

ISSUE BRIEF : Q1 2020

MINNESOTA COMPANIES EXPLAIN CLIMATE CHANGE AND SEVERE WEATHER RISK



BUSINESSFORWARD
FOUNDATION

EXECUTIVE SUMMARY

This report examines how severe weather is disrupting supply chains, distorting commodity prices, damaging plants and equipment, and hurting consumer demand for Minnesota businesses. It is meant to serve as a resource for local, state, and Congressional officials and media interested in energy and climate change policy. Specifically, the points made here should help media and officials answer a simple question about climate change: Can we fix climate change without wrecking our economy?

Minnesota's top entrepreneurs, executives, investors, and small business owners are changing how they build, where they locate, and how they insure their assets. They are creating new business lines and models to mitigate the effects of climate change. And they are issuing warnings to their investors about climate change that skeptics in St. Paul and Washington, D.C. should not ignore.

Severe weather affects Minnesota's greatest competitive advantages, including fast-moving global supply chains, model climate for soybeans and corn, and access to important waterways like Lake Superior and the Mississippi River. Severe weather is affecting key industries, from farms and orchards to aerospace, auto suppliers, railroads, restaurants, and shipping.

Business Forward has worked with more than 1,980 entrepreneurs, executives, and small business owners across Minnesota. These leaders have helped brief Congress, the White House, and state legislatures on a range of issues, including tax reform, trade agreements, infrastructure investment, and immigration reform. More than 690 of them have participated in our climate change and clean energy program, where they have learned about renewable energy options and shared their experience managing severe weather costs.

**16 OF MINNESOTA'S 17
FORTUNE 500
COMPANIES
HAVE ISSUED WARNINGS TO
THEIR INVESTORS, AS WELL
AS INDUSTRY LEADERS IN
RETAIL, MANUFACTURING, FOOD
PROCESSING, AND MORE.**

KEY THEMES FROM FORTUNE 500 WARNINGS ABOUT CLIMATE CHANGE

“JUST IN TIME” INVENTORY AND GLOBAL SUPPLY CHAINS RAISE RISK

To boost profits, U.S. companies source from across the globe, encourage suppliers to specialize, and reduce overhead costs by operating with as little as two to four hours of parts inventory on site.

As our supply chains grow more global, more specialized, and faster, severe weather events become more expensive.

HIGHER TEMPERATURES THREATEN COMPARATIVE ADVANTAGES ACROSS SUPPLY CHAINS

Corn is one of the most important crops for Minnesota’s agriculture industry; it is also particularly vulnerable to high temperatures.

Extreme heat days above 95 degrees are occurring more often in Minnesota, causing irreparable damage to corn fields.¹

DAMAGE TO THE DEVELOPING WORLD HURTS U.S. COMPANIES

Developing markets face greater climate risk: their populations live in hotter climates and are concentrated in coastal areas with poor infrastructure.

This hurts Fortune 500 companies, because those developing markets are expected to drive their future growth.

WEATHER CAN BE THE DIFFERENCE BETWEEN A GOOD YEAR AND GOING OUT OF BUSINESS

For retailers, restaurants, and the entertainment industry, weather can make or break their year.

Good weather allows golf courses to sell more afternoon rounds and restaurants and sports teams to fill outdoor seating. For low-margin businesses, marginal sales are critical to survival.

SMALL BUSINESSES ARE LESS LIKELY TO SURVIVE SEVERE WEATHER LOSSES

They have smaller cash reserves, are more likely to operate out of a single location, less likely to have backup systems, and have a harder time relocating.

Small businesses are more likely to shut down due to severe weather events, and their failures are bad news for the big companies they supply.

CLIMATE CHANGE HITS MINNESOTA WHERE IT HURTS - INFRASTRUCTURE

Minnesota's infrastructure is particularly vulnerable to severe weather events. According to the American Society of Civil Engineers (ASCE), Minnesota has the fifth-most public roadway miles of any state, which are underfunded by **\$885 million** annually. Road conditions are frequently poor in Minnesota and the Twin Cities metropolitan area experiences heavy congestion issues that will only worsen with population growth; on average, congestion costs Twin Cities drivers **\$1,332** per year. Minnesota's public transit system requires **\$450 million** in investment over the next five years to cover current necessary upgrades.

A majority of Minnesota's dams have outlived their 50-year design life, and less than half of the 199 high- or significant-hazard dams in the state have state-mandated emergency action plans. Bridges are critical forms of infrastructure for Minnesota, yet the state has a spending shortfall of more than **\$2 billion** over the next two decades. There are currently more than **1,000 bridges** in poor condition in Minnesota. Minnesota's drinking water system requires more than **\$7.5 billion** in investment over the next 20 years.²

The Federal Government has been underfunding infrastructure for years, resulting in a system that fails: the ASCE gave the United States a **D+** on infrastructure in 2017.³ Without a strong federal partner, local and state governments are left to themselves to plan and fund infrastructure investments on their own. Minnesota has **3,672** total governmental units, which means planning and coordination between governments is more difficult.⁴

Because of these factors, Minnesota companies are warning investors that climate change threatens to reduce productivity and profits.

