3.11 RISK ASSESSMENT: SEVERE STORMS

DESCRIPTION

A severe storm is an atmospheric disturbance that results in one or more of the following phenomena: strong winds and large hail, thunderstorms, tornadoes, rain, snow, or other mixed precipitation. Of the 22 Presidential Disaster declarations in Idaho since 1970, six have been attributed to “storms” or “severe storms” at least in part. Of the six Federal disasters in Idaho that have been attributed to a “storm,” five have occurred during winter months. Several damaging elements of severe storms are detailed as their own hazard elsewhere in this document (flooding, dam/levee/canal failure, lightning, and wind/tornadoes). The following section deals primarily with winter storms and secondarily with thunderstorms and hail.

Winter Storms

Winter storms range widely in size, duration, and intensity. These storms may impact a single community or a multi-State area. They may last hours or days. The severity of storms can range from a small amount of dry snow to a large, blanketed area of wet snow and ice. Generally, winter storms are characterized by low temperatures and blowing snow.

A severe winter storm is defined as one that drops 4 or more inches of snow during a 12-hour period, or 6 or more inches during a 24-hour span. A blizzard is a winter storm with winds exceeding 35 miles per hour and temperatures of 20°F or lower. Strong winds can lower the effective temperature through “wind chill.” An ice storm occurs when cold rain freezes immediately on contact with the ground, structures, and vegetation.

The principal hazards associated with severe winter storms are:

- Snow and/or ice accumulation
- Extreme cold
- Significant reduction of visibility

In Idaho, the NWS criteria (National Weather Service – Pocatello, Idaho) for issuing winter storm and accompanying hazardous condition notifications to the public are:
**Winter Storm Watch:** Potential exists for a blizzard, heavy snowfall, ice storm, and/or strong winds within the next 72 hrs;

**Blizzard Warning:** Winds of at least 35mph and falling/drifting snow frequently reduce visibility to less than ¼ mile, for 2 hours or more;

**Heavy Snow Warning:** (Valleys) 6 inches or more snowfall in 24 hours; (Mountains) 9 inches or more snowfall in 24 hours;

**Ice Storm Warning:** Ice accumulations of at least ¼ inch are expected over the next 24 hours;

**Sleet Warning:** Sleet accumulations of at least ¾ inch are expected over the next 24 hours;

**Winter Storm Warning:** Heavy snow in combination with wind, freezing rain, or wind chill is occurring or expected;

**Blowing/Drifting Snow Advisory:** Occurring or imminent blowing/drifting snow will cause significant travel problems;

**Freezing Rain/Drizzle Advisory:** Occurring or imminent freezing rain/drizzle may lead to life-threatening circumstances;

**Snow Advisory:** (Snake Plain Only) 3 to 5 inches of snow accumulation expected in the next 24 hours;

**Winter Weather Advisory:** (Snake Plain Only) A combination of snow, wind, freezing rain, etc. that will create inconvenience but not reach warning criteria, is expected; and

**Avalanche Warning:** (issued by avalanche centers) snow pack conditions indicate the potential for significant avalanches.

**Thunderstorm – Hail**

The NWS definition of “hail” is showery precipitation in the form of irregular pellets or balls of ice more than 5 mm in diameter, falling from a cumulonimbus cloud. Hail is a product of thunderstorms and their dynamic internal winds. Air cycles vertically through the storm mass, known as a “cell.” At the earth’s surface, air is warmed and rises through the cell. As it reaches the higher atmosphere (cells can rise tens of thousands of feet above the surface), it cools and drops back to the surface, replacing warm air rising from the base of the cell. This ongoing cycle captures and carries water droplets up to a height where freezing occurs. The resultant ice particles grow during each up-and-down cycle within the storm cell, until, too heavy to be carried by the rising air, they fall to the ground as hail. Hail is produced in a wide range of sizes and falls in varied quantities. Hail of ¾ inch or greater diameter is sufficient to classify a thunderstorm as “severe.”
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RISK ASSESSMENT: SEVERE STORMS

LOCATION, EXTENT, AND MAGNITUDE

Winter Storms

Past winter storm disasters have been focused in the western and northern portions of the State, but severe winter storms are possible throughout Idaho. Table 3.11.A presents the winter storm hazard ranking for Idaho’s 44 counties, according to BHS.

