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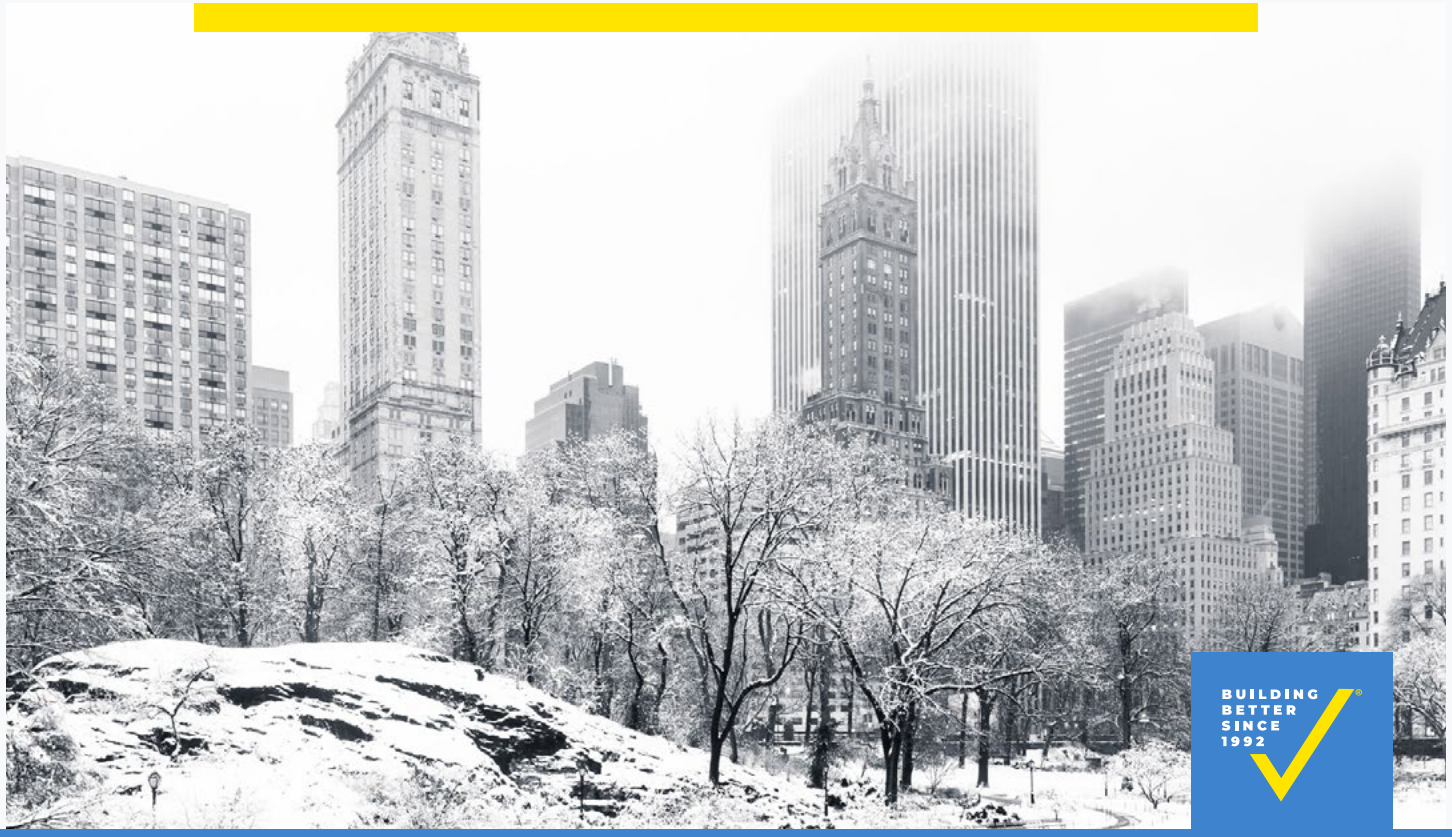
Winterization Preparedness

Empowering your community to thrive through harsh winters, unforeseen challenges, and evolving demands.