C
**RATING FOR
INFRASTRUCTURE
FROM ASCE**

\$542
**COST PER
MOTORIST DUE
TO POOR ROAD
CONDITIONS**

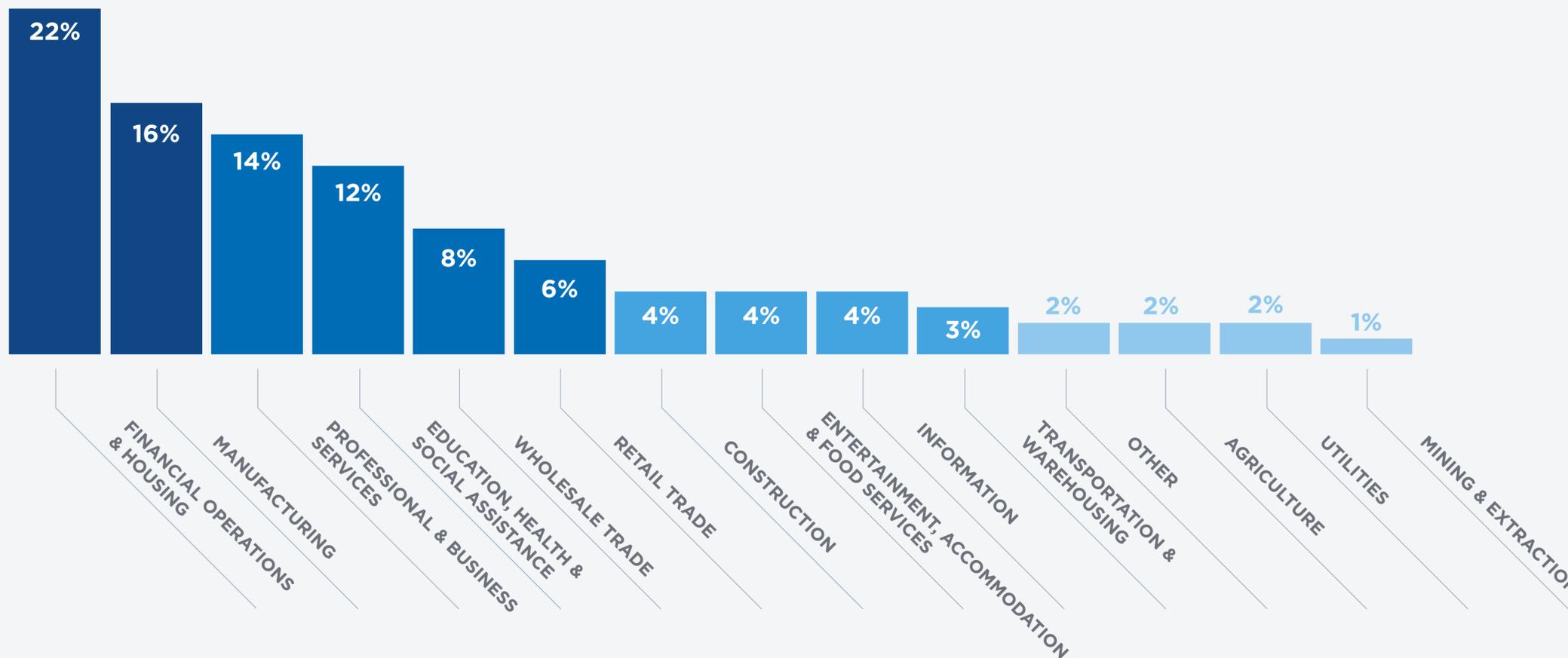
\$2.2B
**FUNDING SHORTFALL
OVER 20 YEARS
TO UPGRADE
SUBSTANDARD
BRIDGES**

\$7.5B
**IN DRINKING WATER
INFRASTRUCTURE
NEEDS OVER THE NEXT
20 YEARS**

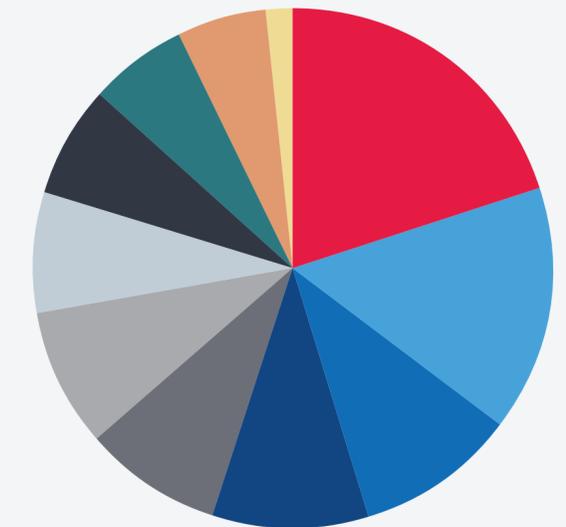
A SNAPSHOT OF MINNESOTA'S ECONOMY



GROSS DOMESTIC PRODUCT BY INDUSTRY (2018)



EMPLOYMENT BY INDUSTRY (2018)



- 20% - OFFICE MANAGEMENT & SUPPORT
- 15% - FINANCIAL OPERATIONS & SALES
- 10% - CONSTRUCTION & MAINTENANCE
- 10% - HEALTH CARE
- 9% - FOOD SERVICES & AGRICULTURE
- 9% - PERSONAL & PROTECTIVE SERVICES
- 7% - MANUFACTURING
- 7% - SKILL INTENSIVE
- 6% - TRANSPORTATION & SHIPPING
- 6% - EDUCATION
- 1% - ENTERTAINMENT

SOURCE: GDP DATA IS FROM THE BUREAU OF ECONOMIC ANALYSIS. EMPLOYMENT DATA IS FROM THE BUREAU OF LABOR. POPULATION FROM THE CENSUS BUREAU. ENERGY DATA FROM EIA.

HOW SEVERE WEATHER AFFECTS KEY MINNESOTA INDUSTRIES, AS EXPLAINED BY MINNESOTA EXECUTIVES

AEROSPACE

The aerospace industry is a direct beneficiary of Minnesota's highly-educated workforce. Minnesota has the seventh most-skilled workforce in technology and science, as well as the highest percentage of high school graduates. The aerospace industry contributes \$1.3 billion to the state's GDP, and Minnesota exported more than \$330 million of aerospace and defense products in 2017. Since 2013, the industry has seen 112 percent job growth.⁵

Collins Aerospace (under the parent company United Technologies and formerly under Rockwell Collins) has a technical center and a sensors and integrated systems site in Burnsville.⁶ **Rockwell Collins** warns that its aerospace business may "not always have alternate sources of supply readily available for certain goods or services, such as liquid crystal displays. A shortage of raw materials or components, the loss of a significant supplier or subcontractor or their inability to meet performance, quality or delivery requirements due to natural disaster... or other causes could have a material adverse effect on our business, financial condition, results of operations and cash flows."⁷