<table>
<thead>
<tr>
<th>IMPACT/PROBABILITY</th>
<th>LOW (GREEN)</th>
<th>MEDIUM (YELLOW)</th>
<th>HIGH (RED)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOW (GREEN)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MEDIUM (YELLOW)</td>
<td>Ada, Bannock, Bear Lake, Bingham, Bonneville, Butte</td>
<td>Cassia, Franklin, Jefferson, Owyhee, Shoshone, Twin Falls</td>
<td></td>
</tr>
</tbody>
</table>

Notes: Definitions for Probability: High = Situated in winter storm patterns, severity and duration of storms, proximity to higher elevations, Medium = Situated in less severe storm patterns, lower elevations, shorter duration of storms, Low = Normally mild winter seasons, infrequent winter storms

Definitions for Impact: High = Population congestion and concentration, transportation corridors and power delivery significantly disrupted, agricultural operations hampered or damaged, susceptibility to hardships caused by cold, excessive snow and wind, vulnerable population, Medium = More dispersed population, transportation corridors more easily maintained, population acclimatized towards and experienced in severe weather, Low = Population adapted to severe winter weather, transportation corridors regularly maintained, situated in milder climate patterns.

Source: Idaho Bureau of Homeland Security
Aspects of a snowstorm’s magnitude can be measured in inches of snow accumulation and wind speeds; the magnitude of hailstorms can be measured by the diameter of the average hail particle. Specific size thresholds for defining certain kinds of storms are listed above under “Description.”

For winter storm disaster declarations, a county must have experienced a record or near-record snowfall (or meet FEMA’s contiguous county criteria). A record snowfall is defined by FEMA as one that meets or exceeds the highest record snowfall within a county over a 1-, 2-, 3-day or longer period of time, as published by the NCDC. A near-record snowfall means a snowfall that approaches, but does not meet or exceed, the historical record snowfall within a county as published by the NCDC; FEMA generally considers snowfall within 10 percent of the record amount to be a near-record snowfall.

**Thunderstorm – Hail**

Thunderstorm and hail events can and do occur across the entire state.

**PAST OCCURRENCE**

Map 3.11.E, at the end of this section, shows the locations of past major severe storms, summarized at the county level. This information has been compiled from a number of sources, a majority of the data coming from SHELDUS and NCDC databases, and includes both severe summer and winter storms.

**Winter Storms**

Table 3.11.B, below, lists the State Disaster declarations, and associated Federal declarations when applicable, that resulted from severe winter storms from 1972 to 2013.

<table>
<thead>
<tr>
<th>Date</th>
<th>Counties Listed in Declaration</th>
<th>Federal Disaster ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 1972</td>
<td>[unknown]</td>
<td>DR 324 “Idaho Severe Storms, Snowmelt, Flooding”</td>
</tr>
<tr>
<td>January 1989</td>
<td>Bonner, Clark</td>
<td>N/A</td>
</tr>
<tr>
<td>January 1993</td>
<td>Jerome</td>
<td>N/A</td>
</tr>
<tr>
<td>January 1994</td>
<td>Elmore</td>
<td>N/A</td>
</tr>
<tr>
<td>February 2006</td>
<td>Owyhee</td>
<td>DR 1630 “Idaho Severe Storms and Flooding”</td>
</tr>
<tr>
<td>2008</td>
<td>Bonner, Boundary, Kootenai, Latah,</td>
<td>N/A</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Date</th>
<th>Counties Listed in Declaration</th>
<th>Federal Disaster ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>Benewah</td>
<td>N/A</td>
</tr>
<tr>
<td>2012</td>
<td>Bonner, Idaho, Latah, Shoshone</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Source: Federal Emergency Management Agency

**March 1972:** Federal disaster declared for severe storms and associated snowmelt and flooding conditions in Idaho.

**January 1974:** Federal disaster declared for severe storms and associated extensive flooding in Idaho.

**Clark County, 1989:** Severe winds and blizzard conditions kept ranchers from reaching livestock.

**Northern Idaho, 1996:** The third week of January brought large amounts of low-elevation snow, especially in the Panhandle region, where stations measured an additional 10 inches of snow. By the end of January, sites in the north had as much as 2½ feet of snow on the ground.