BUILDING BETTER SINCE 1992

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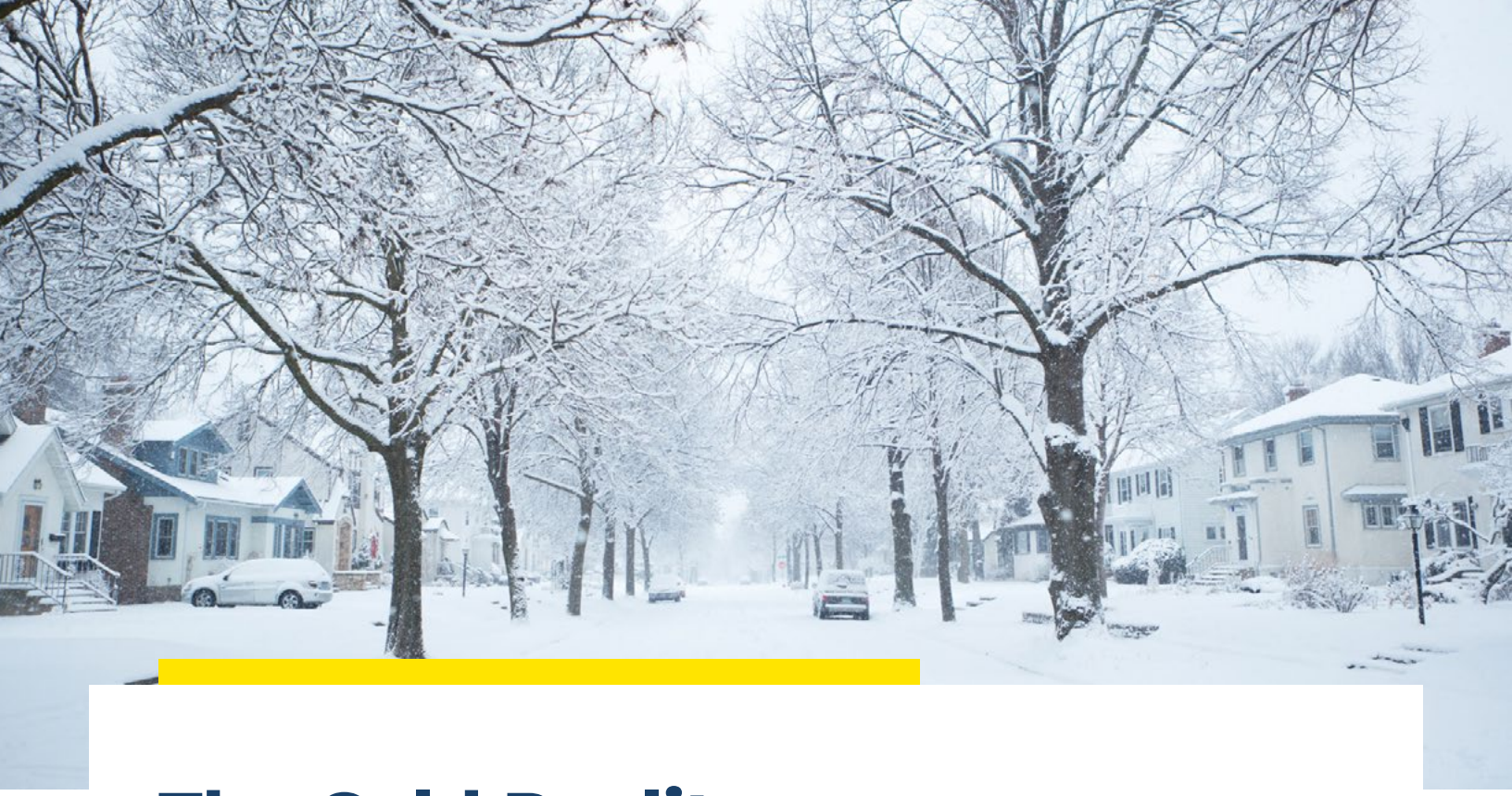


The Cold Reality:

Winter in Harsher Environments

In regions where winter brings plummeting temperatures and icy conditions, “winter” isn’t just a season – it’s a complex set of challenges that impact every aspect of community life. As a municipal leader in a cold-climate area, you’re tasked with managing scenarios that go far beyond mere inconvenience:

- Extreme weather events that strain infrastructure and disrupt services
- Daily snow and ice management requiring significant resources
- Infrastructure stress from cold temperatures and freeze-thaw cycles
- Surging energy demands and associated cost concerns
- Winter safety risks, from hypothermia to carbon monoxide poisoning

Modern winterization demands a year-round, comprehensive approach. Here’s why:

- Extended cold seasons blur the lines between traditional seasons
- Environmental change brings more extreme and unpredictable winter events
- Cold weather’s cumulative toll on infrastructure requires ongoing attention
- Maintaining a winter-ready workforce is a continuous process

By adopting this proactive, year-round mindset, you position your community to not just survive but thrive throughout the winter months. Let’s explore how SAFEbuilt can help you build a resilient, winter-ready municipality that stands strong against the cold.