Honeywell employs 2,200 Minnesotans in its Coon Rapids location.⁸ The company warns, "Our facilities, supply chains, distribution systems and information technology systems are subject to catastrophic loss due to natural disasters including hurricanes and floods, power outages, fires, explosions, terrorism, equipment failures, sabotage, adverse weather conditions... which can result in undesirable consequences, including financial losses and damaged relationships with customers."⁹

BAE Systems has a weapons systems site in Fridley.¹⁰ The company states in its annual report that it "recognizes that environmental and climate risks could directly impact our ability to meet our strategic priorities. Matters which are considered likely to influence our organization and future strategic decisions include: constrained supply and volatile prices of fuel and the associated taxes; availability of critical materials; increasing stringency of environmental legislation; impact of climate change on the operability of our products..."¹¹



**MINNESOTA HAS HAD
9 BILLION-DOLLAR
WEATHER & CLIMATE
DISASTERS SINCE 2011¹²**

17 Fortune 500 companies are headquartered in Minnesota, 16 of them have issued warnings about severe weather risks.

Companies operating factories, farms, shops, restaurants, or hotels in Minnesota have reported that rising temperatures, extreme weather, and drought are affecting their operations here.

Many also report that increasingly severe weather is affecting their global operations. As Minnesota businesses grow, their severe weather risks grow too.

AIRPORTS

Minneapolis-St. Paul International Airport (MSP) is a key generator of jobs and GDP for the state. The airport directly employs more than 21,000 workers, paying out \$1.3 billion in wages each year.¹³ MSP was voted “Best Airport of its size” in North America in 2016, 2017, and 2018.¹⁴

Delta Airlines operates its second largest hub and is the largest carrier at MSP, where 70 percent of all passengers fly Delta.¹⁵ The company’s most recent 10-K warns investors, “Our results of operations are impacted by severe weather, natural disasters and seasonality. Severe weather conditions and natural disasters (or other environmental events) can significantly disrupt service and create air traffic control problems. These events decrease revenue and can also increase costs. In addition, increases in the frequency, severity or duration of thunderstorms, hurricanes, typhoons or other severe weather events, including from changes in the global climate, could result in increases in delays and cancellations, turbulence-related injuries and fuel consumption to avoid such weather, any of which could result in loss of revenue and higher costs. In addition, demand for air travel is typically higher in the June and September quarters, particularly in our international markets, because there is more vacation travel during these periods than during the remainder of the year. The seasonal shifting of demand causes our financial results to vary on a seasonal basis.”¹⁶

Southwest is a major airline that operates at Minneapolis-St. Paul International. The company has experienced significant financial losses in recent years due to weather and natural disasters. Southwest reports, “adverse weather and natural disasters such as hurricanes and earthquakes in third quarter 2017... resulted in approximately \$100 million in reduced revenues for the company as a result of approximately 5,000 canceled flights.”¹⁷ In the third quarter of 2018, Southwest had to cancel another 2,200 flights because of extreme weather.¹⁸

American Airlines has the third-largest market share of passengers at MSP.¹⁹ The airline considers severe weather to be one of its largest risk areas: “Our business has been and will continue to be affected by many changing economic and other conditions beyond our control, including global events that affect travel behavior, and our results of operations could be volatile and fluctuate due to seasonality...including, among others: weather and natural disasters, including increases in such disasters and related costs caused by more severe weather due to climate change.”²⁰



HOW SEVERE WEATHER AFFECTS CASH CROPS (AND FOOD PRICES)

1.

Consistently warmer temperatures stress plants and livestock, reducing crop yields and livestock health.

2.

Rising surface temperatures are disrupting weather patterns, affecting rainfall, and even the timing and duration of growing seasons.

3.

More severe storms are damaging crops and livestock.

AUTOMATIVE MANUFACTURING

The auto industry employs nearly 100,000 Minnesotans, or 2.6 percent of the state's workforce. Minnesota relies on tax revenue from the industry; it received one billion dollars in state tax revenue in 2018.²¹

Polaris, headquartered in Medina, is a leading manufacturer of snowmobiles, ATVs, and motorcycles. Climate change negatively affects Polaris' financial performance according to its most recent annual report: "Changing weather conditions may reduce demand and negatively impact net sales and production of certain of our products. Lack of snowfall in any year in any particular geographic region may adversely affect snowmobile retail sales and related PG&A sales in that region. Additionally, to the extent that unfavorable weather conditions are exacerbated by global climate change or other factors, our sales may be affected to a greater degree than we have previously experienced."²²

CHEMICALS

The chemical industry is an important sector of Minnesota's economy. The state hosts a Fortune 500 and a Fortune 1000 chemical company: **Mosaic** and **H.B. Fuller**, respectively.

Mosaic is a Fortune 500 agriculture fertilizer company with headquarters in Plymouth. It warns, "The prospective impact of climate change on our operations and those of our customers and farmers remains uncertain. Scientists have hypothesized that the impacts of climate change could include changes in rainfall patterns, water shortages, changing sea levels, changing storm patterns and intensities, and changing temperature levels and that these changes could be severe. These impacts could vary by geographic location. Severe climate change could impact our costs and operating activities, the location and cost of global grain and oilseed production, and the supply and demand for grains and oilseeds. At the present time, we cannot predict the prospective impact of climate change on our results of operations, liquidity or capital resources, or whether any such effects could be material to us."²³

H.B. Fuller is an adhesive manufacturer that has headquarters in St. Paul. The company's annual report states, "Catastrophic events could disrupt our operations or the operations of our suppliers or customers, having a negative impact on our financial results. Unexpected events, including natural disasters and severe weather events, fires or explosions at our facilities or those of our suppliers, acts of war or terrorism, supply disruptions or breaches of security of our information technology systems could increase the cost of doing business or otherwise harm our operations, our customers and our suppliers. Such events could reduce demand for our products or make it difficult or impossible for us to receive raw materials from suppliers and deliver products to our customers."²⁴

“

[To] the extent that unfavorable weather conditions are exacerbated by global climate change or other factors, our sales may be affected to a greater degree than we have previously experienced.