During the last week of January, temperatures dropped below 0, and highs remained in the single digits, causing ice to form on many rivers. Subsequent warming led to extensive flooding throughout the region.

On February 11, 1996, the President declared a major disaster in the State of Idaho (designated DR-1102). Ten counties and the Nez Perce Indian reservation were declared eligible for assistance. As of February 1, 2001, this assistance included $22,635,325 in public assistance, $71,639 in individual assistance, $301,081 from the NRCS, and $5,022,353 in hazard mitigation grants. Although much of this damage derived from flooding, the preceding storm clearly contributed to the disaster.

**Northern Idaho, November 1996 – January 1997:** In the last months of 1996, significant early season storms caused extensive damage and subsequently led to severe landslides and flooding throughout Northern Idaho. By many measures, this was a significant series of storms. Mountain snow packs were holding more than 150 percent of their normal water content. Snowfall in areas of the Panhandle counties sometimes exceeded the design loads of buildings.

During November 16-21, 2 to 3 feet of snow were dumped in the Bonners Ferry area, collapsing roofs of businesses, schools, and homes. On November 19, freezing rain produced 1 inch of ice in Kootenai, Clearwater, and Idaho Counties. Strong winds and the ice toppled numerous trees and power lines. Power outages lasted for weeks. Additional above-normal snowfall fell in late December throughout Northern and Central Idaho. Subsequent warm rains produced heavy runoff that overwhelmed rivers and led to flooding and widespread landslides.
On January 4, 1997, the President declared a major disaster (DR-1154) in 18 counties, making them eligible for Federal assistance. As of February 1, 2001, assistance included $19,404,105 in public assistance, $39,988 in individual assistance, $125,937 from the NRCS, $576,314 from the U.S. Army Corps of Engineers, and $5,593,892 in hazard mitigation grants.

**Owyhee County, 2006:** A Federal disaster was declared for a storm that hit Owyhee County between December 30, 2005, and January 4, 2006.

**Northern Idaho, 2008:** A State disaster was declared for a storm that brought heavy snow to Bonner, Boundary, Kootenai, Latah, and Shoshone counties.

**Benewah County, 2009:** A State disaster was declared for a storm that brought severe winter weather to Northern Idaho, specifically for Benewah County.

**Northern Idaho, 2012:** A State disaster was declared for a storm that brought severe winter weather to Bonner, Idaho, Latah, and Shoshone counties.

Other notable storms in the recent past that were not declared, but worthy of documenting in this plan can be found below.

**Treasure Valley, 2013:** Icing conditions, the worst in 30 years according to Boise NWS forecasters, were reported in Idaho’s Treasure Valley on Wednesday (1/23/13) and Thursday (1/24/13) due to a prolonged cold snap. Roadway icing forced closure of 83 miles of Interstate 84 between Boise and Bliss where dozens of long-haul trucks were observed sliding off the highway. I-84 was reported reopened Thursday afternoon after de-icing operations. Burst frozen piping affected over a thousand customers in Boise and surrounding communities and prompted fire department responses to fire sprinkler water flow alarms.

**Thunderstorms/Hail**

Hail falls in various locations throughout the State every year. Significant events are most common in summer. For example, in June 1996, golf-ball-sized hail was reported in Bonneville County. According to NCDC data, an August 1997 storm caused a $1 million of property damage in Bannock County, and a July 1998 storm caused $5 million in crop damage in Latah County. No State or Federal Disaster declarations or any deaths been reported as the result of hail damage in the State.

**FUTURE OCCURRENCE**

**Winter Storms**

Three climactic factors combine to produce winter storms:

**Cold Air:** below-freezing temperatures in the clouds and near the ground are necessary to make snow and/or ice.

**Moisture:** forms clouds and precipitation; air blowing across a body of water, such as a large lake or the ocean, is an excellent source of moisture.
Lift: something to raise the moist air to form the clouds and cause precipitation. An example of lift is warm air colliding with cold air and being forced to rise over the cold dome. The boundary between the warm and cold air masses is called a front. Another example of lift is air flowing up a mountainside.

