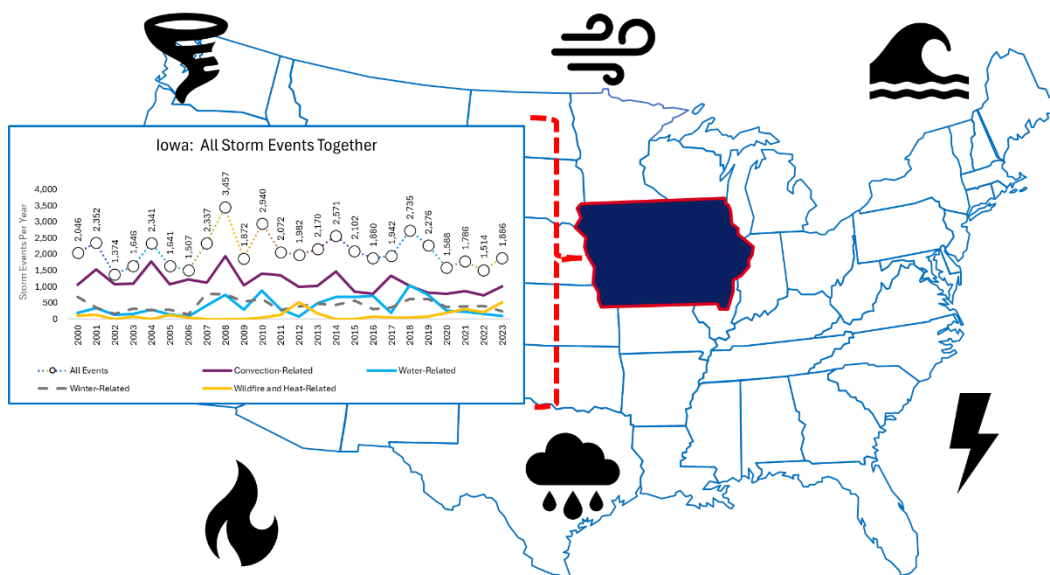


2024 Iowa Storm Events Summary



As a benefit of your membership in the **Big I Iowa**, you are receiving this *2024 Iowa Storm Events Summary*. This exclusive membership benefit is designed to deliver you easy access to historical public weather data from a credible and public resource, that has been tailored to be specific to your state. The goal is to give you data that can help you see and explain, to your insureds and prospects, the importance of insurance products in helping manage Iowa weather risks.

The core component of tracking weather is what is known as a “Storm Event.” This *2024 Iowa Storm Events Summary* focuses on 56 types of Storm Events, as defined by the National Center for Environmental Information (NCEI), a division of the National Oceanic and Atmospheric Administration (NOAA), which is an agency of the National Weather Service (NWS). The www.NOAA.gov website states that “NWS data and products form a national information database and infrastructure which can be used by other governmental agencies, the private sector, the public, and the global community.” For further understanding, shortened descriptions of the NCEI “Storm Events,” are provided in **Appendix #1– NCEI Storm Event Directives Summarized**.

This *Summary* provides a graphic presentation of Storm Events in Iowa over the past 24 years, since the year 2000. Weather data is presented for Iowa, and also for the United States, for comparison. To facilitate the management and presentation of Iowa's weather, raw data for all Storm Events is grouped into similar broad categories, then further refined into sub-categories of closely related Storm Event types. Severe weather data is examined separately from the broader data to see trends and variability in Severe Storm Events.

This *2024 Iowa Storm Events Summary* does not attempt to and is not a tool for predicting future weather events or climate change trends. The intent is to give you easy access to valid and reliable Storm Events data. Sometimes the biggest benefit of any summary is simply the knowledge that the data exists, and understanding all the instances when it can be used to answer questions or devise strategy.

Storm Events Data as a Resource for Insurance Agents

Iowa specific Storm Event data can show insurance clients that certain insurable Storm Events do indeed occur in Iowa. It can also provide insight into the frequency of those Storm Events, any Storm Event trends, and also weather variability.

Storm Events data can be of use, and helpful to independent insurance agents when in discussion with their clients or prospects, in looking back at particularly challenging loss years, and in helping those clients or prospects make thoughtful risk management decisions with potential Storm Events in mind. Insurance coverage for such events is very situation dependent, and using state-specific Storm Event data to facilitate insured discussions can both educate, and help clarify what is and what is not intended to be covered by insurance premiums paid. For example, insureds considering retaining (self-insuring) the risk of Convection-Related Storm Events may benefit from looking at recent years Storm Events data and reflecting on the benefits of property and casualty (P&C) insurance coverage, including insurer assistance in cash-flow and recovery after more widespread Convection-Related Storm Events.

Readers might also be interested in comparing Iowa's Storm Event data with the *2024 Iowa P&C Marketplace Summary*. And also comparing United States Storm Event data with the *2024 United State P&C Marketplace Summary*. In any case, the data in this *2024 Iowa Storm Events Summary* can help make the case that weather events are highly variable, and that P&C insurance is likely the best form of risk management for an independent insurance agency customer.

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Weather Data and Storm Events

Weather Data Collection and Sources

As previously mentioned, Storm Events data is obtained from the NCEI, whose mandate includes monitoring climate, weather, oceans, coasts, and related geophysics. The NCEI collects, archives, and distributes Storm Event data, which includes thunderstorms, tornadoes, hurricanes, floods, winter storms, and more. The NCEI comprehensive database details the location, date, time, duration, intensity, and impacts of each event.

The data is gathered from various sources including:

- National Weather Service (NWS)
- County, state, and federal emergency management officials
- Local law enforcement officials
- “Skywarn” spotters
- NWS damage surveys
- Newspaper clipping services
- Insurance industry
- General public

Storm Event Description

The agencies, entities, and sources that collect Storm Event data are provided by the NCEI, highly detailed directives that set parameters for weather data gathering. To enhance understanding of the parameters guiding weather data collection, abbreviated summaries of the Storm Event types are listed in **Appendix #1–NCEI Storm Event Directives Summarized**. The directives instruct sources as to what qualifies as a particular Storm Event, and how to document it. The instructions are highly detailed so that the data reporting methods remain consistent and take into account the differences from one Storm Event to another.

NCEI has changed a few of its reporting practices through the years though, particularly in how several Storm Events are named. The older name, “Hurricane (Typhoon)” was replaced by the shorter “Hurricane.” Technically, a Typhoon only occurs in the western Pacific, and tropical cyclones are referred to as Hurricanes as far west as Hawaii. And Northern Lights were once reported in West Virginia in 2002, but is no longer included in NCEI Storm Events so is ignored here. For presentation in this *2024 Iowa Storm Events Summary* the older “Hurricane (Typhoon),” and the newer “Hurricane” Storm Events are consolidated as a single Storm Event.

The NCEI database includes data from U.S. States Territories (e.g, Puerto Rico and the Virgin Islands) as well as marine environments like coastal areas and navigable waterways. However, the data presented in this *Summary* excludes any territory like Puerto Rico. And no marine-only events are included, unless they develop into a land-based event, for example where “Marine Thunderstorm Wind” becomes “High Wind” or “Thunderstorm Wind.”

Data Categorization of Storm Events

For clearer understanding and visualization of the impact of Iowa's weather data on insurance matters, Storm Events that have similar insurance impacts are grouped together in this *Summary* into four different Storm Event Categories, for data presentation purposes. These categories were organized and developed by Real Insurance Solutions Consulting for this *Summary* and are not NCEI's.

The Categories of Storm Events used in the *Summary* are:

- Convection-Related
- Water-Related
- Winter-Related
- Wildfire and Heat-Related

To aid in quickly and easily identifying the different types of Storm Events, below is Table 1: *Color-Coded Representation of Storm Event Categories*, which provides a color-coded representation of 56 Storm Events as defined by the NCEI. These Storm Events are each found listed under its broader, but related Storm Event Category, from the list above. These Storm Event Categories are represented by the color purple for Convection-Related Storm Events, blue for Water Related Storm Events, grey for Winter-Related Storm Events, and amber for Wildfire and Heat-Related Storm Events.

Color-Coded Representation of Storm Event Categories

Convection-Related	Water-Related	Winter-Related	Wildfire and Heat-Related
Dense Fog Dust Devil Dust Storm Funnel Cloud Hail High Wind Hurricane Hurricane (Typhoon) Lightning Marine Dense Fog Marine Hail Marine High Wind Marine Hurricane/Typhoon Marine Lightning Marine Strong Wind Marine Thunderstorm Wind Marine Tropical Depression Marine Tropical Storm Strong Wind Thunderstorm Wind Tornado Tropical Depression Tropical Storm Waterspout	Astronomical Low Tide Coastal Flood Debris Flow Flash Flood Flood Heavy Rain High Surf Lakeshore Flood Rip Current Seiche Sneakerwave Storm Surge/Tide Tsunami	Avalanche Blizzard Cold/Wind Chill Extreme Cold/Wind Chill Freezing Fog Frost/Freeze Heavy Snow Ice Storm Lake-Effect Snow Sleet Winter Storm Winter Weather	Dense Smoke Drought Excessive Heat Heat Volcanic Ash Volcanic Ashfall Wildfire

Table 1 | Source: NOAA/NCEI Storm Events Database (The 4 Categories are by Real Insurance Solutions Consulting)

All Storm Event Data Combined and Four Categories

The 24 years of Storm Event data for Iowa, reported on in this Summary, are graphed below in Figure 1A: *Iowa: All Storm Events Together*. The data is consolidated into the four Storm Events Categories created by Real Insurance Solutions Consulting, and graphing follows the Storm Event Category color-codes previously shown in Table 1.

And for comparison, Figure 1B: *United States: All Storm Events Together*, provides the United States data for all states combined.

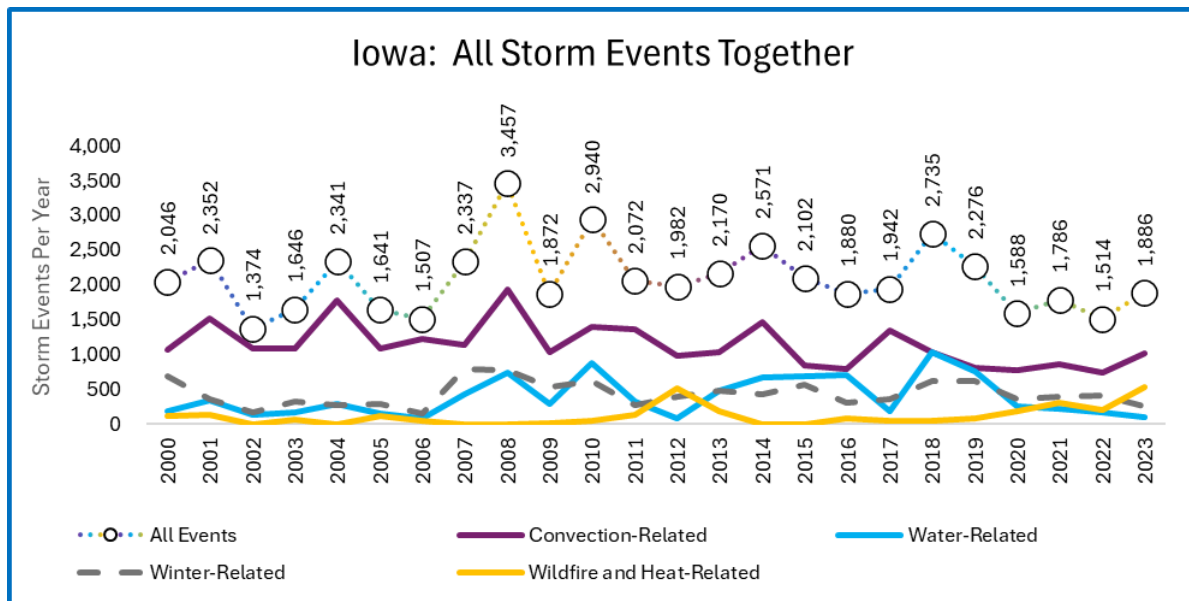


Figure 1A | Source: National Centers for Environmental Information (NCEI) Storm Events Database

