Childcare and Natural Hazards
State of Colorado
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Please use the following when citing this report:

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CHILD CARE AND NATURAL HAZARDS
State of Colorado
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Project Overview

In the state of Colorado, about half of all children age 0-5 are cared for in licensed childcare centers and in-home childcare settings on any given weekday. Yet, information about the relationship between childcare center location and natural hazards risk is limited. This represents an important gap because the number of disasters is on the rise in Colorado and because the youngest children are those who are most vulnerable to these events. This is true because infants and children age 0-5 are partially or totally dependent on adults for protection, support, comfort, and care. Colorado also only meets two of the four standards recommended as “essential” for basic disaster preparedness and safety in schools and childcare centers. This puts Colorado in the bottom half of all the states in the nation in terms of disaster planning for children, making it a location worthy of additional attention and study.

This project is funded by the Federal Emergency Management Agency (FEMA), National Preparedness Division, Region VIII. It is designed to focus attention on the number, location, and preparedness levels of licensed childcare centers and in-home childcare settings in the state of Colorado. The information included in this report provides an overview of the demographic composition of young children age 0-5 in Colorado; a summary of the number and location of licensed childcare facilities and in-home care settings throughout the state; and data on the types, frequency, and impacts of natural hazards in Colorado from 1960-2010.

Key Definitions

The Colorado Department of Human Services, Office of Early Childhood, Division of Early Care and Learning is responsible for the licensing and monitoring of childcare facilities in the State. In this report and the broader project, we focus on licensed facilities responsible for caring for the youngest children age 0-5 in Colorado.

In Colorado, a family childcare home (or in-home childcare setting) is required to be licensed when care is provided to 2 or more children on a regular basis at a place of residence. Children in this type of care are from different family households and are not related to the head of household.

In Colorado, a childcare center is required to be licensed when 5 or more children are in care at any one time. A large childcare center provides care for 16 or more children; a small childcare center provides care for 5-15 children.

In this report, for the sake of efficiency in writing, we refer to “childcare centers” throughout.

However, it should be noted that the data in this report encompasses both licensed family childcare

1 Colorado has a family-child reunification plan and a K-12 school multiple disaster plan; however, the state does not have an evacuation-relocation plan or a plan for children with special needs in disaster settings. For more information see: Save the Children. 2013. Is America Prepared to Protect Its Children? Disaster Preparedness in America: The 2013 Report. Westport, CT: Save the Children. Available at: http://www.savethechildren.org/site/c.8rKLIXMGIpI4E/b.8777053/k.F31D/Get_Ready_Get_Safe_Disaster_Report_Card.htm
homes and small and large childcare centers.

In addition to reporting on childcare settings in the state, we also analyze the human and economic impacts of various natural hazards, which include:

- avalanches,
- drought,
- flooding,
- fog,
- hail,
- landslides,
- lightning,
- severe weather (e.g., thunderstorms),
- tornadoes,
- wildfires,
- wind events,
- winter weather,
- and complex events, which refer to hazard incidents when more than one hazard type is present—for example severe thunderstorms which also cause localized flooding.

Focus

This report focuses on childcare centers, children age 0-5, and natural hazards events in the state of Colorado. The following overview sections include information on children, childcare providers, and hazards for the state of Colorado. The remainder of the report includes a county-by-county² breakdown of information on children, childcare, and hazards events and losses for the state.

Key Information for the State

Childcare Centers

- As of 2012, there were over 4,700 licensed childcare centers and licensed in-home family childcare settings in Colorado.
- The following table includes a breakdown of the number of licensed childcare facilities, by county³. Arapahoe County has the most licensed facilities with 576, followed by El Paso County (563), Jefferson County (518), and Denver County (501).