In the northwest, including Idaho, winter storms are often caused by strong storms from the North Pacific crossing the coast from California to Washington. The vast Pacific provides an unlimited source of moisture for storms. If the air is cold enough, snow falls over Washington and Oregon and sometimes even in California. As the moisture rises into the mountains, heavy snow closes the mountain passes and can cause avalanches. The cold air from the north has to filter through mountain canyons into the basins and valleys to the south. If the cold air is deep enough, it can spill over the mountain ridge. As the air funnels through canyons and over ridges, wind speeds can reach 100 mph, damaging roofs and taking down power and telephone lines. The combination of these winds with snow results in a blizzard.

The occurrence of severe winter storms is, to a large part, dependent on broad climatic trends. These trends are difficult to forecast and the assumptions underlying the projection of future vents are subject to intense debate. The relatively high frequency of these events in the 1990s may reflect a change in the overall pattern, or it may be only a minor deviation from the norm.

It is consequently difficult to generate any hard estimates of future storm frequency or intensity. It is reasonable to suspect, however, that the relatively moderate climate of Idaho will continue to limit the number and severity of winter storms within historical ranges.

Although past disasters have been focused in the western and northern portions of the State, severe winter storms are possible throughout Idaho. All of the State is rated by FEMA as subject to “moderate snowfall” or “heavy snowfall”. As population growth and development continues, the possibility of significant damage will increase.

Thunderstorm/Hail
Severe thunderstorms are most likely in Idaho during the spring and summer months. The probability of severe thunderstorms is increased if strong upper-level winds are present in conjunction with a moist and unstable atmosphere. Such conditions are most likely in association with the passage of a cold front from west to east across the State, with warm, moist air ahead of the front. Strong areas of upper-level low pressure over the Pacific Northwest can also create favorable conditions for severe thunderstorms in Idaho. Other weather patterns favorable for severe thunderstorm formation include monsoon moisture from the desert southwest working its way northward into Idaho. This weather pattern is usually associated with an unstable atmosphere conducive to the formation of thunderstorms in midsummer. Hail damage can be expected to continue for all areas of the state.

RELATIONSHIPS TO OTHER HAZARDS
Severe storms do influence a large number of other hazards, mainly due to the associated precipitation that accompanies those events. Rainfall, hail, and snowfall from storms play a major role in the hazard
of flooding, where rainfall amount, intensity, and duration can correlate with the impacts of a flood event. Rain-on-snow events can further exacerbate these types of events. This flooding can also then increase the likelihood for dam, levee, and canal failures. Precipitation, as well as the associated freeze and thaw cycles that storms can create, are also a major causes of landslides, through a number of mechanisms. This is also true for avalanches, where snow loading or rain-on-snow events can trigger a slide.

There are also beneficial relationships between severe storms and other hazards. Precipitation caused by severe storms can decrease the susceptibility to wildfire events. Similarly, long-term or repeat precipitation events can also help to lessen drought conditions.

Extreme cold temperatures and precipitation can also negatively impact some human-caused hazards. One way is by impacting the agriculture sector, which could lead to food shortages which can contribute to civil disturbances. Severe storms also increase transportation-related accidents, which are what cause most hazardous material events. Ice forming on power or communication lines, in extreme cases, could lead to energy shortages and cyber disruptions. Cold weather also is tied to increased illness, which could influence the chances of a pandemic event. Although not directly tied to cold temperatures, cold weather forces humans indoors, which increases the ability to transmit disease.

Lightning and wind/tornado are also associated with severe storms, but are covered in their own hazard sections.

**ENVIRONMENTAL IMPACTS**

Impacts of a winter storm on vegetation and wildlife can include death, depending on the timing of the storm (i.e., late in the spring after blooms or early in the fall, prior to leaf fall). However, it is unlikely that severe storms would jeopardize the existence of rare species or vegetative communities throughout the State. The loss of crops or livestock due to hail can have far-reaching economic effects (detailed more under “Vulnerability”). Damage to trees from hail or heavy snowfall can have a relatively short-term alteration of the visual landscape, but the long-term recovery of natural resources from these effects is likely. Both hail and heavy snowfall can damage historic structures, particularly roofs, requiring restoration activities. Severe winter storms and hail are unlikely to impact geology and soils. Rain-on-snow events increase the potential for flooding and the resulting damages to the natural environment. Direct impacts from severe winter storms can include a downturn in recreational activities due to dangerous conditions and damaged infrastructure, but indirect impacts can include improved winter recreation from increased snowfall. Indirect effects of heavy snowfall can also include a higher risk of flooding, but the improved water supplies would decrease the risk of drought and improve agriculture and water-based recreation after the winter.