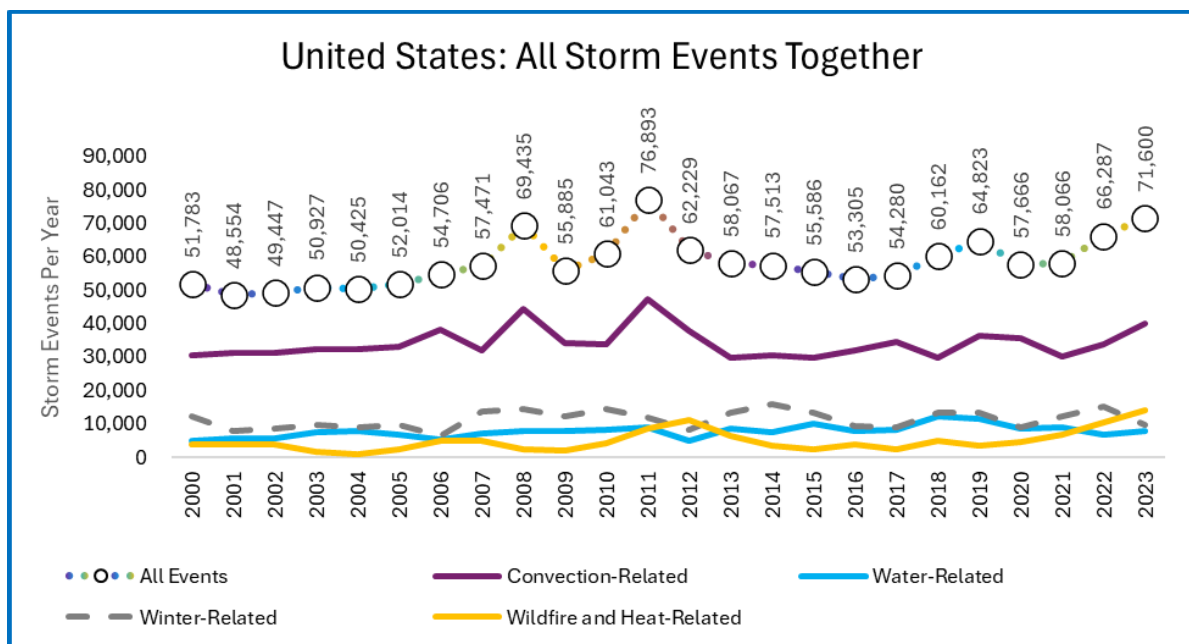


Figure 1B | Source: National Centers for Environmental Information (NCEI) Storm Events Database

Convection-Related Storm Events

Convection-Related Defined

Convection-related Storm Events are those that result from vertical forces in the atmosphere that transport heat, moisture, and momentum up, and then generate storm-related weather at the ground level. Convection can be seen daily as the sun heats the earth's surface, air rises, and moisture in the air condenses and clouds form. Convection can advance to the formation of thunderstorms, tornados, hurricanes, and tropical storms. Additionally, when large masses of cold air approach warmed air, convection can intensify, and the warmed air can be forced to rise rapidly over wide areas, which can cause squall lines and even derechos.

Generally, property losses resulting from Convection-Related Storm Events are covered by property and casualty (P&C) insurance in Lines of Business like Homeowners Multi-Peril, Commercial Multi-Peril, Personal and Commercial Automobile insurance (if physical damage is insured), but also may be covered by lesser thought of P&C insurance policies like Aircraft, Crop Insurance, and Inland Marine.

Convection-Related Sub-Categories

Real Insurance Solutions Consulting has placed the 24 Storm Event types found within the purple Convection-Related Category in Table 1, into four Sub-Categories, to provide a more detailed level of Storm Event data presentation. Those four Convection-Related Sub-Categories are: Tornado, Straight-Line (wind), Hail, Hurricane and Other (Δ). Those four Sub-Categories and their component Storm Event types are shown below in Table 2: *Convection-Related Sub-Categories and their Component Storm Events*. Table 2 uses the color purple, with either a solid line, dashed line, dotted line, or purple shading to delineate each Sub-Category of Convection-Related Storm Events. Also note, the last Sub-Category "Other" is designated by a purple triangle (Δ) symbol only.

Convection-Related Sub-Categories and their Component Storm Events

Tornado	Straight-Line	Hail	Hurricanes	Other (<u>Δ</u>)
Funnel Cloud Tornado Waterspout	High Wind Lightning Marine High Wind Marine Lightning Marine Strong Wind Marine Thunderstorm Wind Strong Wind Thunderstorm Wind	Hail Marine Hail	Hurricane Hurricane (Typhoon) Marine Hurricane/Typhoon Marine Tropical Depression Marine Tropical Storm Tropical Depression Tropical Storm	Dense Fog Dust Devil Dust Storm Marine Dense Fog

Table 2 | Real Insurance Solutions Consulting

Convection-Related Storm Event Data

Below, Figure 2A: *Iowa: Convection-Related Storm Events*, presents data on the Sub-Categories of Convection-Related Storm Events with the colors, shading, and line treatments previously shown in Table 2 above. Figure 2B: *United States: Convection-Related Storm Events*, provides comparable data for the entire United States. In both Figures a “Total” is provided, which represents the total number of Convection-Related Storm Events for the years included in this 2024 *Iowa Storm Events Summary*.

Note: Hurricanes Events have their own scale on the right-hand axis, for better visibility of Hurricane data as compared to the rest of the Sub-Categories. In states with no Hurricanes, no purple-colored columns are visible. States with Hurricanes will have purple columns shown that represent that data.

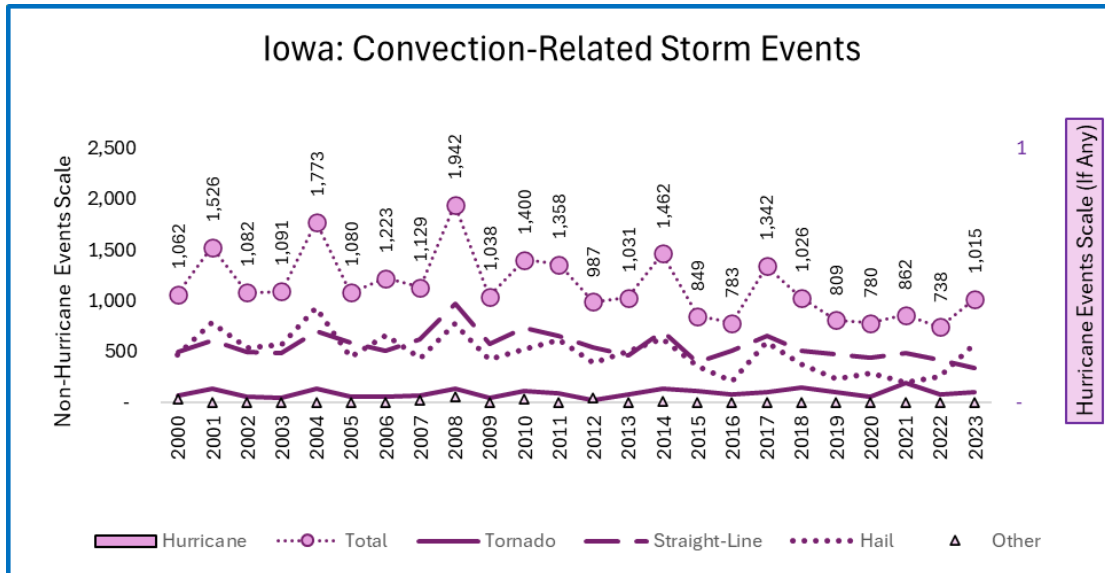


Figure 2A | Source: National Centers for Environmental Information (NCEI) Storm Events Database

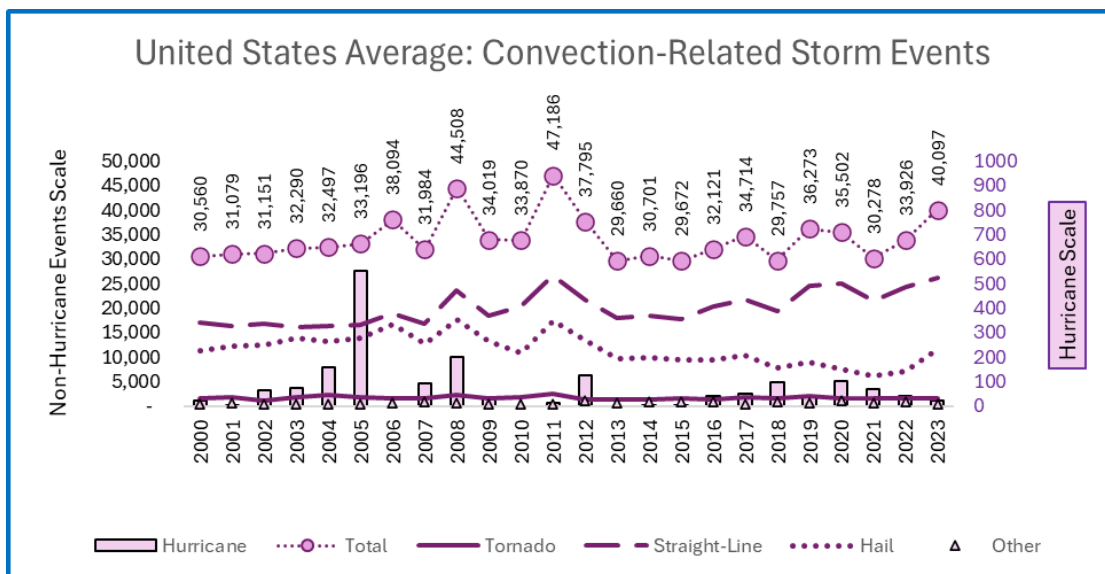


Figure 2B | Source: National Centers for Environmental Information (NCEI) Storm Events Database

Water-Related Storm Events

Water-Related Defined

Water-Related Storm Events are those in which precipitation, such as rain or other forms of condensation, along with rising or moving water, are the primary elements of the Storm Event. This category includes flash flooding, even though the root cause of flash flooding often involves Convection-Related circumstances. This is because property and casualty (P&C) insurance treats flash flooding more like other types of Water-Related Storm Events, than it does tornadoes and other Convection-Related Storm Events.

Generally, potential property losses which may result from Water-Related Storm Events require situation-specific risk management discussions between independent agents and their insureds, as the property itself, its location, it's mobility (or lack of mobility) makes a significant difference in insurance coverage needed. For example, virtually every Private Passenger Auto, Commercial Auto policy, and Inland Marine policy provides physical damage coverage for loss due to water damage (that is, if the auto policies are not "liability-only"). That is not the case with residential and commercial property, where a separate policy is often required for rising water from a Storm Event. Private Crop insurance (historically often referred to as "Rain and Hail" crop insurance) may or may not cover water damage, while Multi-Peril Crop insurance (reinsured by the U.S. government) nearly always includes such Water-Related perils. The point is, adequately insuring for situations involving Water-Related loss potential will benefit from discussion between independent insurance agents and clients. Access to Storm Event data, and more specifically Water-Related Storm Event data, can enhance those discussions.

Water-Related Sub-Categories

Real Insurance Solutions Consulting has placed the 13 Storm Event types found in the Water-Related Category in Table 1 into three further Sub-Categories, to provide a more detailed level of Storm Event data presentation. The three Water-Related Sub-Categories are: Rising Water, Rain, and Other Water. These three more specific Sub-Categories and their component Storm Event types are shown below in Table 3: *Water-Related Sub-Categories and their Component Storm Events*. Table 3 uses the color blue, with either a solid, dashed, or dotted line to delineate each Sub-Category of Water-Related Storm Events.