Natural hazards: A glossary

More and more regions in the country are experiencing new weather phenomena for their areas. Here is a list of some of the most damaging natural hazards, as defined by the Federal Emergency Management Agency (FEMA).

Avalanche — A mass of snow in swift motion traveling down a mountainside.

Coastal flooding — When water inundates or covers normally dry coastal land because of high or rising tides or storm surges.

Cold wave — A rapid fall in temperature within 24 hours and extreme low temperatures for an extended period.

Hail — A form of precipitation that occurs during thunderstorms when raindrops, in extremely cold areas of the atmosphere, freeze into balls of ice before falling toward the earth's surface.

Heat wave — A period of abnormally and uncomfortably hot and unusually humid weather typically lasting two or more days with temperatures outside the historical averages for a given area.

Hurricane — A tropical cyclone or localized, low-pressure weather system that is made up of organized thunderstorms but no front (a boundary separating two air masses of different densities) and with maximum sustained winds of at least 74 mph.

Ice storm — A freezing rain situation (rain that freezes on surface contact) with significant ice accumulations of 0.25 inches or greater.

Landslide — The movement of a mass of rock, debris, or earth down a slope.

Lightning — A visible electrical discharge or spark of electricity in the atmosphere between clouds, the air and/or the ground, and often produced by a thunderstorm.

Riverine flooding — When streams and rivers exceed the capacity of their natural or constructed channels to accommodate water flow and water overflows the banks, spilling out into adjacent low-lying, dry land.

Strong wind — Consists of damaging winds, often originating from thunderstorms, that are classified as exceeding 58 mph.

Tornado — A narrow, violently rotating column of air that extends from the base of a thunderstorm to the ground and is visible only if it forms a condensation funnel made up of water droplets, dust, and debris.

Wildfire — An unplanned fire burning in natural or wildland areas such as forests, shrub lands, grasslands, or prairies.

Winter weather — Consists of winter storm events in which the main types of precipitation are snow, sleet, or freezing rain.

The National Landscape of Winter

The impact of extreme weather

Winter extremes: Trending up from coast to coast

While most municipalities have their hands full managing winter-as-usual, extreme weather events and anomalies during the winter season are on the rise.

- In 2022, the continental United States saw a nearly 30% increase in climate extremes, both high and low, between the months of October and March (a 10% increase from the year prior).[1]
- While approximately 1% of the U.S. was covered in snow until October 1 of 2021, a winter storm brought record-breaking snowfall totals to Michigan's Upper Peninsula and northern Wisconsin. 30% of the U.S. was covered by snow at the end of March / beginning of April.[2]
- Every winter the eastern half of the country is experiencing more frequent heat extremes, while the West is experiencing unprecedented low temperatures.[3]
- Precipitation extremes throughout the year are contributing to dry-wet cycles of summer droughts followed by intense flooding.[4]