**DEVELOPMENT TREND IMPACTS**

The threat of severe storms, particularly the effects of winter storms, has undoubtedly impacted development in Idaho. This is especially true for utilities and transportation facilities, which typically
suffer the greatest losses from these events. Hail can have a devastating impact on crops, although the timing of the storm in relation to the maturity of the crop greatly influences the amount of damage. Severe cold temperatures late in the spring or early in the fall can also have devastating effects on crop production. As long as development trends continue to focus on mitigation measures as they relate to severe storms, increased development may not correlate to an increase in potential losses.

**CRITICAL INFRASTRUCTURE AND STATE FACILITY IMPACTS**
No critical or State facilities in Idaho are completely safe from threat of severe storms. Threats include loss of power and productivity from damages to utilities and transportation corridors to these places of work. Heavy snows can directly impact these facilities by causing roof failures or falling trees and limbs.

**VULNERABILITY ASSESSMENT**
Severe storms can be particularly difficult to mitigate for and recover from because of their varied and widespread nature. The rural nature and difficult terrain found in much of the State can make repairs particularly challenging for utility and transportation resources. As stated previously, the western and northern counties are particularly vulnerable to severe winter storms. Peak snowfalls and the coldest temperatures tend to occur in the higher elevations. There are low-elevation locations in Idaho that do not experience a single month with a mean temperature below freezing.

According to SHELDUS data, 85 deaths have been caused by snowstorms since 1960. This equates to 1.63 deaths a years.

An area may be less vulnerable if it participates in the NWS “StormReady” Program. There are presently 37 counties, 127 communities, and five government sites that have StormReady status within Idaho (http://www.stormready.noaa.gov/com-maps/id-com.htm). These numbers have increased from those reported in the 2010 State Plan, similarly to the increase observed between the 2010 and 2007 Plans. In addition, one Indian Nation, two universities, and seven supporting entities (e.g., an airport or news broadcaster) have StormReady status. Map 3.11.C illustrates the number and location of jurisdictions that have attained StormReady status.
Map 3.11.C: Idaho Storm Ready Status. Gold Shading: StormReady County; Blue Dot: StormReady Community; Green Outline: StormReady Indian Nation; Purple Dot: StormReady University; Purple +: StormReady Supporter (e.g., airport or news broadcaster).

Local Hazard Mitigation Plan Vulnerability Assessments
The 47 local mitigation plans produced throughout Idaho were analyzed to determine the major hazards in each jurisdiction. A majority, 38 jurisdictions, indicated that severe storms were a major hazard (see Map 3.11.F at the end of this section). This number has increased by three localities since the 2010 plan update, with Ada, Lewis, and Washington counties now also considering severe storm to be a major threat.

LOSS ESTIMATION
No specific, statewide loss estimation exists for the hazard of severe storms. Historical losses are sometimes reported with the resulting flooding or avalanche events that are triggered by severe storms. However, severe storms can also have losses reported uniquely as their own event.

From a general perspective, severe storms damage and destroy public, commercial, and private property, including livestock, structures, and infrastructure. Additional costs can stem from snow/debris removal, maintenance, and response. Road and railroad closures are not uncommon. The economic costs of these disruptions can be significant, especially in areas with limited access options.

Local Hazard Mitigation Plan Loss Estimations
The 47 local mitigation plans produced throughout Idaho were analyzed to determine the major hazards in each jurisdiction. A majority, 38 jurisdictions, identified severe storms as such. Table 3.11.D summarizes the loss estimates for winter storms from these 38 local plans.

