsible office identified in each mitigation measure will be responsible for tracking and reporting on an annual basis to the EPC on project status and provide input on whether the project as implemented meets the defined objectives and is likely to be successful in reducing vulnerabilities.

If the project does not meet identified objectives, the EPC will determine what additional measures may be implemented and an assigned individual will be responsible for defining project scope, implementing the project, monitoring success of the project, and making any required modifications to the plan.

Changes will be made to the plan to accommodate for projects that have failed or are not considered feasible after a review for their consistency with established criteria, the time frame, city priorities, and/or funding resources. Priorities that were not ranked high but were identified as potential mitigation strategies will be reviewed as well during the monitoring

and of this plan to determine feasibility of future implementation. Updating of the plan will be by written changes and submissions, as the EPC deems appropriate and necessary, and as approved by the Cottonwood Heights City Council. In keeping with the process of adopting the plan, a public involvement process to receive public comment on plan maintenance and updating will be held during the annual review period, and the final product will be re-adopted by City Council.

### **7.2.3 Incorporation into Existing Planning Mechanisms**

The mitigation strategy in Section 5.3 Mitigation Strategy of this plan recommends using existing plans and/or programs to implement hazard mitigation in the city, where possible. This point is also emphasized previously in this chapter. Based on this plan's capability assessment, the city has and continues to implement policies and programs to reduce losses to life and property from natural hazards. This plan builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implementing projects, where possible, through the following mechanisms:

- Flood mitigation plans
- Cottonwood Heights Community Wildfire Protection Plan
- Cottonwood Heights Recovery Plan (in development)
- Capital improvement plans and budgets Comprehensive Flood and Stormwater Master Plan Facilities and Asset Management Master Plan
- Greenways Master Plan Structure Protection Plan Transportation Master Plan
- Other plans, regulations, and practices with a hazard mitigation or loss prevention element

### **7.2.4 Continued Public Involvement**

Continued public involvement is also imperative to the overall success of the plan's implementation. The process provides an opportunity to publicize success stories from the plan implementation and seek additional public comment. At least one public meeting or workshop to receive public input will be held during the next period. When the EPC reconvenes for the , they will coordinate with all stakeholders participating in the planning process-including those that joined the committee since the planning process began-to and revise the plan. The plan maintenance and process will include continued public and stakeholder involvement and input through attendance at designated committee meetings, web postings, and press releases to local media.