”

- POLARIS

“

Severe climate change could impact our costs and operating activities, the location and cost of global grain and oilseed production, and the supply and demand for grains and oilseeds.

”

- MOSAIC

CROPS & AGRICULTURE

Agribusiness is a critical sector in Minnesota's economy. The state ranks fifth in total agricultural production, fourth in crops, and fourth in exports. Some of Minnesota's most important agricultural products are sweet corn, oats, soybeans, turkeys, and hogs. Altogether, the industry is worth \$16.8 billion.²⁵

CHS is based in Inver Grove Heights and employs 2,500 workers in the state.²⁶ The agriculture company works in the food processing, wholesale, and farm supply spaces. CHS is vulnerable to severe weather events and the long-term effects of climate change, according to its annual report: "Adverse weather conditions, such as heavy snow or rainfall and any flooding as a result thereof, may cause transportation delays and increased transportation costs, or damage physical assets, especially facilities in low-lying areas near coasts and river banks or situated in hurricane-prone and rain-susceptible regions... Changes in weather patterns may shift periods of demand for products or even regions in which our products are produced or distributed, which could require us to evolve our procurement and distribution processes... Significant changes in water levels (up or down, as a result of flooding, drought or otherwise) may cause changes in agricultural activity, which could require changes to our operating and distribution activities, as well as significant capital improvements to our facilities."²⁷

General Mills employs 3,100 employees in Minnesota, is an industry leader in food processing, and has its global headquarters in Minneapolis.²⁸ General Mills states that the "ability to make, move, and sell products is critical to our success. Damage or disruption to raw material supplies or our manufacturing or distribution capabilities due to weather, including any potential effects of climate change, natural disaster, fire...or other factors could impair our ability to manufacture or sell our products. Many of our product lines are manufactured at a single location. Our suppliers' policies and practices can damage our reputation and the quality and safety of our products. Failure to take adequate steps to mitigate the likelihood or potential impact of such events, or to effectively manage such events if they occur, particularly when a product is sourced from a single supplier or location, could adversely affect our business and results of operations, as well as require additional resources to restore our supply chain."²⁹

“ It can go from being pretty warm to winter, and plants don't have the chance to transition into dormant season... the ultimate thing that would be really nice is if we just had a stable climate.³⁰ ”

- ADAM KEMP
UFF-DA ORGANICS & NORTHERN HARVEST FARM,
WRENSHALL

“ Before, most of the bees in the Midwest stayed all winter. The beekeeper would wrap them with insulation and give them a top entrance, so they could ventilate the moisture out of the colony. And the bees would be just fine... if you try to do that with a bee colony now, it's dead by November... The hive simply can't thermoregulate.³¹ ”

- JEFF ANDERSON
MINNESOTA HONEY FARMS,
EAGLE BEND

Headquartered in Eden Prairie, major grocery chain **Supervalu** warns, “Severe weather conditions and natural disasters in areas in which we or our customers operate or from which we obtain products may adversely affect our financial condition and results of operations, as a result of physical damage to our properties, closure of one or more of our or our customers’ stores... temporary disruption in the supply of products, disruption in the transport of goods, delays in the delivery of goods to distribution centers or stores... In addition, adverse climate conditions and adverse weather patterns, such as drought or flood, that impact growing conditions and the quantity and quality of crops yielded by food producers may adversely affect the availability or cost of certain products within the grocery supply chain.”³²

Hormel Foods has its corporate headquarters in Austin. The Fortune 500 company received praise from the 2019 Farm Animal Investment Risk & Return Index, which rates food companies’ approaches to challenges like sustainability, food safety, and animal welfare. Hormel Foods was awarded for its practices in water conservation, as well as it being the only company to establish a sustainable agriculture policy that includes feed-grain growers. These efforts are designed to mitigate the company’s exposure to environmental threats like extreme weather.³³

Land O’Lakes is a Fortune 500 food company headquartered in Arden Hills. In its 2018 annual report, Land O’Lakes emphasized intentions to “drive on-farm conservation solutions at scale, working together with farmers and their ag retailers to help them make a tangible impact on the long-term sustainability of our food system.” The company’s sustain program works to “help mitigate environmental impact while increasing profitability.”³⁴

ENERGY

Minnesota is one of the most energy-diverse states in America. Its energy portfolio includes natural gas, coal, nuclear, and renewables (mostly wind); all of these forms generated at least 18 percent of Minnesota’s electricity in 2019. Coal has experienced a gradual decline in market share of Minnesota’s electricity generation. In 2011, coal generated more than half of the utility-scale electricity in the state; today, that number is 37 percent. Minnesota is a leader in wind energy, ranking seventh in the nation in total generation. Minnesota is also a U.S. leader in ethanol output thanks to its in-state corn production, ranking fourth among all states.³⁵

EFFICIENCY & CLIMATE RISK

For decades, Minnesota companies have built increasingly large, complex, and fast-moving supply chains. To reach the lowest-cost producers, Minnesota companies depend more on Asian, South American, and African markets.

To maximize each individual supplier plant’s efficiency, Minnesota companies have encouraged their suppliers to specialize. And, to reduce overhead costs, more Minnesota companies are following just-in-time inventory practices, which require their global supply chains to operate with greater speed.

As their supply chains become more global, Minnesota factories, stores, and plants grow more vulnerable to severe weather in other countries.