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>Loss Estimate for Severe Storms</th>
<th>Note on Methodology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ada Co.</td>
<td>$13,701,741,516</td>
<td>Assumed 30% Damage of Assessed Building Value</td>
</tr>
<tr>
<td>Adams Co.</td>
<td>Not indicated</td>
<td></td>
</tr>
<tr>
<td>Bannock Co.</td>
<td>$1,000,000s</td>
<td>Historical Average</td>
</tr>
<tr>
<td>Bear Lake Co.</td>
<td>Not indicated</td>
<td></td>
</tr>
<tr>
<td>Benewah Co.</td>
<td>Not indicated</td>
<td></td>
</tr>
<tr>
<td>Bingham Co.</td>
<td>Not indicated</td>
<td></td>
</tr>
<tr>
<td>Blaine Co.</td>
<td>$100,000s</td>
<td>From Magnitude Table Loss Estimations</td>
</tr>
<tr>
<td>Boise Co.</td>
<td>Not indicated</td>
<td></td>
</tr>
<tr>
<td>Bonner Co.</td>
<td>$4,585,672,000</td>
<td>Other than Historical Average or % Geographic Area</td>
</tr>
<tr>
<td>Boundary Co.</td>
<td>Not indicated</td>
<td></td>
</tr>
<tr>
<td>Butte Co.</td>
<td>$1,000,000s</td>
<td>Historical Average</td>
</tr>
<tr>
<td>Camas Co.</td>
<td>Not indicated</td>
<td></td>
</tr>
<tr>
<td>Canyon Co.</td>
<td>Not indicated</td>
<td></td>
</tr>
<tr>
<td>Caribou Co.</td>
<td>Not indicated</td>
<td></td>
</tr>
<tr>
<td>Cassia Co.</td>
<td>$1,000,000s</td>
<td>Historical Average</td>
</tr>
<tr>
<td>Clark County</td>
<td>$1,000,000s</td>
<td>Historical Average</td>
</tr>
</tbody>
</table>
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TABLE 3.11.D: LOSS ESTIMATES FROM LOCAL PLANS FINDING SEVERE STORMS TO BE A TOP HAZARD

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>Loss Estimate for Severe Storms</th>
<th>Note on Methodology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clearwater Co.</td>
<td>Not indicated</td>
<td></td>
</tr>
<tr>
<td>Custer Co.</td>
<td>$1,000,000s</td>
<td>Historical Average</td>
</tr>
<tr>
<td>Duck Valley Indian Reservation</td>
<td>$ 72,325,766</td>
<td>Other than Historical Average or % Geographic Area</td>
</tr>
<tr>
<td>Elmore Co.</td>
<td>$489,318,497</td>
<td>Combined Estimated Losses from Wind + Tornado</td>
</tr>
<tr>
<td>Franklin Co.</td>
<td>$ 1,000,000s</td>
<td>Historical Average</td>
</tr>
<tr>
<td>Fremont Co.</td>
<td>$ 1,000,000s</td>
<td>Other than Historical Average or % Geographic Area</td>
</tr>
<tr>
<td>Gem Co.</td>
<td>Not indicated</td>
<td></td>
</tr>
<tr>
<td>Gooding Co.</td>
<td>Not indicated</td>
<td></td>
</tr>
<tr>
<td>Idaho Co.</td>
<td>Not indicated</td>
<td></td>
</tr>
<tr>
<td>Jerome Co.</td>
<td>$ 1,000,000s</td>
<td>Historical Average</td>
</tr>
<tr>
<td>Lemhi Co.</td>
<td>$ 100,000s</td>
<td>Historical Average</td>
</tr>
<tr>
<td>Lewis Co.</td>
<td>Not indicated</td>
<td></td>
</tr>
<tr>
<td>Lincoln Co.</td>
<td>Not indicated</td>
<td></td>
</tr>
<tr>
<td>Madison Co.</td>
<td>$ 100,000s</td>
<td>Historical Average</td>
</tr>
<tr>
<td>Minidoka Co.</td>
<td>$ 100,000s</td>
<td>Historical Average</td>
</tr>
<tr>
<td>Oneida Co.</td>
<td>$ 100,000s</td>
<td>Historical Average</td>
</tr>
<tr>
<td>Owyhee Co.</td>
<td>Not indicated</td>
<td></td>
</tr>
<tr>
<td>Power Co.</td>
<td>$ 100,000s</td>
<td>Historical Average</td>
</tr>
<tr>
<td>Shoshone Co.</td>
<td>$ 771,830,042</td>
<td>Total Improvement Values</td>
</tr>
<tr>
<td>Teton Co.</td>
<td>$ 100,000s</td>
<td>Historical Average</td>
</tr>
<tr>
<td>Twin Falls Co.</td>
<td>&quot;Sheltering Requiring Neighboring Counties’ Help or Major Business Interruption&quot;</td>
<td>Historical Average</td>
</tr>
<tr>
<td>Washington Co.</td>
<td>Not indicated</td>
<td></td>
</tr>
</tbody>
</table>