Water-Related Sub-Categories and their Component Storm Events

Rising Water	Rain	Other Water
Coastal Flood Debris Flow Flash Flood Flood High Surf Lakeshore Flood Storm Surge/Tide Tsunami	Heavy Rain	Astronomical Low Tide Rip Current Seiche Sneakerwave

Table 3 | Real Insurance Solutions Consulting

Water-Related Storm Event Data

Figure 3A: *Iowa: Water-Related Storm Events*, presents data on the three Sub-Categories of Water-Related Storm Events using the color, shading and line treatments previously shown in Table 3 above. And Figure 3B: *United States: Water-Related Storm Events*, provides the comparable United States data for Water-Related Storm Events. In both Figures a “Total” is provided, which represents the total number of Water-Related Storm Events, for each year included in this 2024 *Iowa Storm Events Summary*.

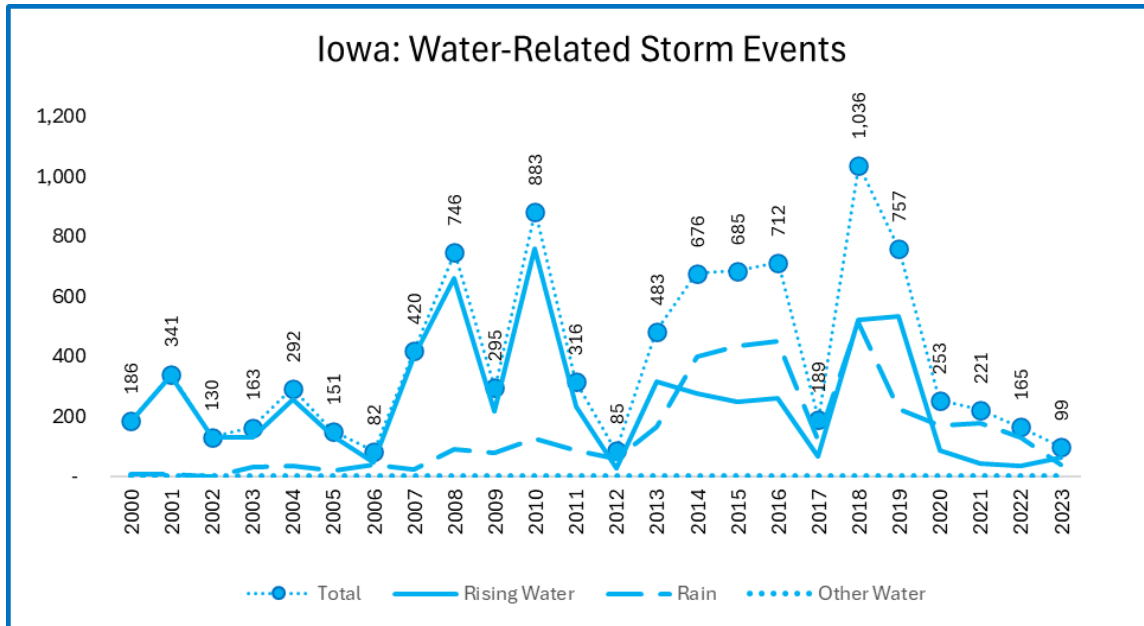


Figure 3A | Source: NOAA/NCEI Storm Events Database

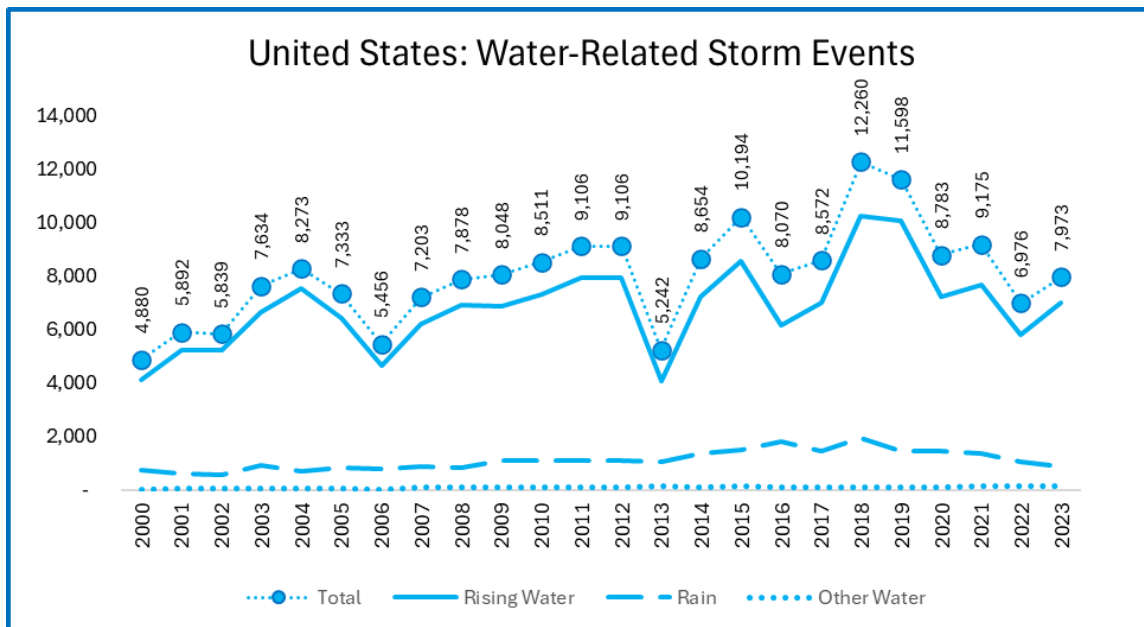


Figure 3B | Source: NOAA/NCEI Storm Events Database

Winter-Related Storm Events and Sub-Categories

Winter-Related Defined

Winter-related Storm Events are those where cold weather, starting in the fall season and continuing to the spring, are the predominant cause of the Storm Event. These include the result of freezing from cold temperatures, from precipitation related to snow, sleet, freezing rain, and accumulations resulting from these events. This is a category of Storm Events where nearly every state has a chance of some type of Winter-Related Storm Event occurring within its borders, but some states have significantly less chance of experiencing Winter-Related Storm Events. It should be noted that the NCEI directives do generally instruct their sources to include only significant (abnormal or not routine) events when reporting Winter-Related Storms.

Generally, property losses resulting from Winter-Related Storm Events are covered by property and casualty (P&C) insurance if the Storm Event results in damage over a short period of time. However, damage from Winter-Related Storm Events can sometimes be cumulative and/or result in slower deterioration or even collapse of property, and coverage is less likely. Depending on the coverage, it can be important to discuss potential situations with insureds to ensure they understand both the benefits and limitations of their P&C insurance, especially since the type of policy significantly affects coverage for winter-related storm events, including often overlooked factors like building occupancy.

Winter-Related Sub-Categories

Real Insurance Solutions Consulting has placed 12 Storm Event types in the Winter-Related category into three Winter-Related Sub-Categories, which are: Snow or Sleet, Cold Temperature, and Avalanche. These three Sub-Categories and their component Storm Event types are shown below in Table 4: *Winter-Related Sub-Categories and their Component Storm Events*. Table 4 uses the color grey, with either a solid line, dashed line, or dotted line to delineate each Winter-Related Sub-Category of Storm Events.

Winter-Related Sub-Categories and their Component Storm Events

Snow or Sleet	Cold Temperature	Avalanche
Blizzard Freezing Fog Heavy Snow Ice Storm Lake-Effect Snow Sleet Winter Storm	Cold/Wind Chill Extreme Cold/Wind Chill Frost/Freeze Winter Weather	Avalanche

Table 4 | Real Insurance Solutions Consulting

Winter-Related Storm Event Data

Figure 4A: *Iowa: Winter-Related Storm Events*, presents data on the 3 Sub-Categories of Winter-Related Storm Events with the colors, shading and line treatments as previously shown in Table 3 above. Figure 4B, *United States: Winter-Related Storm Events*, provides the comparable United States data for Winter-related Storm Events. In both Figures a “Total” is provided, which represents the total number of Winter-Related Storm Events, for each year included in this 2024 *Iowa Storm Events Summary*.

Note: Avalanche has its own scale on the right-hand axis, for better visibility of Avalanche Storm Events, compared to the more frequent Snow or Sleet, and Cold Temperature Winter-Related Sub-Categories. If there were no Avalanches in a particular state, there are no grey-colored columns visible. If there were Avalanches in the data, then grey columns will be shown that represent that data.