Duluth's location at the end of the St. Lawrence Seaway results in energy sources from around the world coming through the city's ports to be transported nationwide. Thirty percent of all U.S. crude oil imports enter through Minnesota, and the nearby Pine Bend Refinery in Rosemount processes a significant portion of that crude oil. Pine Bend is the largest crude oil refinery in the U.S. in a state that does not produce oil itself.³⁶

EcoLab, headquartered in St. Paul, provides water, energy, and hygiene technologies and services to industries like health care and hospitality.³⁷ The company warns that "natural or manmade disasters, water shortages or severe weather conditions affecting the energy, foodservice, hospitality, travel, health care, food processing, pulp and paper, mining, steel and other industries can cause a downturn in the business of our customers, which in turn can have an adverse effect on our consolidated results of operations, financial position or cash flows. In particular, the U.S. Gulf Coast is a region with significant refining, petrochemicals and chemicals operations which provide us raw materials, as well as being an important customer base for our Energy and Water operating segments. Hurricanes or other severe weather events impacting the Gulf Coast could adversely affect our ability to obtain raw materials at reasonable cost, or at all, and could adversely affect our business with our customers in the region."³⁸

Xcel Energy is one of the largest utility companies in the U.S. and is based in Minneapolis. In December of 2018, Xcel Energy became the first major utility company to commit to a carbon-free plan; Xcel committed to decreasing carbon emissions 80 percent by 2030, and the company states that by 2050 it will be 100 percent carbon-free. Xcel currently serves 3.6 million customers across eight states,³⁹ and warns investors: "Climate change can create physical and financial risk. Physical risks include changes in weather conditions and extreme weather events. Our customers' energy needs vary with weather. To the extent weather conditions are affected by climate change, customers' energy use could increase or decrease. Increased energy use due to weather changes may require us to invest in generating assets, transmission and infrastructure. Decreased energy use due to weather changes may result in decreased revenues. Extreme weather conditions in general require system backup, costs, and can contribute to increased system stress, including service interruptions. Extreme weather conditions creating high energy demand may raise electricity prices, increasing the cost of energy we provide to our customers. Severe weather impacts our service territories, primarily when thunderstorms, flooding, tornadoes, wildfires and snow or ice storms occur. To the extent the frequency of extreme weather events increases, this could increase our cost of providing service. Periods of extreme temperatures could impact our ability to meet demand. Changes in precipitation resulting in droughts or water shortages could adversely affect our operations. Drought conditions also contribute to the increase in wildfire risk from our electric generation facilities."⁴⁰

“**Hurricanes or other severe weather events impacting the Gulf Coast could adversely affect our ability to obtain raw materials at reasonable cost, or at all...**”

- **ECOLAB**

“**Extreme weather conditions in general require system backup, costs, and can contribute to increased system stress, including service interruptions.**”

- **XCEL ENERGY**

HEALTH CARE & PHARMACEUTICALS

Minnesota has a total of 144 hospitals that employ more than 127,000 workers. Overall, the health care and social assistance sector employs 471,800 workers and has added 141,000 jobs since 2004. Four of the ten largest employers in the state are in health care delivery.⁴¹ Minnesota is home to the world's largest health care provider, **UnitedHealth Group**,⁴² as well as a premier health care facility in America, the **Mayo Clinic**.

UnitedHealth Group earned \$225 billion in revenue in 2018 and is ranked sixth on this year's Fortune 500 list.⁴³ Based in Minnetonka, UnitedHealth Group names climate change and natural disasters as inherent risks that pose threats to health care facilities and business operations.⁴⁴

Mayo Clinic employs 43,000 Minnesotans at its Rochester center and satellite Minnesota facilities.⁴⁵ U.S. News ranks the Rochester Mayo Clinic first in its annual "Best Hospital" rankings.⁴⁶ Mayo Clinic is changing its medical school's curriculum to integrate the topic of climate change; the new curriculum includes the detection and treatment of conditions or illnesses that may arise as a result of climate change, which is a growing risk all over the world.⁴⁷

HOTELS

Minnesota hosts 940 hotel properties within the state, which provide nearly 60,000 jobs. The lodging industry overall contributed \$9.4 billion to Minnesota's GDP in 2017, and hotels support \$2.7 billion in taxes. Averaged out, the tax revenue of the hotel industry is \$1,254 per Minnesota household, making it an important generator of revenue for state projects.⁴⁸

Hilton has 74 hotel locations in Minnesota.⁴⁹ The hotel chain warns investors of threats to its operations: "Climate change or availability of natural resources; natural or man-made disasters and extreme weather conditions, including earthquakes, tsunamis, tornadoes, hurricanes (e.g., hurricanes Florence, Lane and Michael in 2018), typhoons, floods, wildfires... Any one or more of these factors could limit or reduce overall demand for our products and services or could negatively affect our revenue sources, which could adversely affect our business, financial condition and results of operations."⁵⁰

WATER SYSTEMS CHALLENGES

WATER INFRASTRUCTURE

Minnesota's access to freshwater requires up-to-date drinking water infrastructure throughout the state. Minnesota needs an estimated \$7.5 billion in drinking water infrastructure upgrades over the next 20 years to properly provide drinking water to its residents.⁵¹

Marriott operates 89 hotels in Minnesota.⁵² Marriott states in its annual report that the hotel chain is “subject to risks from natural disasters such as earthquakes and severe weather, which may result in damage to our properties. Natural disasters and severe weather such as earthquakes, tornadoes, hurricanes or floods may result in significant damage to our properties. The extent of our casualty losses and loss in operating income in connection with such events is a function of the severity of the event and the total amount of exposure in the affected area... We may be materially and adversely affected by our exposure to losses arising from natural disasters or severe weather.”⁵³

INFORMATION & COMMUNICATIONS TECHNOLOGY

The Minnesota tech sector has a direct economic impact of \$31.1 billion, and the Twin Cities metropolitan area is a national leader in the industry. The area is home to more than 136,000 tech jobs and is one of the fastest growing regions. It has also been named a top metro-area for startups, STEM talent, and net migration of skilled workers.⁵⁴

IBM has a large facility in Rochester that employs 2,800 Minnesotans.⁵⁵ The tech giant states the risk of natural disasters and climate change impacts to its supply chain, customer demand, and business operations in its most recent 10-K.⁵⁶

Ceridian Human Capital Management provides its Dayforce human resources software to clients around the world. Headquartered in Minneapolis, Ceridian HCM warns investors that “any location in any part of the world is susceptible to natural disasters or other risks beyond our control and its third party contractors that could impact operations. For example, the west coast of the United States contains active earthquake zones, the Midwest is subject to periodic tornadoes, and the east coast is subject to seasonal hurricanes and snowstorms... In the event of a major earthquake, tornado, hurricane, or catastrophic event... we may be unable to continue our operations and may endure system interruptions, reputational harm, delays in our application development, length interruptions in our services, breaches of data security and loss of critical data, all of which could have a material adverse effect on our business, financial condition, and results of operations.”⁵⁷

“

Natural disasters and severe weather such as earthquakes, tornadoes, hurricanes or floods may result in significant damage to our properties.