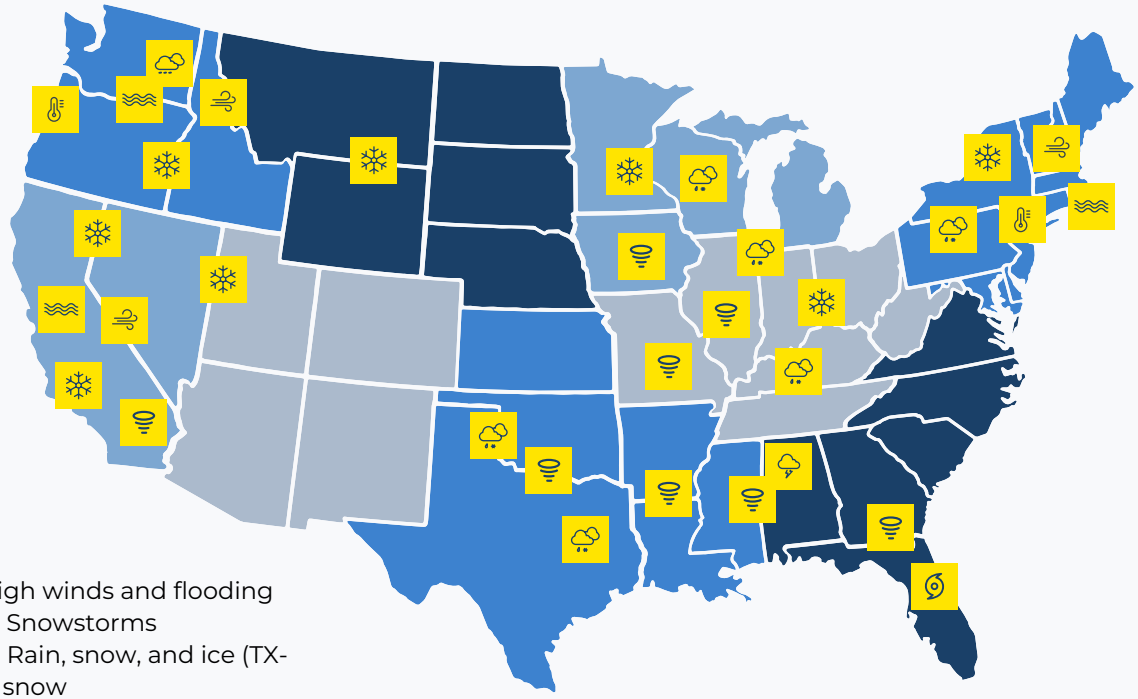
In most cases, the unseasonality, unpredictability, and severity of these extremes have put new levels of stress on infrastructure — and support staff — not originally intended to endure such conditions.

Case study: Historic flooding ravages Colorado's Front Range

In September 2013, Colorado's Front Range experienced catastrophic flooding described as "biblical" by the National Weather Service. The disaster affected 17 counties, damaging around 18,000 buildings and forcing nearly 12,000 evacuations. In Boulder, Weld, and Larimer counties, rainfall exceeded 20 inches - a staggering amount for a region averaging just 2 inches in September. The floods washed out hundreds of miles of roads, isolating mountain communities and resulting in Colorado's worst natural disaster of the 21st century. SAFEbuilt's rapid response teams, working alongside FEMA and local authorities, conducted over 200 structural assessments in hard-hit areas like Lyons and Milliken, helping jumpstart recovery efforts in these devastated communities.

Winter's National Impact: A Call for Strategic Preparedness

Recent years have shown that even regions accustomed to harsh winters can be caught off guard by extreme events. Let's examine the national landscape to understand the true scope of winter preparedness challenges.



Northeast
October: High winds and flooding
November: Snowstorms
December: Rain, snow, and ice (TX-ME); heavy snow
January: Snowless (NYC); record warmth (CT, MA, ME, NH, NJ, RI, VT)
February: Lowest temp ever in U.S. history (NH)
March: Heavy snowfalls

Northern Rockies and Plains
October: Snow (CO, MT)

Northwest
October: Extreme heat (Pacific NW)
November: Flooding, heavy rain, heavy snow, wind

Ohio Valley
December: Rain, snow, ice (TX-ME)
January: Tornado outbreak (IL)

South
November: 2 EF-4 Tornadoes (AR, LA, OK, TX)
December: Tornado outbreak (LA, MS, OK, TX); rain, snow, and ice (TX)
January: Freezing rain, ice (OK, Southern Plains, TX)
February: 11 Tornadoes (OK)
March: Tornadoes (South and Midwest)

Southwest
October: Snow (NV, UT)
March: Snow (UT)

Upper Midwest
October: Record-breaking snowfall, power outages
December: Rain, snow, ice (TX-ME)
January: Tornadoes (IA)

West
October: Snow (Eastern CA)
November: Flooding, heavy rain, heavy snow, wind
December: Drought (CA)
January: Flooding, mudslides, landslides (CA)
February: Heavy snow (Southern CA)
March: Snow (CA); tornado (Southern CA)

This snapshot illustrates the diverse and often unexpected challenges communities face during winter months. From record-breaking cold in the Upper Midwest to unprecedented ice storms in the South, these anomalies underscore the need for robust, adaptable winterization strategies—even in areas familiar with cold weather.