Source: Idaho’s Local Hazard Mitigation Plans

MITIGATION RATIONALE

Winter storms have been the cause for five Presidential disaster declarations since 1972 (28 years), which is the same as the number of wildfire disaster declarations. Damaging storms can result in casualties and extensive property damage, including impairment of economic activity throughout the State. However, considering that a large part of the damages from winter storms are due to flooding, as indicated in their FEMA names (see Table 3-22 above), and the fact that many of the damages are small, compared to potential damages from earthquakes or large wildfires, mitigation for winter storms above
and beyond that for flooding does not merit the attention given to the top three hazards in this State Plan. Nonetheless, BHS has concluded from several regional and county workshops that local emergency managers consider power outages during severe snowstorms to be a significant and probable hazard.

**Policy Framework**
Mitigation of severe storms hazards is established, generally, in the Idaho Disaster Preparedness Act of 1975 as amended (Idaho State Code Chapter 10, Title 46) and, more specifically, in the Governor’s Executive Order, 2000-04. No agency is specifically assigned responsibility for storm-related mitigation, but the BHS is assigned the general responsibility for coordinating mitigation for all hazards.

**Existing Mitigation Planning Programs**

**Local Government**
Mitigation of severe storms begins with local governments adopting building codes that protect facilities and homes. Facilities and buildings are to be built, per the IBC, to withstand basic wind speeds of a 90-mph, 3-second gust. This may be higher in special regions along the Montana border. See the Idaho State Climate Services (http://snow.cals.uidaho.edu/index.html) for information. Snow loads are also determined by the IBC, and historical snow loads for individual counties can be found at the Idaho State Climate Services. For additional information, see the State Division of Building Safety recommendations at http://dbs.idaho.gov/building/loads.html.

An additional important action taken by local communities is participation in the NWS “Storm Ready” Program. See Map 3.11.C, above, for the status of participation in this program throughout the State.

**GENERAL MITIGATION APPROACHES**

**Hazard Management**
Structures in winter storm hazard areas should be designed and built to withstand the projected snow (and ice) loads. Non-occupancy buildings, such as greenhouses and storage sheds, which are not subject to building codes, should be given special attention. High-cost or difficult-to-replace property should not be stored outside in high-risk areas.

Critical facilities in areas of high storm hazard should be designed and managed to withstand likely storm impacts such as power outages, personnel shortages, and property damage.

**Information/Outreach and Public Education**
Residents and property owners should be informed of storm hazards and educated in safety and mitigation techniques.
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Infrastructure
Snow fencing and related technologies should be constructed in areas where important highways are at risk of blockage during storm events. Utility lines should be placed underground where feasible. Aboveground utility lines should be kept free of potentially damaging vegetation.

Regulatory
Adoption and enforcement of appropriate building codes and construction standards can significantly reduce damages caused by severe storms.

Winter storm, Worley, ID 2008, Union Pacific freight train immobilized by snow
Source: BHS
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RISK ASSESSMENT: SEVERE STORMS

PAST OCCURRENCE
SEVERE STORM

Note: 'Major' events are defined by the reporting source and do vary somewhat. Generally, these are events that produced losses or fatalities. Additional details concerning source data can be found in Appendix A of this document.

NUMBER OF MAJOR EVENTS
- 45 - 64
- 65 - 83
- 84 - 103
- 104 - 129

Map 3.11.E: Severe Storm Identified as Local Plan Major Hazard
CHAPTER 3
RISK ASSESSMENT: SEVERE STORMS

Map 3.11.F: Past Severe Storm Occurrence

LOCAL PLAN'S MAJOR HAZARDS - SEVERE STORM

Note: The Top 3 'Major' hazards, as identified within all Local Hazard Mitigation Plans, were compiled for this map.

IDENTIFIED JURISDICTION

Northern
North Central
Northeast
Southwest
Central
Southeast

STATE OF IDAHO HAZARD MITIGATION PLAN 2013