”

- MARRIOTT

“

In the event of a major earthquake, tornado, hurricane, or catastrophic event... we may be unable to continue our operations and may endure system interruptions, reputational harm, delays in our application development, length interruptions in our services, breaches of data security and loss of critical data.

”

- CERIDIAN HUMAN CAPITAL MANAGEMENT

INSURANCE & FINANCIAL SERVICES

The insurance industry in Minnesota contributes significantly to the state economy. In 2017, more than 76,000 Minnesotans were employed in insurance, which contributed \$13.6 billion to Minnesota's gross state product.⁵⁸ Minnesota also has a robust banking sector with more than 50,000 employees statewide.⁵⁹

U.S. Bancorp has its global headquarters in Minneapolis and is the parent company of U.S. Bank, which had \$467 billion in assets at the end of 2018.⁶⁰ Financial institutions like U.S. Bancorp take climate concerns into consideration because severe weather and natural disasters are among their largest liabilities: "Natural disasters affect U.S. Bank's customers and can lead to their inability to fulfill commitments. If their business is destroyed through flooding or other climate related events, they may be unable to conduct business. This would lead to an inability to repay debt and a decrease in future relationship opportunities. It's difficult to manage this risk due to the uncertain nature of where a flood or disasters will hit, but U.S. Bank attempts to evaluate customer relationships in relation to recent trends through our risk management process... Similar to the acute physical occurrences, chronic shifts caused by climate change can also affect our customers and their ability to fulfill commitments, as well as a decrease in future relationship opportunities."⁶¹

Ameriprise Financial, based in Minneapolis, warns, "The occurrence of natural disasters and catastrophes, including earthquakes, hurricanes, floods, tornadoes, fires, blackouts, severe winter weather... could adversely affect our results of operations or financial condition. Such disasters and catastrophes may damage our facilities, preventing our employees and financial advisors from performing their roles or otherwise disturbing our ordinary business operations and by impacting insurance claims... We cannot predict the timing and frequency with which natural and man-made disasters and catastrophes may occur, nor can we predict the impact that changing climate conditions may have on the frequency and severity of natural disasters or on overall economic stability and sustainability."⁶²

Deluxe is a small business financial services company that offers clients marketing and social media strategy, website development, and other business-related products. Deluxe cites fires, floods, and other extreme weather events as potential disruptors to business operations that could adversely harm their business.⁶³

“

Similar to the acute physical occurrences, chronic shifts caused by climate change can also affect our customers and their ability to fulfill commitments, as well as a decrease in future relationship opportunities.

”

- U.S. BANCORP

“

Disasters and catastrophes may damage our facilities, preventing our employees and financial advisors from performing their roles or otherwise disturbing our ordinary business operations and by impacting insurance claims.

”

- AMERIPRISE FINANCIAL

TCF Bank saw its value rise nearly 70 percent in FY18.⁶⁴ TCF Bank states in its annual report, “In addition, severe weather, earthquakes, other natural disasters... could have a significant impact on our lending business. Such events could impair the ability of borrowers to repay outstanding loans, impair the value of collateral securing loans, cause significant property damage and/or cause us to incur additional expenses. Because our lending businesses are geographically diverse, those businesses are likely to be impacted more often by natural disasters, including hurricanes, flooding, fires and earthquakes, which have caused extensive damage in various parts of the United States in which they conduct business. The occurrence of any such events could have a material adverse effect on our financial condition and results of operations.”⁶⁵

MANUFACTURING

Minnesota’s manufacturing sector includes more than 8,300 manufacturers and 315,000 employees. It is among the largest private sector components of the state’s GDP and overall, both directly and indirectly, manufacturing supports nearly one third of jobs in Minnesota.⁶⁶

Headquartered in St. Paul and a Fortune 500 company, **3M** employs 12,000 Minnesotans⁶⁷ and warns its investors about “natural and other disasters or climate change affecting the operations of the Company or our suppliers and customers, new business opportunities, product development, and future performance or results of current or anticipated products.”⁶⁸

Patterson Companies, the medical device manufacturer based in St. Paul, has warned investors: “Poor or unusual weather conditions can significantly affect the purchasing decisions of our production animal customers. The timing and quantity of rainfall are two of the most important factors in agricultural production. Drought can affect the availability and price of feed for livestock.” It adds, “Weather, natural disaster, fire... could cause our operating expenses to rise and materially adversely affect our ability to deliver products on a timely basis. Our ability to provide same-day shipping and next-day delivery is an integral component of our business strategy and any significant increase in shipping rates or service interruptions could adversely impact our business, financial condition or results of operations.”⁶⁹



SEVERE WEATHER TREND

HIGHER TEMPERATURES

Temperatures across the U.S. are 1.8 degrees warmer, on average, than they were at the beginning of last century, and most of this increase has occurred since 1970. The last five years have been the globe’s warmest on modern record, and 18 of the 19 warmest years have occurred this century.⁷⁰

The Twin Cities have warmed 3.2 degrees since 1951, which is a higher rate of warming than national and global averages. During that same period, precipitation amounts increased by more than 20%.⁷¹

Donaldson Company is a filtration manufacturer headquartered in Minneapolis. It warns investors that weather events can interrupt supply chains and consequently disrupt operations, causing “physical damage to and complete or partial closure of one or more of our headquarters, manufacturing facilities or distribution centers, temporary or long-term disruption in the transport of our products to customers and disruption of information systems...”⁷²