The financial impact of these events is staggering:

$2.6T

Adding the 2023 events to the record that began in 1980, the U.S. has sustained 376 weather and climate disasters with the overall damage costs reaching or exceeding $1 billion. The cumulative cost for these 376 events exceeds $2.660 trillion.[6]

According to the National Weather Service, 2024 is on track to have the most billion-dollar weather events in history.[6] Although these are by no means the norm, they do represent the increasing types and scope of damages that occur during winter months.

$176B

In 2022, 18 extreme weather events caused 474 deaths and cost $176.9B[6]

But the costs are far greater than what can be quantified in dollar amounts. Human and animal lives, local history, physical spaces, natural wonders, government resources, and time are all part of the damage done.

These figures highlight the critical importance of proactive winterization efforts. By investing in preparedness, communities can potentially mitigate costs and recover more quickly from extreme events.

A Closer Look: West Weld County

Hail damage: By the numbers[7]

First incorporated: November 20, 1920
Population: Approximately 6,494
Elevation: 4,888 feet
Number of hailstorm reports in 2023 (January – August): 11
Largest hailstone recorded: 1.5 inches in diameter
ZIP code with highest concentration of damage: 80634
Most people injured in a single storm: 100
Associated weather: Damaging winds, tornadoes
Largest recorded hailstones in CO history: 5 inches in diameter (Kit Carson County), 2019
Most expensive hailstorm in CO history: $2.3B in property damage (Jefferson County), 2018

Fortifying Infrastructure:

Your Winter-Ready Checklist

In cold climates, winter puts immense stress on community infrastructure. From roads to water systems, every aspect of your built environment faces unique challenges. Here's your action-oriented checklist to prepare:

TRANSPORTATION INFRASTRUCTURE

- [ ] **Road surface degradation from freeze-thaw cycles and salt application**
- [ ] **Bridge and overpass vulnerabilities to extreme cold and ice accumulation**
- [ ] **Snow removal capacity and storage considerations**

WATER SYSTEMS

- [ ] **Install pipe insulation and heat tape in vulnerable areas of municipal water systems**
- [ ] **Establish a regular fire hydrant maintenance and anti-freezing protocol**
- [ ] **Develop a rapid response plan for potential water main breaks**

BUILDINGS AND FACILITIES

- [ ] **Perform comprehensive roof inspections and reinforce structures for snow load**
- [ ] **Upgrade insulation and weatherization in all public facilities**
- [ ] **Schedule pre-winter HVAC system checks and maintenance**

ENERGY INFRASTRUCTURE

- [ ] **Trim trees near power lines to prevent ice-related outages**
- [ ] **Install and test backup generators at critical facilities**
- [ ] **Coordinate with utility providers on cold-snap demand management strategies**

COMMUNICATION SYSTEMS

- [ ] **Conduct stress tests on emergency communication systems under simulated extreme conditions**
- [ ] **Implement redundant communication channels for critical infrastructure**
- [ ] **Develop a public information strategy for winter-related alerts and updates**

By focusing on these key areas, you'll build a more resilient infrastructure capable of withstanding winter's harshest tests.

The Human Element:

Balancing Safety, Staffing, and Service

While infrastructure often takes center stage in cold climate preparedness, the human element is equally crucial. Winter brings unique workforce management challenges that can significantly impact municipal operations.

In cold climates, these staffing hurdles are further amplified by:

- Increased workload from snow and ice management
- Higher risk of cold-related injuries and illnesses
- Potential staff burnout from extended winter operations

8

MILLION

According to the U.S. Bureau of Labor Statistics, nearly 8M workers missed work in January 2022 due to illness, injury, and other medical issues (up 3.7M from 2021).