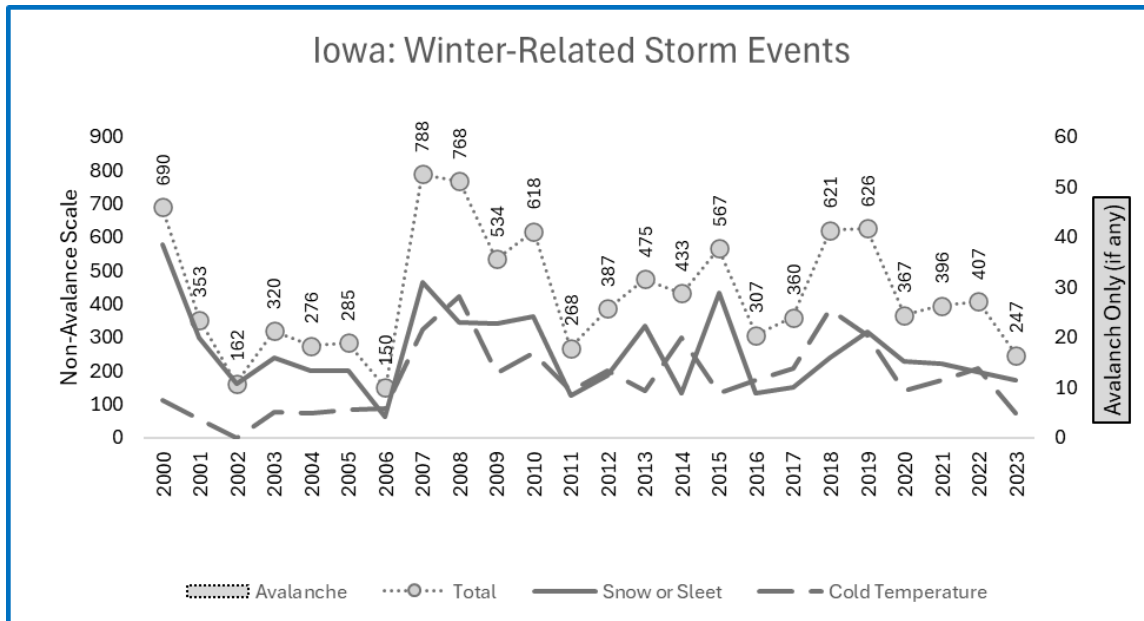


Figure 4A | Source: NOAA/NCEI Storm Events Database

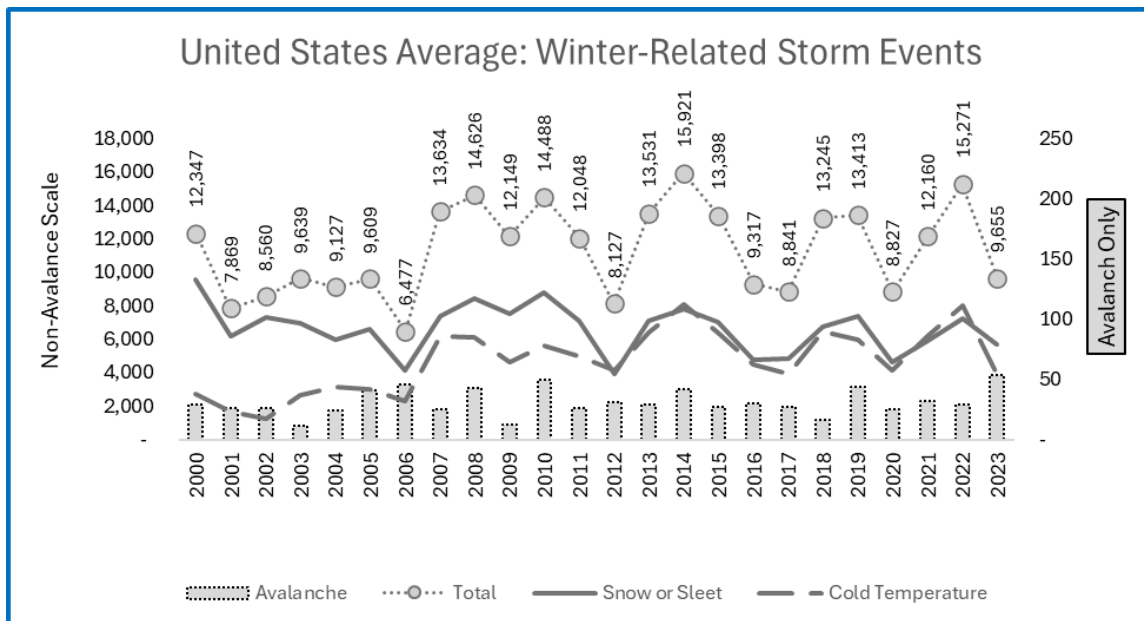


Figure 4B | Source: NOAA/NCEI Storm Events Database

Wildfire and Heat-Related and Sub-Categories

Wildfire and Heat-Related Defined

Wildfire and Heat-Related Storm Events are those that result from summer-season high temperatures, and fire that is generally, but not always, associated with the summer season. High temperatures for long time periods of time are included as a Storm Event in the data. Drought, which is extended periods of no precipitation, is also included as that Storm Event is the accumulation of many days, weeks or months of no precipitation. Drought may be heat related, or exacerbate wildfires. Like Winter-Related Storm Events, it should be noted that the NCEI directives do generally instruct their sources reporting Wildfire and Heat-Related Storm events to include only significant (abnormal or not routine) events.

The treatment by insurers of property losses that result from Wildfire and Heat-Related Storm Events varies widely from Storm Event to Storm Event, and for the Line of Business insured. Fire is generally covered by all policies providing physical damage coverage, but there can be exceptions, as with some crop insurance. Heat and drought can vary widely in coverage too, from being not covered at all for losses deemed routine and “wear and tear,” to being one of the primary reasons for the purchase of coverage, like with crop insurance. In some areas of the United States, Fire might be such a significant aspect of coverage decisions that the coverage is excluded from standard policies and is insured separately. Again, discussions with insureds and prospects using this data can be important and facilitated by use of this data on Wildfire and Heat-Related Storm Events.

Wildfire and Heat-Related Sub-Categories

Real Insurance Solutions Consulting has placed the 6 Storm Event types in the Wildfire and Heat-Related Category into three Sub-Categories, which are: Wildfire, Heat, and Volcanic. Those three Sub-Categories and their component Storm Event types are shown below in Table 5: *Wildfire and Heat-Related Sub-Categories and their Component Storm Events*. Table 5 uses the color amber, with either a solid line, dashed line, or dotted line, to delineate each Sub-Category of Wildfire or Heat-Related Storm Events.

Wildfire and Heat-Related Sub-Categories and their Component Storm Events

Wildfire	Heat	Volcanic
Dense Smoke Wildfire	Drought Excessive Heat Heat	Volcanic Ashfall

Table 5 | Real Insurance Solutions Consulting

Wildfire and Heat-Related Storm Event Data

Figure 5A: *Iowa: Wildfire and Heat-Related Storm Events*, presents data on the Sub-Categories of Wildfire and Heat-Related Storm Events with the colors, shading and line treatments previously shown in Table 5 above. Figure 5B: *United States: Wildfire and Heat-Related Storm Events*, provides comparable data for the entire U.S. In both Figures a “Total,” shows the total number of Wildfire and Heat-Related Storm Events, for each year included in this 2024 Iowa Storm Events Summary.

Note: Wildfire has its own scale on the right-hand axis, which allows for better visibility of Wildfire Events. If there were no Wildfires, there are no amber-colored columns are visible. If there are Wildfires in the data, then there will be amber-colored columns shown, to represent that data.

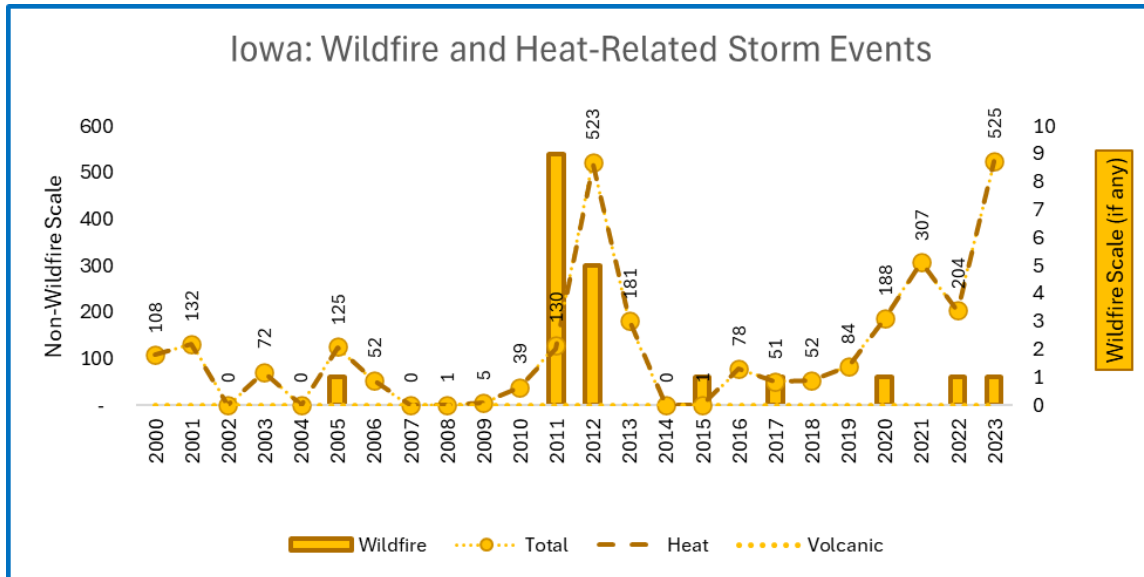


Figure 5A | Source: NOAA/NCEI Storm Events Database

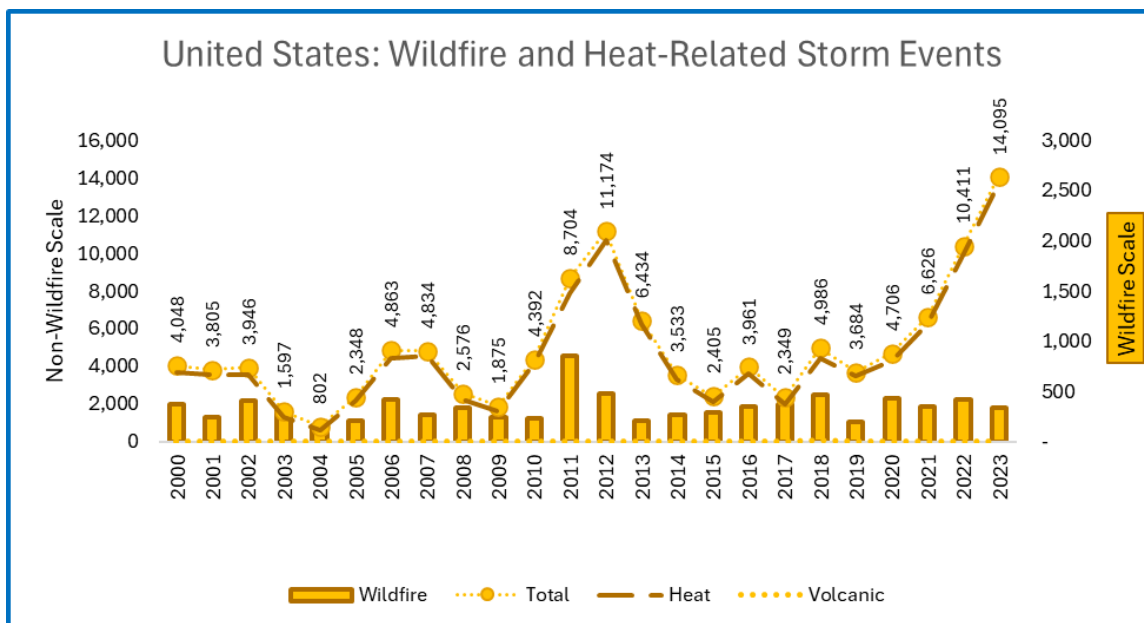


Figure 5B | Source: NOAA/NCEI Storm Events Database

Severe Storm Events and Severe Storm Event Data

Severe Storm Events Defined

This section brings back all 56 Storm Events, then draws out the various Storm Events that are deemed to be “Severe” Storm Events. The parameters of what is considered to be a “Severe Storm Event” have been determined by Real Insurance Solutions Consulting, and not NCEI.

Below Table 6: *Severe Storm Event Groups*, Real Insurance Solutions Consulting has separated Storm Events into six Groups, which are: High Winds, Tornado, Hail, Hurricane, Wildfire, and Other. The type of weather event belonging to each Group, and the parameters by which that type of weather event is considered to be “Severe” are listed. Colors used to represent each group were selected to be consistent with previous use of colors, except the “Other” category. The color used for “Other” is brown.

For clarification, the “Other” Severe Storm Event Group is defined as “Any other Storm Event of any type, that does not fit under, or meet the parameters of the first 5 Severe Storm Event Groups, and where one (1) or more Deaths, or 10 or more Injuries occur.” This “Other” grouping is important and necessary, as there are many Storm Events where reported data reveals less severe parameters than the previous five Severe Storm Event Groups, but one (1) death or 10 or more injuries still occurred. Examples of Storm Events that fall in the Other Category would include: a Tornado of EF1 or EF2 where there is a death or 10 or more injuries; or a Storm Event not in the first 5 Severe Storm Events like Heat, Rip Current or Avalanche where there is a death or 10 or more injuries.

Severe Storm Events Groups

High Winds	Tornado	Hail	Hurricane	Wildfire	Other
High Wind, Marine High Wind, Marine Strong Wind, Marine Thunderstorm Wind, Strong Wind, Thunderstorm Wind of 65 knots (75 mph) or more	Funnel Cloud, Tornado, Waterspout EF3+, >5 miles Long or >500 feet wide	Hail of 2 inches or more	Hurricane, Hurricane (Typhoon) of any Category (1,2, 3, 4 or 5)	Any damages reported	Any other Storm Events of any type, that do not meet the parameters of the first 5 Groups, and where one (1) or more Deaths, or 10 or more Injuries occur

Table 6 | Real Insurance Solutions Consulting

Severe Storm Event Data

Figure 6A: *Iowa Severe Storm Events*, presents Iowa data limited to what is deemed a “Severe” Storm Event by Real Insurance Solutions Consulting (not NCEI), the objective being that it highlights the data most often associated with significant P&C insurance losses. Figure 6B: *United States Severe Storm Events*, provides the comparable Severe Storm Event data for the United States.

Note: The Hurricane Scale is on the right-hand axis, for better visibility of Hurricane data, if any. In states with no Hurricanes, no purple-colored columns are visible. Where Hurricanes are found in the data, purple columns will be shown, to represent that data.