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² There are 64 counties in Colorado. Broomfield County was established in 2001. Because this report focuses on historical hazards losses (1960-2010), Broomfield County is excluded from the analyses and the report.
³ In this table and throughout the report, we include information on 50 counties where we had access to data on the number of childcare centers.
Number of Licensed Childcare Facilities, by County, in Colorado

<table>
<thead>
<tr>
<th>County</th>
<th>Childcare Facilities</th>
<th>County</th>
<th>Childcare Facilities</th>
<th>County</th>
<th>Childcare Facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arapahoe</td>
<td>576</td>
<td>Routt</td>
<td>35</td>
<td>Elbert</td>
<td>14</td>
</tr>
<tr>
<td>El Paso</td>
<td>563</td>
<td>Summit</td>
<td>35</td>
<td>Rio Grande</td>
<td>14</td>
</tr>
<tr>
<td>Jefferson</td>
<td>518</td>
<td>Delta</td>
<td>31</td>
<td>Las Animas</td>
<td>11</td>
</tr>
<tr>
<td>Denver</td>
<td>501</td>
<td>Yuma</td>
<td>29</td>
<td>San Miguel</td>
<td>11</td>
</tr>
<tr>
<td>Adams</td>
<td>360</td>
<td>Fremont</td>
<td>26</td>
<td>Washington</td>
<td>10</td>
</tr>
<tr>
<td>Larimer</td>
<td>351</td>
<td>Chaffee</td>
<td>25</td>
<td>Lake</td>
<td>9</td>
</tr>
<tr>
<td>Douglas</td>
<td>340</td>
<td>Otero</td>
<td>24</td>
<td>Rio Blanco</td>
<td>9</td>
</tr>
<tr>
<td>Weld</td>
<td>318</td>
<td>Kit Carson</td>
<td>20</td>
<td>Lincoln</td>
<td>8</td>
</tr>
<tr>
<td>Boulder</td>
<td>295</td>
<td>Montezuma</td>
<td>19</td>
<td>Saguache</td>
<td>8</td>
</tr>
<tr>
<td>Pueblo</td>
<td>205</td>
<td>Park</td>
<td>19</td>
<td>Baca</td>
<td>7</td>
</tr>
<tr>
<td>Mesa</td>
<td>168</td>
<td>Prowers</td>
<td>19</td>
<td>Bent</td>
<td>6</td>
</tr>
<tr>
<td>Garfield</td>
<td>85</td>
<td>Gunnison</td>
<td>18</td>
<td>Conejos</td>
<td>6</td>
</tr>
<tr>
<td>La Plata</td>
<td>59</td>
<td>Alamosa</td>
<td>16</td>
<td>Huerfano</td>
<td>5</td>
</tr>
<tr>
<td>Montrose</td>
<td>57</td>
<td>Moffat</td>
<td>16</td>
<td>Ouray</td>
<td>4</td>
</tr>
<tr>
<td>Eagle</td>
<td>52</td>
<td>Pitkin</td>
<td>16</td>
<td>Sedgwick</td>
<td>3</td>
</tr>
<tr>
<td>Morgan</td>
<td>44</td>
<td>Teller</td>
<td>16</td>
<td>Gilpin</td>
<td>2</td>
</tr>
<tr>
<td>Logan</td>
<td>38</td>
<td>Grand</td>
<td>15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Young Children in Colorado

- According to the US Census Bureau’s 2012 estimate, Colorado is home to approximately 5,189,458 people. Of these residents, approximately 342,443 (6.5%) are children under the age of 5.
- Based on the labor force participation of adults with children, Child Care Aware of America estimates that there are 243,786 children under the age of 6 in Colorado who are potentially in need of childcare.
- Most requests for childcare in Colorado are from those who are parents of infants, toddlers, and pre-school age children. Again, this age group is the focus of this report.

Hazards Profiles

- Colorado’s diverse landscape and climate produces a wide variety of natural hazard phenomena. What hazards risks exist in the state vary from place to place and depend on localized terrain, weather, and human exposure to these hazards.
- Between 1960 and 2010, conservative estimates indicate that 569 people have lost their lives and 1,842 were injured by natural hazards in Colorado.
- Between 1960 and 2010, natural hazards caused over $4.8 billion in property damage and over $640 million in crop damage.
- Wind, complex events, and winter weather are the most common hazard types in the state.
- Complex events account for the largest number of fatalities (239) although both lightning and
winter weather have also been fatal historically.
• Complex events, wind, and lightning have caused the most injuries in the state.
• Hail is the most costly natural hazard in Colorado. Property damage from hail exceeds $2.1 billion and crop damage from hail is estimated to be over $185 million between 1960 and 2010.