Out of office: By the numbers

31% of employers notice an uptick in sick days around the winter holidays.[10]

20% of employers report that their employees call in sick the most during December, followed by July, January, and February.[12]

Around 16 million Americans called in sick on the Monday after the 2023 Super Bowl. [11]

2023's Most popular days to call in sick[12]

- **Day after Christmas**
- **Day after Easter**
- **Day after New Year's Day**
- **Day after Mother's Day**
- **Mondays**

To address these challenges:

BUILD A WINTER-READY WORKFORCE

- [ ] **Develop flexible coverage plans for critical roles**
- [ ] **Implement cross-training to enhance team adaptability**
- [ ] **Establish partnerships with temp agencies for surge support**

PRIORITIZE EMPLOYEE SAFETY AND WELL-BEING

- [ ] **Invest in high-quality cold weather gear and safety training**
- [ ] **Implement strategic break schedules for extreme cold work**
- [ ] **Launch targeted wellness programs for winter health**

HARNESS TECHNOLOGY FOR EFFICIENCY

- [ ] **Deploy smart monitoring systems for real-time alerts**
- [ ] **Optimize snow removal routes with advanced software**
- [ ] **Expand remote work options to reduce weather-related absences**

By focusing on both your infrastructure and your people, you'll ensure top-notch service delivery, even in the harshest conditions.

Strategic Planning:

Your Roadmap to Cold Weather Resilience

Navigating harsh winters demands a comprehensive approach. Let's move beyond basic preparedness to build true cold weather resilience. Use this action-oriented checklist to strengthen your community:

MASTER SNOW AND ICE MANAGEMENT

- [ ] **Develop a tiered snow removal plan prioritizing critical routes and infrastructure**
- [ ] **Ensure adequate salt and sand supplies, with contingency plans for prolonged winter events**
- [ ] **Implement a proactive de-icing program for high-risk areas**
- [ ] **Establish snow storage locations that minimize environmental impact and flooding risks**

REINFORCE YOUR INFRASTRUCTURE

- [ ] Conduct cold weather vulnerability assessments
- [ ] Launch proactive maintenance to combat freeze-thaw damage
- [ ] Upgrade insulation in public buildings
- [ ] Install cold-resistant systems for critical infrastructure

BOOST ENERGY RESILIENCE

- [ ] Perform municipal energy audits and upgrades
- [ ] Forge strong partnerships with utility providers
- [ ] Install robust backup power systems
- [ ] Educate the public on smart energy use during peak times

ENHANCE WINTER SAFETY AND PUBLIC HEALTH

- [ ] Create a multi-channel cold weather alert system
- [ ] Establish a network of well-equipped warming centers
- [ ] Launch a comprehensive winter safety campaign
- [ ] Coordinate with health officials on cold-related illness prevention

ELEVATE EMERGENCY RESPONSE CAPABILITIES

- [ ] Update response plans for severe winter scenarios
- [ ] Conduct regular cold weather emergency drills
- [ ] Equip vehicles with advanced winter gear
- [ ] Establish resource-sharing agreements with nearby communities

EMPOWER YOUR WINTER WORKFORCE

- [ ] **Provide specialized cold weather safety training**
- [ ] **Implement a winter gear program for employees**
- [ ] **Create flexible scheduling to manage increased workloads**
- [ ] **Launch a tailored winter wellness initiative**

LEVERAGE SMART TECHNOLOGY

- [ ] **Deploy advanced weather monitoring systems**
- [ ] **Implement AI-driven snow removal optimization**
- [ ] **Install IoT sensors for early issue detection**
- [ ] **Create a centralized winter operations command center**

SECURE FINANCIAL PREPAREDNESS

- [ ] **Establish a dedicated winter emergency fund**
- [ ] **Explore comprehensive extreme weather insurance**
- [ ] **Implement precise tracking of winter-related expenses**
- [ ] **Conduct ROI analysis on proactive winterization measures**

By embracing this holistic approach, your community will not just survive but thrive through even the most challenging winter seasons. Remember, resilience is built through preparation, adaptation, and continuous improvement.

The winter and the damage done

Winter storms have cost municipalities billions of dollars in damage and uncounted costs in human lives, with recovery efforts lasting well into the summer months in many cases. To get an idea of what can go wrong when winter does its worst, here are a few examples of some of the costliest winter storms of 2022-2023 and their consequences.[13]

California Flooding

December 2022 – March 2023

Severe flooding, record snowfall, and copious rainfall significantly reduced drought deficits across California while impacting homes, businesses, levees, agriculture, and other infrastructure, particularly in the central portion of the state.

Number of deaths: 22

Damage in dollars: $4.6B

Southern and Eastern Severe Weather

March 2023

High winds and tornadoes caused widespread damage to homes, vehicles, businesses, government buildings, and infrastructure in Alabama, Indiana, Kentucky, Mississippi, Ohio, Tennessee, and Texas.