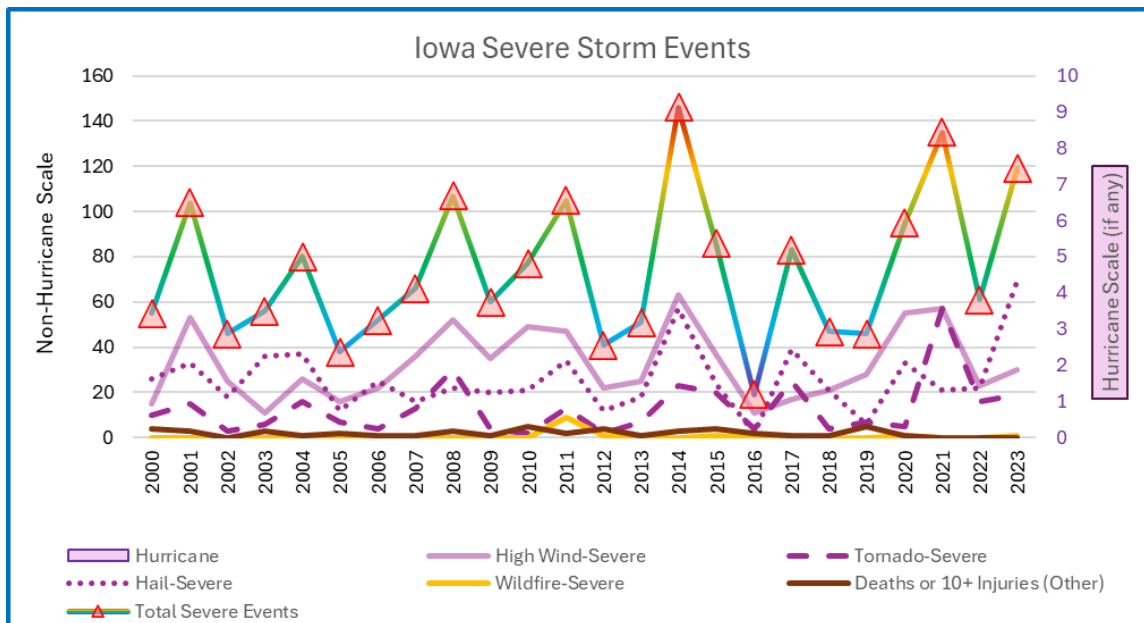


Figure 6A | Source: NOAA/NCEI Storm Events Database and Real Insurance Solutions Consulting

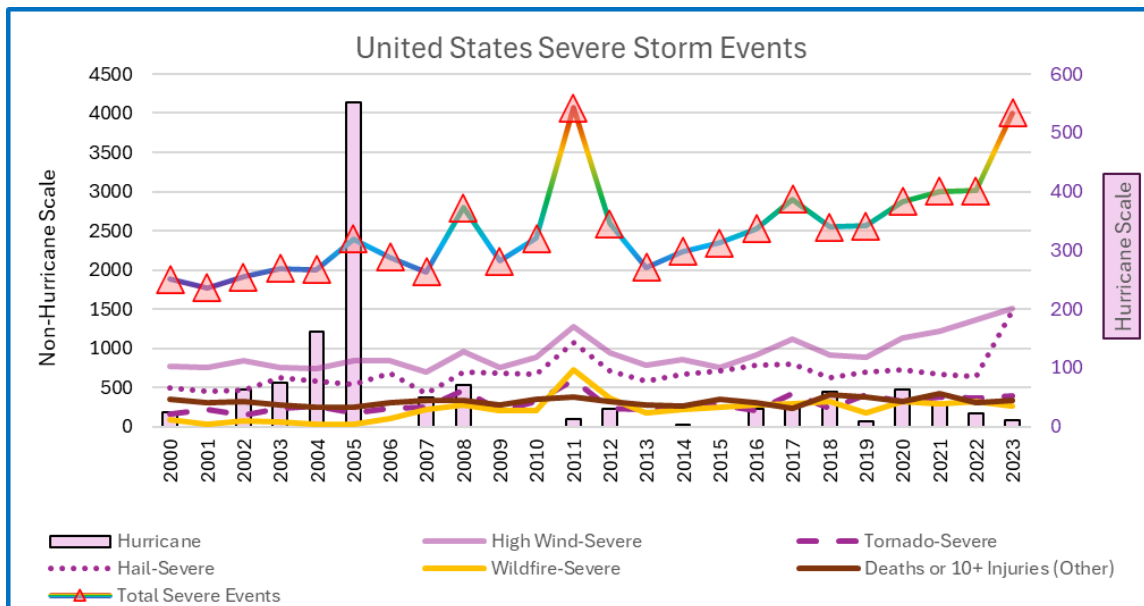
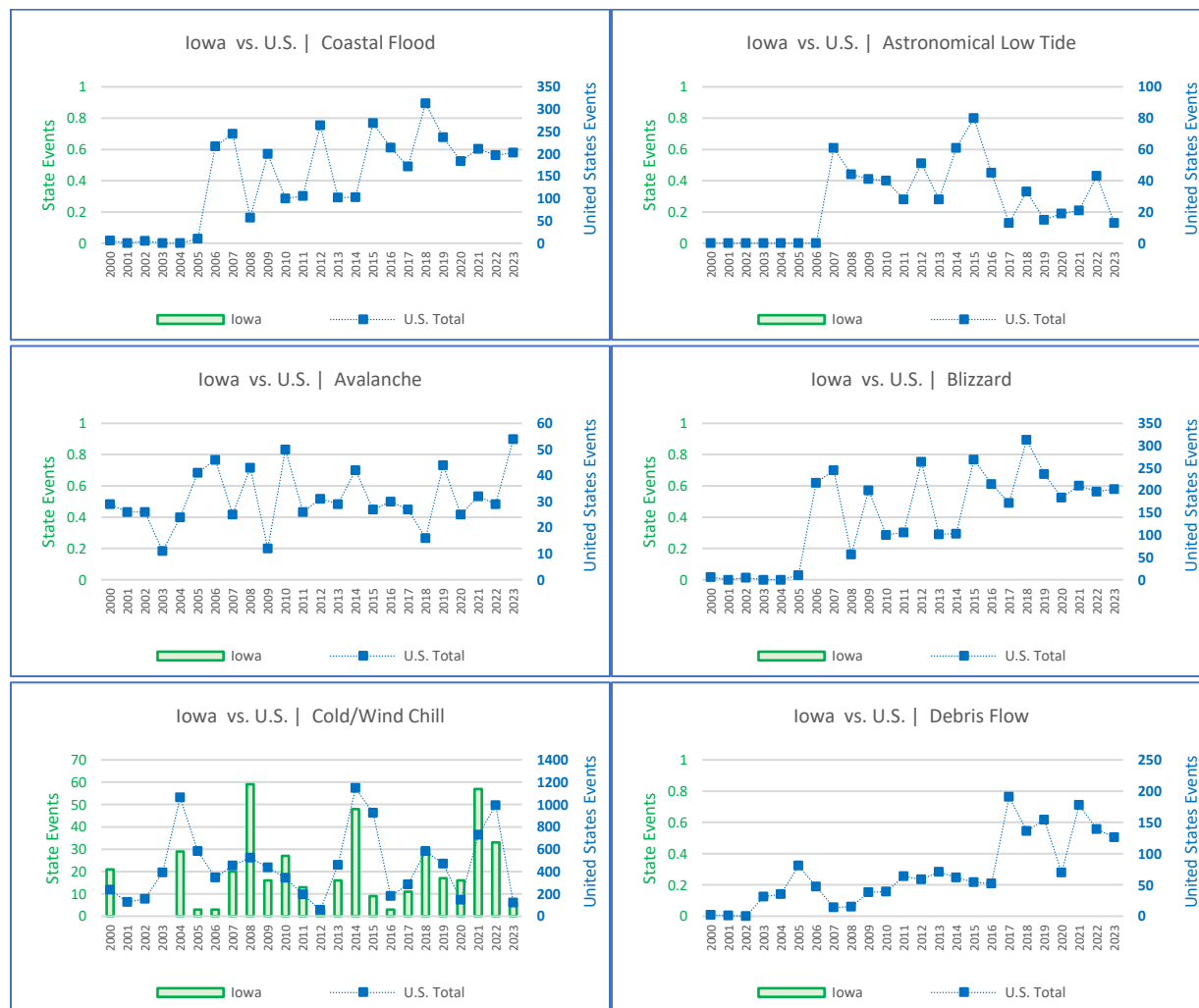


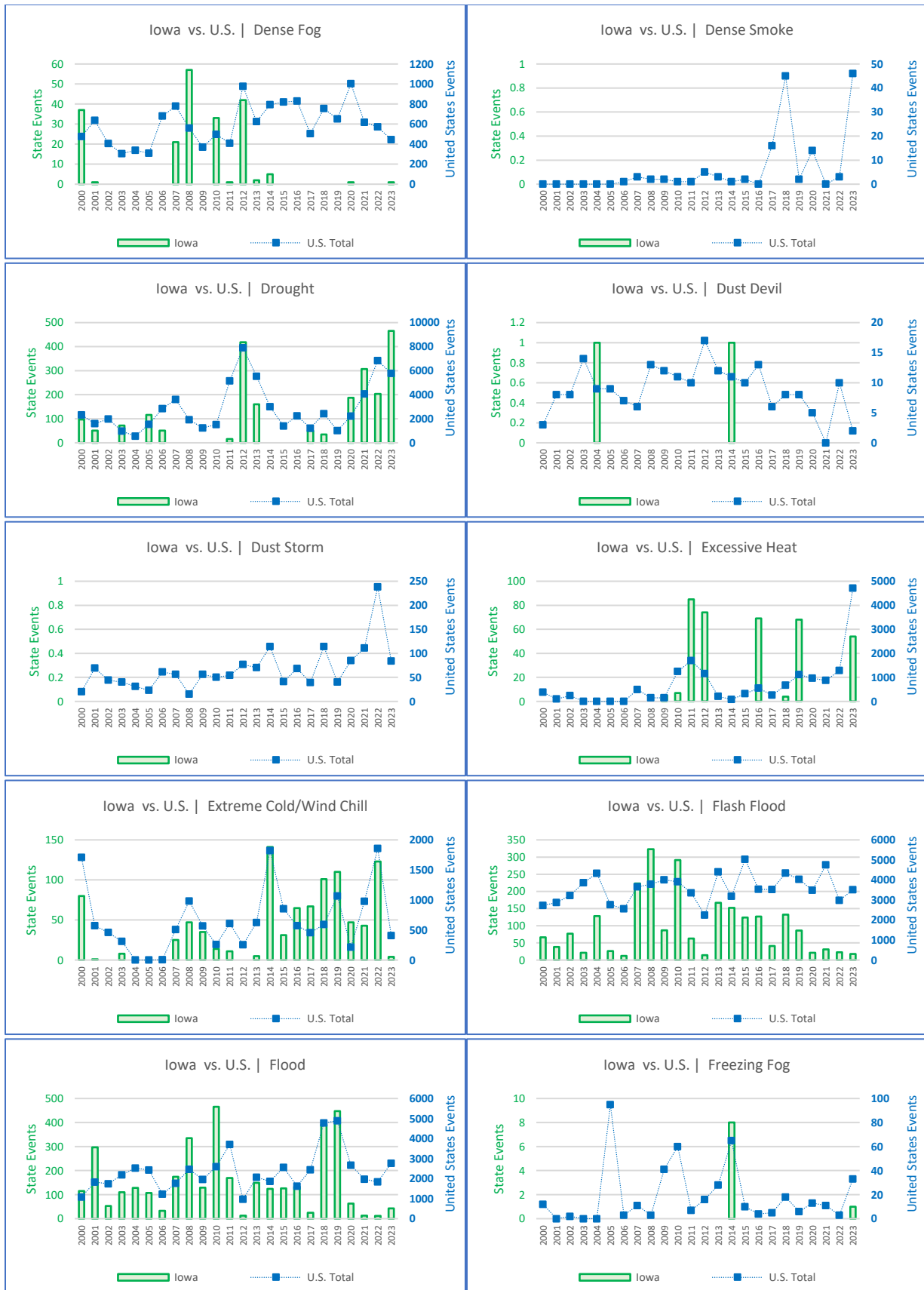
Figure 6B | Source: NOAA/NCEI Storm Events Database and Real Insurance Solutions Consulting