Summary of Natural Hazards Events and Losses in Colorado, 1960-2010

<table>
<thead>
<tr>
<th>Hazard Type</th>
<th>Events</th>
<th>Fatalities</th>
<th>Injuries</th>
<th>Property Damage</th>
<th>Crop Damage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avalanche</td>
<td>195</td>
<td>47</td>
<td>42</td>
<td>565,116</td>
<td>0</td>
</tr>
<tr>
<td>Complex Events</td>
<td>2,686</td>
<td>239</td>
<td>534</td>
<td>336,093,535</td>
<td>82,913,079</td>
</tr>
<tr>
<td>Drought</td>
<td>69</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>114,406,557</td>
</tr>
<tr>
<td>Flooding</td>
<td>386</td>
<td>27</td>
<td>57</td>
<td>1,026,818,108</td>
<td>18,005,975</td>
</tr>
<tr>
<td>Fog</td>
<td>6</td>
<td>1</td>
<td>3</td>
<td>410,353</td>
<td>0</td>
</tr>
<tr>
<td>Hail</td>
<td>602</td>
<td>1</td>
<td>122</td>
<td>2,178,978,694</td>
<td>185,224,236</td>
</tr>
<tr>
<td>Landslides</td>
<td>56</td>
<td>5</td>
<td>10</td>
<td>4,580,710</td>
<td>0</td>
</tr>
<tr>
<td>Lightning</td>
<td>591</td>
<td>128</td>
<td>343</td>
<td>16,355,122</td>
<td>93,985</td>
</tr>
<tr>
<td>Severe Weather</td>
<td>819</td>
<td>14</td>
<td>24</td>
<td>413,407,424</td>
<td>53,083,546</td>
</tr>
<tr>
<td>Tornadoes</td>
<td>340</td>
<td>3</td>
<td>154</td>
<td>93,398,482</td>
<td>26,902,957</td>
</tr>
<tr>
<td>Wildfire</td>
<td>71</td>
<td>0</td>
<td>6</td>
<td>337,388,380</td>
<td>20,000</td>
</tr>
<tr>
<td>Wind</td>
<td>2,963</td>
<td>20</td>
<td>442</td>
<td>185,059,726</td>
<td>38,748,226</td>
</tr>
<tr>
<td>Winter Weather</td>
<td>2,287</td>
<td>84</td>
<td>105</td>
<td>259,991,915</td>
<td>124,041,326</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>11,071</td>
<td>569</td>
<td>1,842</td>
<td>4,853,047,565</td>
<td>643,439,887</td>
</tr>
</tbody>
</table>
Total Number of Hazards Events, by County in Colorado, 1960 – 2010

The following map shows the total number of hazard events by county between 1960 and 2010. Arapahoe, El Paso and Jefferson counties experienced the most events, while Ouray, Sedgwick and Gilpin counties experienced the fewest.
Number of Injuries from Natural Hazards, Colorado, 1960 – 2010

It is estimated that 11,071 people were injured by natural hazards in Colorado between 1960 and 2010. There is large inter-year variation in the number of injuries from natural hazards with the highest numbers occurring in 1976 and 1989. On the whole, the number of injuries from natural hazards in the state is declining between 1960 and 2010.

The number of injuries from natural disasters in Colorado are on the decline at a rate of about -0.407 per year.
**Number of Fatalities from Natural Hazards, Colorado, 1960 – 2010**

Between 1960 and 2010, approximately 569 people died as the direct result of natural hazard events. During normal years, fatalities from natural hazards remain below 15. In 1976, 160 people lost their lives as the result of natural hazards. The majority of these deaths can be attributed to the Big Thompson Canyon.