Number of deaths: 13

Damage in dollars: $6.1B

Central and Eastern Winter Storm and Cold Wave

December 2022

Heavy rains, snow, ice, and high winds sent temperatures plummeting and left more than a million customers, from Texas to Maine, without power. Additional impacts were widespread frozen water pipes that led to extensive water damage in homes, businesses, and other critical infrastructure.

Number of deaths: 87

Damage in dollars: $8.6B

Central and Northeastern Winter Storm and Arctic Blast

January 2024

A severe winter storm swept across the Central and Northeastern United States, bringing heavy snowfall, freezing rain, and dangerously low temperatures.The storm's impact was amplified by a subsequent arctic air mass, causing temperatures to plummet into single digits and even subzero in some areas. Widespread travel disruptions, power outages, and infrastructure damage occurred across multiple states.

Number of deaths: 41

Damage in dollars: $1.9B

Adaptive Approaches:

Flexibility in Extreme Conditions

Even meticulous planning can be challenged by severe winter weather's unpredictability. The key to successfully navigating the winter season lies in your ability to adapt quickly and effectively. Here's how to implement and fine-tune your strategies as winter unfolds:

REAL-TIME MONITORING AND RESPONSE

- [ ] **Set up a winter operations hub for round-the-clock weather and community impact tracking**
- [ ] **Launch a system for instant reporting of road conditions, outages, and winter-related issues**
- [ ] **Employ predictive analytics to foresee and prevent potential problems**

FLEXIBLE RESPONSE STRATEGIES

- [ ] **Create multi-tiered action plans activated by specific winter severity levels**
- [ ] **Design adaptable staffing models for swift personnel deployment during extreme events**
- [ ] **Define clear thresholds for scaling winter response efforts up or down**

SMART RESOURCE MANAGEMENT

- [ ] **Deploy real-time tracking for winter response assets like plows and salt spreaders**
- [ ] **Build partnerships with private contractors to handle demand surges**
- [ ] **Implement a central system to manage critical winter supply inventory**

AGILE PUBLIC COMMUNICATION

- [ ] **Develop a multi-channel approach to keep the public informed of changing conditions**
- [ ] **Set up rapid emergency alert dissemination**
- [ ] **Prepare customizable communication templates for various winter scenarios**

ONGOING IMPROVEMENT PROCESS

- [ ] **Conduct prompt reviews after significant winter events to identify immediate enhancements**
- [ ] **Establish a system to gather and analyze feedback from frontline staff and residents**
- [ ] **Be ready to modify strategies mid-season based on emerging patterns or challenges**

By embracing these adaptive approaches, your community can maintain resilience and responsiveness, regardless of winter's challenges. Remember: flexibility, informed decision-making, and willingness to evolve are your best tools against winter's unpredictability.

Post-Winter Analysis:

Lessons From the Frost

As spring emerges, it's crucial to thoroughly examine your winter operations. This review isn't just about performance assessment; it's a chance to gather valuable insights that will bolster your community's cold-weather resilience for years to come. Here's how to conduct an effective post-winter analysis:

COMPREHENSIVE DATA GATHERING

- [ ] **Compile quantitative data on resource use, response times, and incident frequency**
- [ ] **Collect feedback from staff, residents, and partner organizations**
- [ ] **Review winter season logs and reports, with emphasis on extreme weather events**

PERFORMANCE EVALUATION

- [ ] Measure outcomes against predetermined goals and benchmarks
- [ ] Identify long-term trends by analyzing data from multiple winter seasons
- [ ] Benchmark your performance against similar cold-climate municipalities

INFRASTRUCTURE RESILIENCE CHECK

- [ ] Perform detailed post-winter inspections of roads, bridges, and buildings
- [ ] Evaluate the success of winterization measures in preventing cold-related damage
- [ ] Pinpoint areas requiring infrastructure upgrades for enhanced cold-weather resilience

ENERGY EFFICIENCY REVIEW

- [ ] Analyze energy consumption data for municipal buildings and operations
- [ ] Assess the impact of pre-winter energy efficiency measures
- [ ] Identify opportunities for further energy optimization in future winters

WINTER SAFETY AND HEALTH ASSESSMENT

- [ ] Examine data on winter-related accidents, injuries, and health issues
- [ ] Evaluate the effectiveness of winter safety public education efforts
- [ ] Assess the performance and utilization of warming centers and emergency shelters