Based in Bloomington, **The Toro Company** manufactures equipment for turf and irrigation maintenance. It has warned investors, “Our business and operating results could be impacted to a greater degree than we previously experienced to the extent that unfavorable weather conditions are exacerbated by global climate change or otherwise.” It explains the impact on consumer behavior: “drought conditions have had an adverse effect on sales of certain mowing equipment products, unusually rainy weather or severe drought conditions that result in watering bans have had an adverse effect on sales of our irrigation products ...” and also warns of supply chain disruptions: “Our facilities and our manufacturing and other operations and those of our distribution channel customers and suppliers may incur losses or experience disruptions as a result of natural disasters and/or climate change-related events...”⁷³

Fastenal Company is headquartered in Winona and distributes fasteners. It explains to investors how climate change is disrupting its operations: “In August and September 2017, we experienced temporary disruptions in our distribution network in our Gulf Coast, Florida, Georgia, and Puerto Rico regions due to hurricanes Harvey, Irma, and Maria. These storms adversely impacted our product demand and revenues, as well as our gross and operating profit percentages, due to an increase in demand for storm-related products which have a lower gross profit margin, and inefficiencies in delivery services in the immediate aftermath of the storms. In September 2018, hurricane Florence had a similar impact in our Carolinas region.”⁷⁴

MILITARY

Camp Ripley is a 53,000-acre training center near Little Falls for the Minnesota National Guard. The training center has been recognized for its cultural resource management in protecting historic and prehistoric sites and is committed to defending the wildlife and 18 miles of undeveloped Mississippi River shoreline in central Minnesota. Camp Ripley has been awarded the Department of Defense Environmental Award on multiple occasions.⁷⁵

“

Our business and operating results could be impacted to a greater degree than we previously experienced to the extent that unfavorable weather conditions are exacerbated by global climate change or otherwise.

”

- THE TORO COMPANY

“

In August and September 2017, we experienced temporary disruptions in our distribution network in our Gulf Coast, Florida, Georgia, and Puerto Rico regions due to hurricanes Harvey, Irma, and Maria. These storms adversely impacted our product demand and revenues...

”

- FASTENAL COMPANY

In January 2019 the Pentagon released a report examining how climate change affects our national defense: “The effects of a changing climate are a national security issue with potential impacts to Department of Defense missions, operational plans, and installations.” Of the 79 military facilities examined, the Pentagon found about two-thirds are vulnerable to “current or future recurrent flooding” and more than one-half to “current or future drought.” In 20 years, seven more locations are expected to be vulnerable to flooding, five to drought, and seven to wildfires.⁷⁶ Camp Ripley’s prioritization of the surrounding environment should be the norm.

PORTS & SHIPPING

Water transport is central to Minnesota’s economy. The “Land of 10,000 Lakes” sits on the shore of Lake Superior, the world’s largest freshwater lake. At the end of the St. Lawrence Seaway, the port in Duluth welcomes boats from all over the world to Minnesota. The Mississippi River begins in Minnesota and one-third of the world’s third-largest river is within the state’s borders.⁷⁷

The Great Lakes Seaway employs more than 6,000 Minnesotans and the four deep-draft commercial ports move more than 58 million tons of cargo annually. Major industries that rely on this shipping advantage are agriculture and mining, and important exports include coal, iron ore, and limestone.⁷⁸

C.H. Robinson Worldwide is a Fortune 500 provider of transportation and sourcing services. It is headquartered in Eden Prairie and warns investors, “Our sourcing business is dependent upon the supply and price of fresh produce. The supply and price of fresh produce is affected by weather and growing conditions (such as drought, freeze, insects, and disease) and other conditions over which we have no control. Commodity prices can be affected by shortages or overproduction and are often highly volatile.” It also reports that weather events “could cause the actual transit period to differ” for shipping services.⁷⁹

UPS reports that severe weather “may result in decreased revenues... or increased costs to operate our business, which could have a material adverse effect on our results of operations.”⁸⁰ **FedEx** warns that “given the broad and global scope of our operations and our susceptibility to global macroeconomic trends, we are particularly vulnerable to the physical risks of climate change.”⁸¹

“

The effects of a changing climate are a national security issue with potential impacts to Department of Defense missions, operational plans, and installations.

”

- THE PENTAGON

“

Given the broad and global scope of our operations and our susceptibility to global macroeconomic trends, we are particularly vulnerable to the physical risks of climate change.

”

- FEDEX

RAIL

Minnesota is home to 4,420 miles of railroads serviced by 21 railroad companies. Combined annual revenue is more than \$447 million and there are four Class One railroad operators: **Burlington Northern Santa Fe Railway, Union Pacific, Canadian National, and Canadian Pacific.**⁸²

Burlington Northern Santa Fe has warned investors, “Severe weather, climate change and natural disasters, such as tornados, fires, flooding and earthquakes, could cause significant business interruptions and result in increased costs and liabilities and decreased revenues.” The railway operator also reports that increased weather volatility can “negatively affect the performance of locomotives and rolling stock.”⁸³

Union Pacific warns, “Climate change, including the impact of global warming, could have a material adverse effect on our results of operations, financial condition, and liquidity.” It adds, “We are exposed to severe weather conditions and other natural phenomena, including... extreme temperatures, and significant precipitation... [which] can adversely affect revenue, costs, and liabilities...”⁸⁴

Canadian National recognizes that “climate change, including the impact of global warming, has the potential physical risk of increasing the frequency of adverse weather events...” while emphasizing that “severe weather and natural disasters, such as extreme cold or heat, flooding, droughts, fires, hurricanes and earthquakes, can disrupt operations... [resulting] in increased costs, increased liabilities and lower revenues.”⁸⁵

Canadian Pacific also warns investors, “There is potential for significant impacts to CP’s infrastructure due to changes in global weather patterns. Increasing frequency, intensity and duration of extreme weather events such as flooding, storms and forest fires may result in substantial costs...”⁸⁶

RESTAURANTS

Restaurants play a crucial role in Minnesota’s economy. There are nearly 10,000 eating and drinking locations in Minnesota, and there are 275,000 foodservice workers in the state. Restaurants generated almost \$10 billion in sales in 2017.⁸⁷