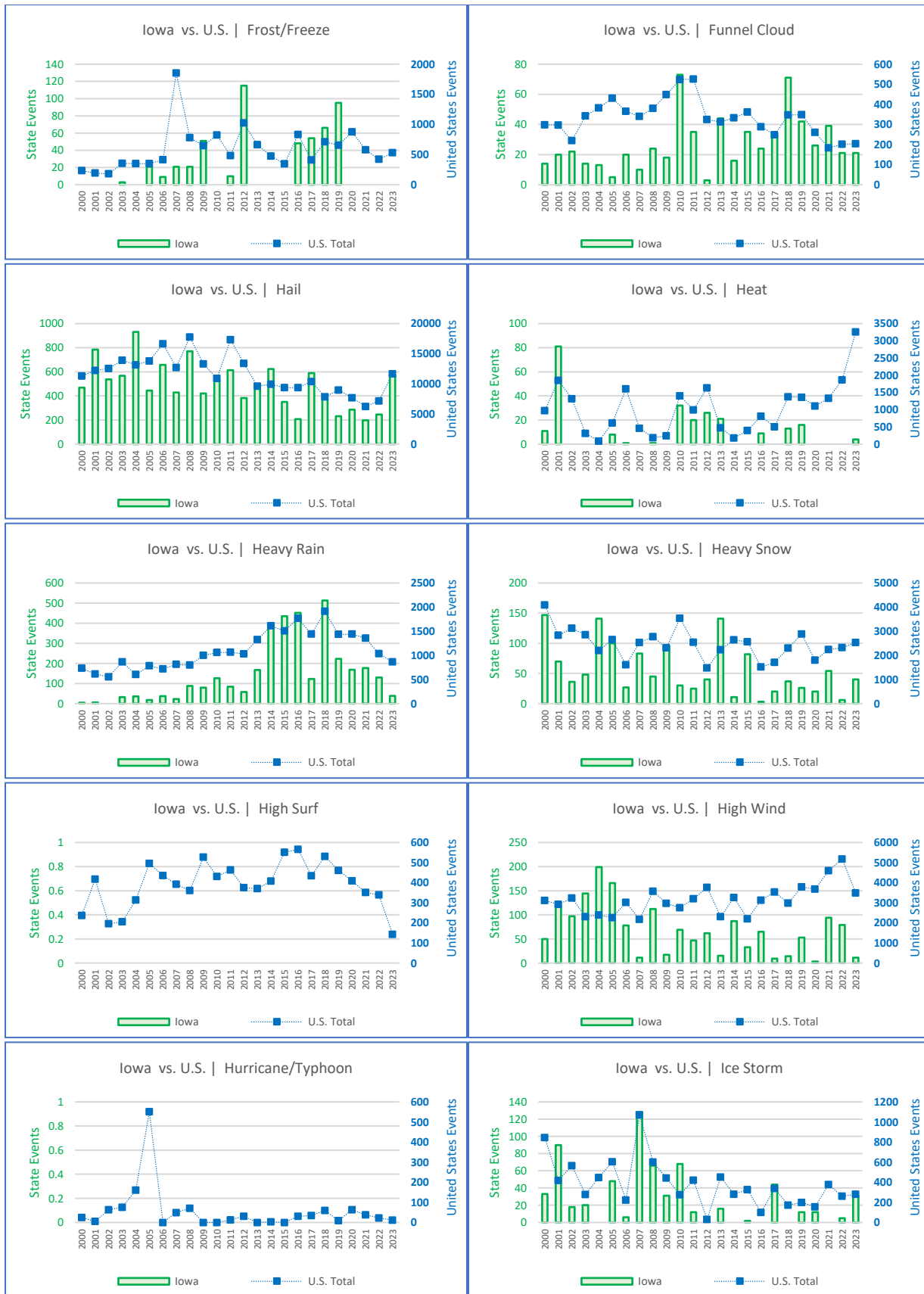
Iowa Storm Events Shown Individually

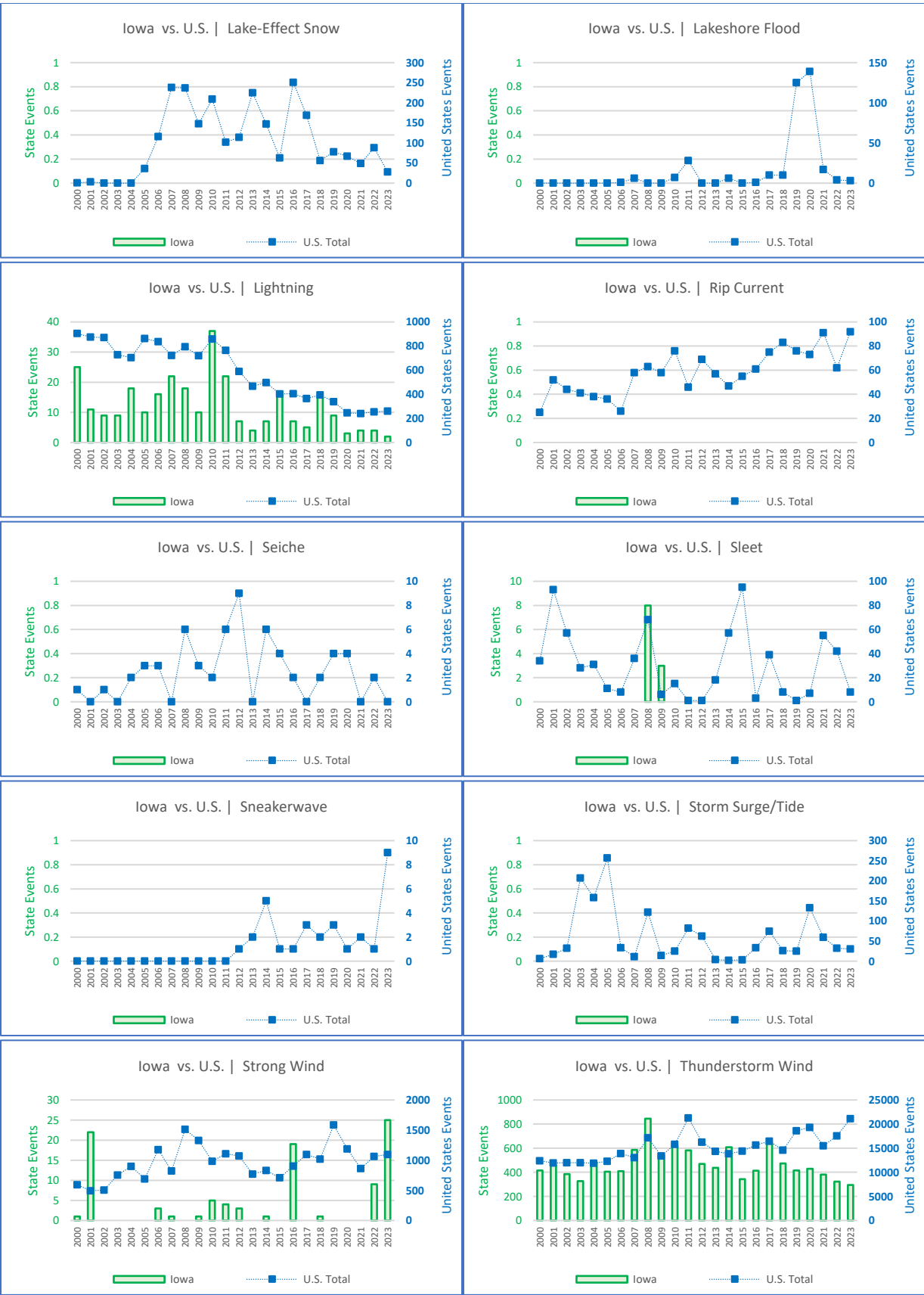
To complete this *2024 Iowa Storm Events Summary*, below are presented graphs which compare, on the same graph, the Iowa data for each type of Storm Event with the corresponding United States data. The scale for state Storm Events data is found on the left-hand vertical axis in blue color. The different scale required for United States data is found on the right-hand vertical axis, in orange color. State Storm Event graphs are presented in alphabetical order by type of Storm Event, and cover the total 24 years of weather data encompassed in this *Summary*.

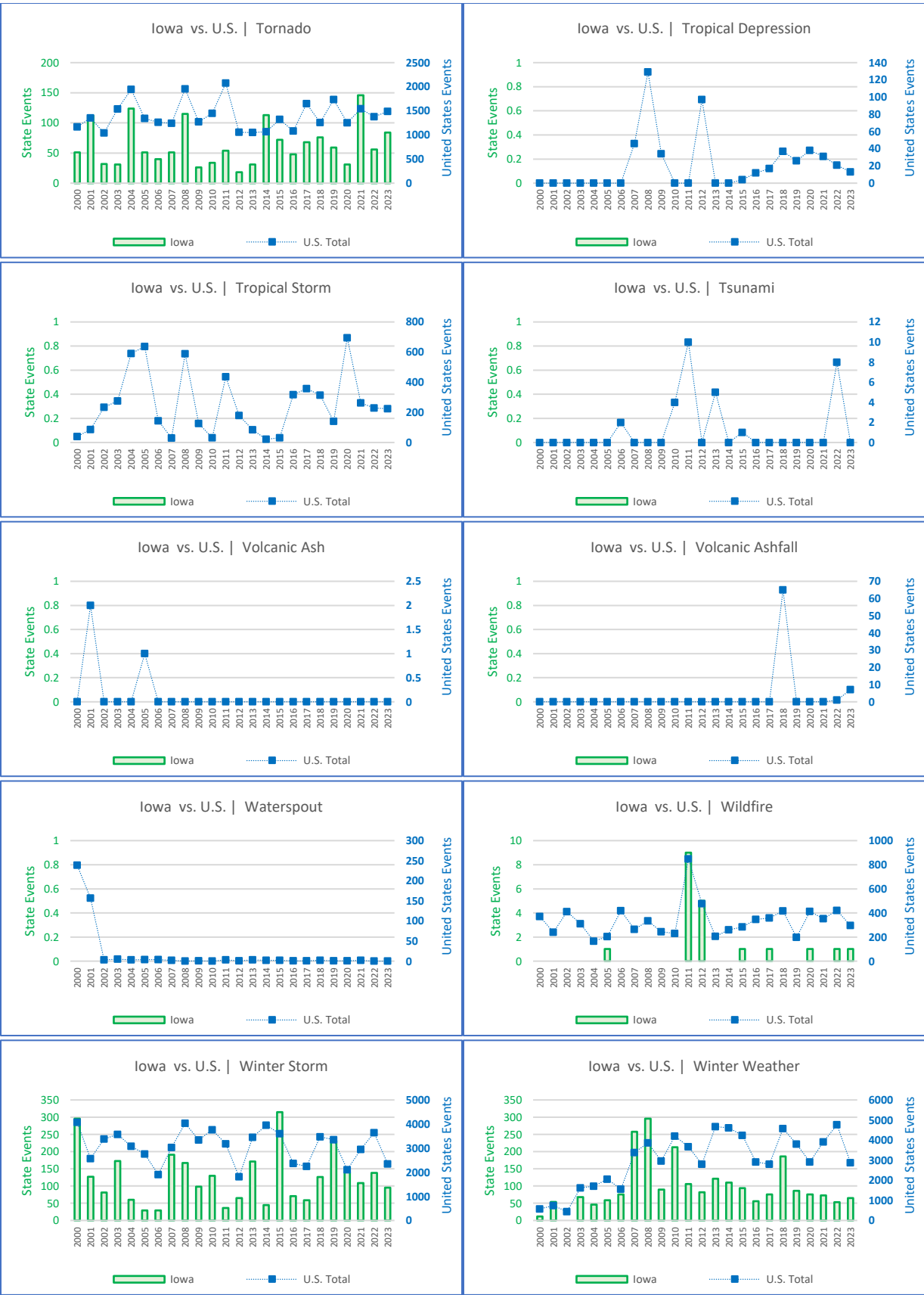
As mentioned earlier, eliminated from display are any Marine Events, and Northern Lights. And the older reference to Hurricane (Typhoons) is consolidated with Hurricanes into a single Storm Event in that graph. And note that Figure numbers are NOT provided for each Storm Event under each graph. This is due to space considerations.