FINANCIAL IMPACT ANALYSIS

- [ ] Conduct a thorough review of winter-related expenses
- [ ] Assess the accuracy of winter budget forecasts and identify areas for improvement
- [ ] Evaluate the cost-effectiveness of various winter preparedness measures

TECHNOLOGY AND EQUIPMENT AUDIT

- [ ] **Assess the reliability and effectiveness of winter-specific equipment and technologies**
- [ ] **Identify technological gaps or areas where upgrades could enhance winter operations**
- [ ] **Evaluate the performance of newly implemented technologies or equipment**

WORKFORCE MANAGEMENT REVIEW

- [ ] **Analyze staffing levels, overtime hours, and sick leave data for winter operations**
- [ ] **Assess the effectiveness of winter preparedness training programs**
- [ ] **Review employee feedback on winter working conditions and support measures**

COMMUNITY FEEDBACK INTEGRATION

- [ ] **Analyze resident surveys and feedback on winter service delivery**
- [ ] **Evaluate the success of public communication efforts during winter events**
- [ ] **Identify areas where community expectations were met, exceeded, or fell short**

STRATEGIC ACTION PLANNING

- [ ] **Develop a concrete improvement plan based on your analysis**
- [ ] **Prioritize enhancements based on impact, feasibility, and cost-effectiveness**
- [ ] **Assign clear responsibilities and timelines for implementing improvements**

By conducting this comprehensive post-winter analysis, you transform each winter into a learning opportunity. This process of continuous improvement ensures that your community becomes more resilient and better prepared to face the challenges of cold climates with each passing year.

SAFEbuilt: Your Partner in Cold Weather Resilience

Whether we're providing hourly staff or a full-service embedded department, SAFEbuilt delivers custom building and safety solutions designed to help you maintain the safety and satisfaction of your community before, during, and after the winter season.

Full-service, full-coverage

Our team includes subject matter experts, building officials, plan reviewers, inspectors, business managers, problem solvers, and customer relationship managers. We understand building department services and develop an operational and staffing solution that best fits the needs of your community. In addition, SAFEbuilt has technology solutions for managing inspections as well as plan reviews that streamline the processes and provide better visibility and management of the work.

Custom-built solutions

We bring a custom and personalized approach to your building department with the ability to scale up and down based on your development workload and needs. Whether you need to fill a building-official role to fulfill state regulations, require a large increase in inspectors, or want to simplify your permit process, we have the experts on hand to make your life easier, boost your local economy, and keep your community safe.

Getting it right the first time

We operate building departments as an extension of your community. For this reason, we place the highest value in getting the job done right the first time. By doing it right the first time, we increase customer satisfaction on the front end, decrease inefficiency costs, and reduce customer complaints.

It's never too early to start the winterization conversation: **Contact us today about your winter plans, questions, and concerns.**

SAFEbuilt®

Sources

[1]NOAA National Centers for Environmental Information (NCEI), 2023. Climate Extremes Index (All Steps Combined) Cold Season (October 2021 - March 2022).

[2]NOAA National Centers for Environmental Information (NCEI), 2023. National Snow and Ice Report.

[3]NOAA National Centers for Environmental Information (NCEI), 2023. Regional Overview.

[4]NOAA National Centers for Environmental Information (NCEI), 2023. Future Drought.

[5]National Climate Overview: National Climate Report 2023 January

[6]2023: A Historic Year of U.S. Billion-Dollar Weather and Climate Disasters.

[7]Uncover Colorado. Severance, Colorado.

[8]Risk Factor. Wind Risk Overview. Does 80025 have Wind Risk?

[9]Colorado Arts and Sciences Magazine. Western wildfires destroyed 246% more homes and buildings over the past decade. February 2023.

[10]The Craziest Excuses Workers Use When Calling In Sick. October 2012.

[11]Super Bowl Fever: Should the Day After Be a National Holiday? February 2023.

[12]Reader's Digest. This Is the Day You're Most Likely to Call in Sick. February 2023.

[13]NOAA National Centers for Environmental Information (NCEI) U.S. Billion-Dollar Weather and Climate Disasters (2023).

[14]Federal Emergency Management Agency (FEMA) National Risk Index. Social Vulnerability.

[15]Federal Emergency Management Agency (FEMA) National Risk Index. Community Resilience.

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