The number of fatalities from natural hazard events in Colorado are on the decline at -0.148 per year.
Annual Property Damage from Natural Hazards, Colorado, 1960 – 2010

Property damage from natural hazards exceed $4.8 billion dollars between 1960 and 2010. The majority of these losses occurred in 1965, 1990, 1997 and 2009. On the whole, property losses from natural hazards are increasing.

Property damage from natural hazard events in Colorado are on the rise at a rate of approximately $2.732 million per year.
Annual Crop Damage from Natural Hazards, Colorado, 1960 – 2010

Total crop losses from natural hazards exceeded $640 million between 1960 and 2010. There is large inter-year variation in crop damage with 1989 being an exceptionally difficult year for Colorado agriculturalists. On average, crop losses from natural hazards are increasing.

Crop damage from natural hazard events in Colorado are on the rise at a rate of approximately $153,000 per year.
**Approach**

To complete this project, our team analyzed 50 years of county-level hazards impacts data from the Spatial Hazard Events and Losses Database for the United States (SHELDUS), version 10.0.\(^4\) These data, which span from 1960-2010, represent the most comprehensive inventory of losses from natural hazards in the United States. The hazard data was transformed for this research by collecting the total losses in a county in Colorado by impact type and by hazard type. Shapefile data used in the mapping procedures were obtained from the U.S. Census and include the Tiger/Line Shapefiles from the U.S. Census for 2010. Other census data used in this research includes the number of children age 0–5 in a county. All census data is available for download at http://www.census.gov/geo/www/tiger/shp.html. Data manipulation was performed using the statistical program STATA version 10 and all geographic analyses were done using ESRI ArcGIS version 10.1.

Measures of natural hazards losses used in this research include: injuries, fatalities, property damage, and crop damage.

Our research team has also conducted additional analyses by hazard type and losses. For example, our project team has already mapped losses, by county, by specific hazard (e.g., tornado events in Colorado over the past 50 years). Additional analyses and maps of loss and damage data are available upon request.

Estimates for the racial and ethnic composition of Colorado counties was obtained from the Annual County Resident Population Estimates by Age, Sex, Race, and Hispanic Origin: April 1, 2000 to July 1, 2010 (CC-EST2010-ALLDATA) available at http://www.census.gov/popest/research/eval-estimates/eval-est2010.html.

**Organization of the Report**

The remainder of this report is organized in the following manner. We dedicate two pages to each county in the state of Colorado. On the first page, we report on demographic characteristics of children – with a special focus on indicators such as poverty that are known to amplify disaster vulnerability – and the location of childcare centers for each county in the state. On the second page, we then report on hazards events over the past 50 years for that county. We examine the number of hazards events, by type, and also report on hazards losses in terms of fatalities, injuries, property losses, and crop losses. With vulnerability characteristics on every other page, this report, can thus be used as a resource to look at specific counties or to compare childcare data and hazards experiences across counties.

**Limitations**

As with any project, there are some limitations to this report. Not all counties have data available for the estimated number of children without insurance. Only more populous counties have these estimates. Also, all non-licensed childcare facilities and settings are excluded from the report as these facilities are unaccounted for in the available data on childcare facilities regulated by the

state. Because the SHELDUS database we used only includes data from natural hazards losses, we were not able to report here on historical trends regarding technological accidents or willful acts of human violence (such as mass shootings or terrorism) in this report. SHELDUS data are also limited for certain hazard types. For instance, loss totals for avalanches and wildfires are highly conservative due to limited availability of reliable historical data for these hazards.

Acknowledgements

This project, “Childcare and Natural Hazards: State of Colorado,” was funded by the Federal Emergency Management Agency (FEMA), National Preparedness Division, Region VIII. We would like to thank our FEMA collaborators, Daniel Nyquist, Timothy Deal, and Stephanie Poore, for their trust, support, enthusiasm, and numerous contributions to this work. David Collins and Kathi Wagoner, both with the Colorado Department of Human Services, provided the childcare data that made this entire project possible. We would also like to thank the members of our faculty research team and community and professional advisory team for their assistance with this project, as well as the undergraduate and graduate research assistants at Colorado State University’s Center for Disaster and Risk Analysis.