Appendix #1—Storm Event Directives Summarized

On July 26, 2021, the National Weather Service's (NWS) Chief Operating Officer, John D. Murphy, issued Instruction 10-1605, which updated NCEI's weather event reporting directives. This document issues directives and descriptions to the many agencies, entities, and sources that observe Storm Events, collect Storm Event data, and enter that data into the NOAA/NCEI Storm Events database for the National Weather Service.

Instruction 10-1605 is an extensive, 100 + page document, and a resource which has guided Real Insurance Solutions Consulting in the compilation and completion of this *2024 Iowa Storm Events Summary*. Provided in this *Summary* on the following pages, for the reader's easier access and greater understanding of the official reporting of Storm Events, is a shortened, summarized version of the NCEI directives and descriptions. The complete Instruction 10-1605 can be found online at <https://www.nws.noaa.gov/directives/sym/pd01016005curr.pdf>

Storm Event	Description of Storm Event Name (Abbreviated)
Avalanche	A mass of snow, sometimes containing rocks, ice, trees, or other debris, that moves rapidly down a steep slope, resulting in a fatality, injury, or significant damage. If a search team inadvertently starts another avalanche, it will be entered as a new Avalanche event.
Blizzard	A winter storm which produces the following conditions for three (3) consecutive hours or longer: (1) sustained winds or frequent gusts 30 knots (35 mph) or greater, and (2) falling and/or blowing snow reducing visibility frequently to less than 1/4 mile. If the event that occurred is considered significant, even though it affected a small area, it should be entered into Storm Data.
Coastal Flood	Flooding of coastal areas due to the vertical rise above normal water level caused by strong, persistent onshore wind, high astronomical tide, and/or low atmospheric pressure, resulting in damage, erosion, flooding, fatalities, or injuries. Coastal areas are defined as those portions of coastal land zones (coastal county/parish) adjacent to the waters, bays, and estuaries of the oceans. Farther inland, the Storm Data preparer determines the boundary between coastal and inland areas, where flood events will be encoded as Flash Flood or Flood rather than Coastal Flood. Terrain (elevation) features will determine how far inland the coastal flooding extends.
Cold/Wind Chill	Period of low temperatures or wind chill temperatures reaching or exceeding locally/regionally defined advisory (typical value is -18°F or colder) conditions. If the event that occurred is considered significant, even though it affected a small area, it should be entered into Storm Data. There can be situations where advisory criteria are not met, but the combination of seasonably cold temperatures and low wind chill values (roughly 15°F below normal) may result in a fatality. In these situations, a cold/wind chill event may be documented if the weather conditions were the primary cause of death as determined by a medical examiner or coroner. Normally, cold/wind chill conditions should cause human and/or economic impact.
Debris Flow	A slurry of loose soil, rock, organic matter, and water, similar to wet concrete, which is capable of holding particles larger than gravel in suspension. They can mobilize from landslides on steep, nearly saturated slopes or be triggered by intense rain after wildfires. They can travel several miles from their source, growing in size as they pick up sediment, boulders, trees, cars, and other material. High velocity flows can transport large boulders in suspension and cause catastrophic damage, but even slower debris flows can rapidly infill channels, divert streams, and destroy automobiles, buildings, and infrastructure. Hyperconcentrated flows can also carry significant amounts of sediment and debris and are frequently mistaken for debris flows. However, unlike hyperconcentrated flows that have anywhere from 5-10 percent up to 20-60 percent sediment by volume, debris flows typically exceed 50 percent sediment by volume and the flow behavior is significantly controlled by the entrained sediment instead of the water. Many, but not all, flash floods originating in burn scars also contain debris flows.
Dense Fog	Water droplets suspended in the air just above the Earth's surface reducing visibility to values equal to or below locally/regionally established values for dense fog (usually 1/4 mile or less) and impacting transportation or commerce. If the event that occurred is considered significant, even though it affected a small area, it should be entered into Storm Data. Accidents, which resulted in injuries or fatalities, during a dense fog event, are reported using this event category. These injuries or fatalities should be listed as indirect.
Dense Smoke	Dense smoke, reducing visibilities to values equal to or below locally/regionally established values (usually 1/4 mile or less), that adversely affects people and/or impacts transportation or commerce. If the event that occurred is considered significant, even though it affected a small area, it should be entered into Storm Data. Dense smoke in various concentrations suspended in the air at the Earth's surface can cause problems for people with heart or respiratory ailments.
Drought	Drought is a deficiency of moisture that results in adverse impacts on people, animals, or vegetation over a sizeable area. Conceptually, drought is a protracted period of deficient precipitation resulting in extensive damage to crops, resulting in loss of yield. There are different kinds of drought: meteorological, agricultural, hydrological, and social-economic. Each kind of drought starts and ends at different times.
Dust Devil	A ground-based, rotating column of air, not in contact with a cloud base, usually of short duration, rendered visible by dust, sand, or other debris picked up from the ground, resulting in a fatality, injury, or damage. Dust devils usually result from intense, localized heating interacting with the micro-scale wind field. Dust devils that do not produce a fatality, injury, or significant damage may be entered as an event if they are unusually large, noteworthy, or create strong public or media interest.
Dust Storm	Strong winds over dry ground, with little or no vegetation, that lift particles of dust or sand, reducing visibility below locally/regionally established values (usually 1/4 mile or less), which could result in a fatality, injury, damage, or major disruption of transportation. If the event that occurred is considered significant, even though it affected a small area, it should be entered into Storm Data.
Excessive Heat Extreme	Excessive Heat results from a combination of high temperatures (well above normal) and high humidity. An Excessive Heat event occurs and is reported in Storm Data whenever heat index values meet or exceed locally/regionally established excessive heat warning thresholds. Fatalities (directly-related) or major

Storm Event	Description of Storm Event Name (Abbreviated)
	impacts to human health that occur during excessive heat warning conditions are reported using this event category. If the event that occurred is considered significant, even though it affected a small area, it should be entered into Storm Data.
Cold/Wind Chill	A period of extremely low temperatures or wind chill temperatures reaching or exceeding locally/regionally defined warning criteria (typical value around -35°F or colder). If the event that occurred is considered significant, even though it affected a small area, it should be entered into Storm Data. Normally these conditions should cause significant human and/or economic impact. However, if fatalities occur with cold temperatures/wind chills but extreme cold/wind chill criteria are not met, the event should also be included in Storm Data as a Cold/Wind Chill event and the fatalities are direct.
Flash Flood	A life-threatening, rapid rise of water into a normally dry area beginning within minutes to multiple hours of the causative event (e.g., intense rainfall, dam failure, ice jam). Ongoing flooding can intensify to the shorter term flash flooding in cases where intense rainfall results in a rapid surge of rising flood waters. Flash flooding, such as dangerous small stream or urban flooding and dam or levee failures, requires immediate action to protect life and property. Conversely, flash flooding can transition into flooding as rapidly rising waters abate. The Storm Data preparer uses professional judgment in determining when the event is no longer characteristic of a Flash Flood and becomes a Flood.
Flood	Any high flow, overflow, or inundation by water which causes damage. In general, this would mean the inundation of a normally dry area caused by an increased water level in an established watercourse, or ponding of water, that poses a threat to life or property. If the event is considered significant, it should be entered into Storm Data, even if it only affected a small area. Refer to the Flash Flood event (section 14) for guidelines for differentiating between Flood and Flash Flood events.
Freezing Fog	Fog which freezes on contact with exposed objects and forms a coating of rime and/or glaze, resulting in an impact on transportation, commerce, or individuals. Even small accumulations of ice can have an impact. Freezing fog can occur with any visibility of six (6) miles or less. If the event that occurred is considered significant, even though it affected a small area, it should be entered into Storm Data.
Frost/Freeze	A surface air temperature of 32 degrees Fahrenheit (°F) or lower, or the formation of ice crystals on the ground or other surfaces, for a period of time long enough to cause human or economic impact, during the locally defined growing season. If the event that occurred is considered significant, even though it affected a small area, it should be entered into Storm Data.
Funnel Cloud	A rotating, visible extension of a cloud pendant from a convective cloud with circulation not reaching the ground. The funnel cloud should be large, noteworthy, or create strong public or media interest to be entered.
Hail	Frozen precipitation in the form of balls or irregular lumps of ice. Although the minimum size of hail qualifying as “severe” is 1 inch diameter, all reports of hail that is 3/4 of an inch or larger in diameter will be entered. Observed hail accumulations of smaller sizes, or instances where hail accumulates to a measurable depth (e.g., “around 3 inches deep”) that cause property and/or crop damage, should be entered. Injuries or fatalities that result from hail of any size should be entered. Maximum hail size will be encoded for all hail reports entered.
Heat	A period of heat resulting from the combination of high temperatures (above normal) and relative humidity. A Heat event occurs and is reported in Storm Data whenever heat index values meet or exceed locally/regionally established advisory thresholds. Fatalities or major impacts on human health occurring when ambient weather conditions meet heat advisory criteria are reported using the Heat event. If the ambient weather conditions are below heat advisory criteria, a Heat event entry is permissible only if a directly-related fatality occurred due to unseasonably warm weather, and not man-made environments.
Heavy Rain	Unusually large amount of rain which does not cause a Flash Flood or Flood event, but causes damage, e.g., roof collapse or other human/economic impact. Heavy Rain will no longer be acceptable as a means to record low-impact or isolated flood events. Urban and small stream flooding commonly occurs in poorly drained or low lying areas. These are types of areal flooding and are to be recorded as Flood events, not Heavy Rain.
Heavy Snow	Snow accumulation meeting or exceeding locally/regionally defined 12 and/or 24 hour warning criteria. This could mean values such as 4, 6, or 8 inches or more in 12 hours or less; or 6, 8, or 10 inches in 24 hours or less. If the event that occurred is considered significant, even if it affected a small area, it should be entered into Storm Data. In some heavy snow events, structural damage, due to the excessive weight of snow accumulations, may occur in the few days following the meteorological end of the event. The preparer should include this damage as part of the original event and give details in the narrative. Normally, strong winds or other precipitation types are not present in a Heavy Snow event. If they were, then the Winter Storm event should be used.
High Surf	Large waves breaking on or near shore, resulting from swell spawned by a distant storm or from strong onshore winds, causing a fatality, injury or damage. In addition, if accompanied by anomalous