Dairy Queen, based in Bloomington, is a subsidiary of Berkshire Hathaway. According to Berkshire Hathaway’s annual report, factors that cause price volatility for raw materials in Dairy Queen’s business include weather events that cause supply chain disruptions.⁸⁸



SEVERE WEATHER TREND

FLOODING

Warmer climate leads to increased moisture in the atmosphere and higher amounts of precipitation. The January-May period of 2019 is the wettest start to a year in recorded American history, and this heavy rainfall (as well as significant winter snowfall across the Midwest) was a primary cause in the historic Midwest flooding in March.⁸⁹

Not only does Minnesota suffer from flood risks, unpredictable rain patterns, and heavy storms, it also is susceptible to tornadoes. Minnesota lies on the northern edge of “Tornado Alley,” and the state routinely suffers from tornadoes that damage property and even result in fatalities. Climate change exacerbates the threat of tornadoes to the state.⁹⁰

McDonald's has 203 restaurant locations in the state of Minnesota. The company warns investors that severe weather or climate change will adversely impact their supply chains, food pricing, and consumer demand.⁹²

Chipotle has 68 Minnesota locations⁹³ and cautions investors: “Increasing weather volatility or other long-term changes in global weather patterns, including any changes associated with global climate change, could have a significant impact on the price or availability of some of our ingredients... such as chicken, beef, cheese, avocados, beans, rice, tomatoes and pork...”⁹⁴

RETAIL

In Minnesota, the retail industry includes nearly 70,000 establishments supporting more than 780,000 jobs. Major retailers headquartered in the state include Fortune 500 companies **Target** and **Best Buy**. The total impact of retail on Minnesota's GDP is more than \$46 billion.⁹⁵

Target is headquartered in Minneapolis and warns investors that “significant weather conditions can affect consumer shopping patterns, particularly in apparel and seasonal items, which could lead to lost sales or greater than expected markdowns and adversely affect our short-term results of operations.” It adds, “our three largest states by total sales are California, Texas and Florida, areas where natural disasters are more prevalent...[which] could result in significant physical damage to or closure of one or more of our stores, distribution centers or key vendors, and cause delays in the distribution of merchandise from our vendors to our distribution centers, stores, and guests, which could adversely affect our results of operations by increasing our costs and lowering our sales.”⁹⁶

Best Buy, based in Richfield, warns its investors: “The risk or actual occurrence of various catastrophic events could have a material adverse effect on our financial performance. Such events may be caused by, for example: natural disasters or extreme weather events... floods, fires or other catastrophes affecting our properties.”⁹⁷

Walmart has 81 stores and more than 21,600 associates in Minnesota⁹⁸ and reports that “the occurrence of one or more natural disasters, such as hurricanes, tropical storms, floods, fires, earthquakes, tsunamis, cyclones, typhoons... whether as a result of climate change or otherwise... in a country in which we operate or in which our suppliers are located could adversely affect our operations and financial performance.”⁹⁹



Increasing weather volatility or other long-term changes in global weather patterns, including any changes associated with global climate change, could have a significant impact on the price or availability of some of our ingredients.



- CHIPOTLE



Significant weather conditions can affect consumer shopping patterns, particularly in apparel and seasonal items, which could lead to lost sales or greater than expected markdowns and adversely affect our short-term results of operations.



- TARGET

The Home Depot is a major employer in Minnesota with 33 locations statewide.¹⁰⁰ The retailer cites “weather-related events” and natural disasters as factors that can disrupt their supply chain and halt operations. It also reports, “extreme weather conditions such as excessive precipitation, [and] warm temperatures during the winter season... could render a portion of our inventory incompatible with customer needs.”¹⁰¹

Many other clothing retailers (including **The Gap**,¹⁰² **Nike**,¹⁰³ **Abercrombie & Fitch**,¹⁰⁴ and **L Brands**¹⁰⁵) have warned investors about the negative effect severe weather has on their operations and sales. **American Eagle Outfitters** has 17 Minnesota locations¹⁰⁶ and warns that “extreme weather conditions or changes in climate conditions or weather patterns” could negatively affect their financial performance and operations.¹⁰⁷

TOURISM

Tourism is a \$15.3 billion industry that supports more than 270,000 jobs in Minnesota. In 2017, 73 million people visited Minnesota, contributing \$42 million a day.¹⁰⁸ The Twin Cities and Lake Superior are among Minnesota’s major tourism attractions; both are threatened by climate change and increasingly severe weather conditions.

The Minneapolis and St. Paul region alone attracted more than \$10.5 billion in sales in 2017.¹⁰⁹ Extreme temperatures and humidity are particularly dangerous in densely populated urban areas. Minneapolis is the 14th fastest warming city in the United States, having seen a 3.72 degree Fahrenheit rise in average temperatures since 1970.¹¹⁰ In 2016, the Twin Cities set a record for their rainiest year.¹¹¹

Lake Superior offers recreational activities and attractions in Minnesota: hiking and biking trails, beaches, fishing, and wildlife. But climate change and warmer temperatures can significantly change sea levels, triggering shoreline erosion and coastal flooding. On July 1, 2019 Lake Superior reached a record high water level, 14 inches above the average.¹¹² Since 1958, the Midwest has seen 42 percent more “very heavy rainfall events.”¹¹³ Duluth is the 16th fastest warming city in the country, and its average temperatures have increased 3.67 degrees Fahrenheit since 1970.¹¹⁴ The warmer, wetter climate is causing flooding that threatens water quality and puts a strain on outdoor restaurants, fishing and vacation rentals, and water recreation.

“

We just simply don’t get consistent snow anymore. In order to survive, we felt like we needed to [start making snow]... I don’t look forward to the day when our Minnesota winters are like Missouri or southern Iowa, Nebraska - where you get snow one day and the next day it’s all mud.¹¹⁵

”

- DON OLSEN
VASALOPPET CROSS COUNTRY SKI TRACK,
MORA

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