Storm Event	Description of Storm Event Name (Abbreviated)
	astronomical high tides, high surf may produce beach erosion and possible damage to beachfront structures. High surf conditions are often accompanied by rip currents and near-shore breaks. Occasionally, high surf conditions can sweep people off rocks along the shore causing them to drown. If this occurs, include the fatality in the High Surf event type category. The Storm Data preparer exercises professional judgment to determine whether the fatality or injury is a result of a High Surf event.
High Wind	Sustained non-convective winds of 35 knots (40 mph) or greater lasting for 1 hour or longer, or gusts of 50 knots (58 mph) or greater for any duration (or otherwise locally/regionally defined). In some mountainous areas, the above numerical values are 43 knots (50 mph) and 65 knots (75 mph), respectively. If the event that occurred is considered significant, even though it affected a small area, it should be entered into Storm Data.
Hurricane (Typhoon)	A tropical cyclone in which the maximum 1-minute sustained surface wind is 64 knots (74 mph) or greater. In the Atlantic Ocean or the North Pacific Ocean east of the International Date Line, this event would be labeled a Hurricane, and in the North Pacific Ocean west of the International Dateline, this event would be classified as a Typhoon.
Ice Storm	Ice accretion meeting or exceeding locally/regionally defined warning criteria (typical value is 1/4 or 1/2 inch or more). If the event that occurred is considered significant, even though it affected a small area, it should be entered into Storm Data. The Storm Data preparer should include the times that ice accretion began, met criteria, and accretion ended. If the freezing rain was mixed with other precipitation types, then a Winter Storm event should be used.
Lakeshore Flood	Flooding of lakeshore areas due to the vertical rise of water above normal level caused by strong, persistent onshore wind and/or low atmospheric pressure, resulting in damage, erosion, flooding, fatalities, or injuries. Lakeshore areas are defined as those portions of land zones (coastal county/parish) adjacent to the waters of the Great Lakes and other lakes with specific assigned Marine Zones. Farther inland, the Storm Data preparer determines when and where to encode a flood event as Flash Flood or Flood. Terrain (elevation) features will determine how far inland the lakeshore flooding extends.
Lake-Effect Snow	Convective snow bands that occur in the lee of large bodies of water (e.g., the Great Lakes or the Great Salt Lake), when relatively cold air flows over warm water. In extreme cases, snowfall rates of several inches per hour and thunder and lightning may occur. Lake-effect snow accumulations meet or exceed locally defined 12 and/or 24 hour warning criteria (typical values of 6 to 8 inches within 12 hours or 8 to 10 inches within 24 hours). If the event is considered significant, even though it affected a small area, it should be entered into Storm Data.
Lightning	A sudden electrical discharge from a thunderstorm, resulting in a fatality, injury, and/or damage.
Marine Dense Fog	Water droplets suspended in the air just above the Earth's surface, resulting in a fatality, injury, or damage, over the waters and bays of the ocean, Great Lakes, and other lakes with assigned specific Marine Forecast Zones. This fog reduces visibility to values equal to or below locally/regionally established values for dense fog (usually less than one mile). This fog may impact transportation or commerce within a marine environment. Accidents which resulted in injuries, fatalities, or significant damage during a dense fog event over marine waters are reported using this event category.
Marine Hail	Hail 3/4 of an inch in diameter or larger, occurring over the waters and bays of the ocean, Great Lakes, and other lakes with assigned specific Marine Forecast Zones, will be entered. Hail 3/4 of an inch in diameter or larger, occurring immediately along the shorelines of the waters and bays should be entered as a Marine Hail event, especially if the NWSI 10-1605 JULY 26, 2021 A-50 storm moved over the near-shore waters (it is reasonable to assume it maintained its strength). Hail of smaller size, causing damage to watercraft or fixed platforms, should be entered. A maximum hail size will be entered.
Marine Heavy Freezing Spray	Ice accretions on exposed surfaces of fixed platforms or marine vessels on the waters and bays of the ocean, Great Lakes, and other lakes with assigned specific Marine Forecast Zones, which lead to the loss of life or property damage, should be entered. Normally, an ice accretion at the rate of 3 millimeters (mm) per hour is considered to be heavy freezing spray. Ice accretions occurring immediately along the shorelines of the waters and bays should be entered as a Marine Heavy Freezing Spray event as well.
Marine High Wind	Non-convective, sustained winds or frequent gusts of 48 knots (55 mph) or more, resulting in a fatality, injury, or damage, over the waters and bays of the ocean, Great Lakes, and other lakes with assigned specific Marine Forecast Zones. These conditions would correspond to a "storm" situation (48 to 63 knots/55 to 73 mph), or a "hurricane-force" wind situation (64 knots or higher/74 mph or higher). A peak wind gust (estimated or measured) or maximum sustained wind value will be entered.

Storm Event	Description of Storm Event Name (Abbreviated)
Marine Hurricane/Typhoon	A tropical cyclone occurring over the waters and bays of the ocean (those assigned specific Marine Forecast Zones) in which the maximum 1- minute sustained surface wind is 64 knots (74 mph) or greater and results in a fatality, injury, or damage to watercraft or fixed platforms. In the Atlantic Ocean or the North Pacific Ocean east of the International Date Line, this event would be labeled a Hurricane, and in the North Pacific Ocean west of the International Dateline, this event would be classified as a Typhoon.
Marine Lightning	A sudden electrical discharge from a thunderstorm, resulting in a fatality, injury, and/or damage, occurring over the waters and bays of the ocean, Great Lakes, and other lakes with assigned specific Marine Forecast Zones.
Marine Strong Wind	Non-convective, sustained winds or frequent gusts up to 47 knots (54 mph), resulting in a fatality, injury, or damage, occurring over the waters and bays of the ocean, Great Lakes, and other lakes with assigned specific Marine Forecast Zones. Wind speed values of 34 to 47 knots (39 to 54 mph) would correspond to a “gale” situation. A peak wind gust (estimated or measured) or maximum sustained wind value will be entered, in knots. Refer to sections 5.45 and 5.46 for related information.
Marine Thunderstorm Wind	Winds, associated with thunderstorms, occurring over the waters and bays of the ocean, Great Lakes, and other lakes with assigned specific Marine Forecast Zones with speeds of at least 34 knots (39 mph) for 2 hours or less, or winds of any speed that result in a fatality, injury, or damage to watercraft or fixed platforms. Similar thunderstorm winds occurring immediately along the shorelines (to a maximum distance of 1 mile inland) of the waters and bays should be entered as a Marine Thunderstorm Wind, especially if the storm then moved out over the near-shore waters (it is reasonable to assume it maintained its strength). Marine thunderstorm winds occur within 45 minutes before or after lightning is observed or detected.
Marine Tropical Depression	Damaging tropical depression force winds occurring over the waters and bays of the ocean (those assigned specific Marine Forecast Zones), in which the 1-minute sustained (not gust) surface wind is less than 33 knots (39 mph) for 2 hours or more, that result in a fatality, injury, or damage to watercraft or fixed platforms. Similar tropical depression force winds occurring immediately along the shorelines (to a maximum distance of 1 mile inland) of the waters and bays of the ocean should be entered as a “Marine Tropical Depression.”
Marine Tropical Storm	A tropical cyclone occurring over the waters and bays of the ocean (those assigned specific Marine Forecast Zones) in which the maximum 1-minute sustained surface wind is equal to or greater than 34 knots (39 mph) but less than 64 knots (74 mph) for 2 hours or more and results in a fatality, injury, or damage to watercraft or fixed platforms.
Rip Current	A narrow channel of water that flows away from the beach, through the surf zone and dissipates beyond the breaking waves. Rip currents develop in the waters and bays of the ocean, Great Lakes and other lakes with assigned specific Marine Forecast Zones), or any location that experiences breaking waves. They often form when the gradient wind is strong and directly onshore or when swells from a distant extra-tropical or tropical cyclone impinge on the coast. Rip currents will be listed in Storm Data only when they cause a drowning, near- drowning, result in one or more rescues, or damage to watercraft. Events associated with other surf-related currents, such as long-shore or tidal currents, should be included in the appropriate event type category.
Seiche	A standing-wave oscillation in any enclosed lake that continues after a forcing mechanism has ceased and results in shoreline flooding and/or damage. In the Great Lakes and large inland lakes, large pressure differences, high winds, or fast-moving squall lines may act as the forcing mechanism. In addition, earthquakes or debris flows can initiate a seiche. When the forcing mechanism ends, the water sloshes back and forth from one end of the lake to the other, causing water level fluctuations of up to several feet before damping out.
Sleet	Sleet accumulations meeting or exceeding locally/regionally defined warning criteria (typical value is 1/2 inch or more). The Storm Data preparer should include in the narrative the times that sleet accumulation began, met criteria, and ended.
Sneaker Wave	A sneaker wave is the first wave of a set of larger waves that follows a period of relatively calm ocean conditions, resulting in a fatality or damage. The period of calm preceding a sneaker wave can last up to thirty minutes. This period of calm causes beach goers to inaccurately assess the hazard, leading to behavior that places them in harm’s way, such as getting too close to the surf with attention diverted. The hazard caused by sneaker waves is not correlated to the absolute magnitude of the size, but it instead is derived from the relative size, compared to the size of the waves that preceded the sneaker wave
Storm Surge/Tide	For coastal and select lakeshore areas, the vertical rise above normal water level associated with a storm of tropical origin (e.g., hurricane, typhoon, tropical storm, or subtropical storm), caused by any combination of strong, persistent onshore wind, high astronomical tide and low atmospheric pressure, resulting in damage, erosion, flooding, fatalities, or injuries. Note: Coastal flooding not associated with a typhoon, hurricane, tropical storm or subtropical storm should be reported under the Coastal Flood event;

Storm Event	Description of Storm Event Name (Abbreviated)
	flooding adjacent to the Great Lakes and other lakes with specific assigned Marine Zones should be reported under the Lakeshore Flood event.
Strong Wind	Non-convective winds gusting less than 50 knots (58 mph), or sustained winds less than 35 knots (40 mph), resulting in a fatality, injury, or damage. Consistent with regional guidelines, mountain states may have higher criteria. A peak wind gust (estimated or measured) or maximum sustained wind will be entered.
Thunderstorm Wind	Winds, arising from convection (occurring within 30 minutes of lightning being observed or detected), with speeds of at least 50 knots (58 mph), or winds of any speed (non-severe thunderstorm winds below 50 knots) producing a fatality, injury, or damage. Maximum sustained winds or wind gusts (measured or estimated) equal to or greater than 50 knots (58 mph) will always be entered. Events with maximum sustained winds or wind NWSI 10-1605 JULY 26, 2021 A-68 gusts less than 50 knots (58 mph) should be entered as a Storm Data event only if the result in fatalities, injuries, or serious property damage. Storm Data software permits only one event name for encoding severe and non-severe thunderstorm winds. The Storm Data software program requires the preparer to indicate whether the sustained wind or wind gust value was measured or estimated.
Tornado	A violently rotating column of air, extending to or from a cumuloform cloud or underneath a cumuloform cloud, to the ground, and often (but not always) visible as a condensation funnel. For a vortex to be classified as a tornado, it must be in contact with the ground and extend to/from the cloud base, and there should be some semblance of ground-based visual effects such as dust/dirt rotational markings/swirls, or structural or vegetative damage or disturbance.
Tropical Depression	A tropical cyclone in which the 1-minute sustained wind speed is 33 knots (38 mph), or less. A Tropical Depression should be included as an entry when these conditions are experienced in the WFO's CWA. The tropical depression number will be included in the narrative section.
Tropical Storm	A tropical cyclone in which the 1-minute sustained surface wind ranges from 34 to 63 knots (39 to 73 mph). A Tropical Storm should be included as an entry when these conditions are experienced in the WFO's CWA.
Tsunami	A series of very long waves generated by any rapid, large-scale disturbance of the sea (e.g., an underwater earthquake, landslide, or volcanic eruption) resulting in a fatality, injury or damage. When the wave reaches the coast, a tsunami may appear as a rapidly rising or falling tide, a series of breaking waves, or even a bore. The event narrative should include the source of the Tsunami event (e.g., 8.5 magnitude earthquake near the western coast of Chile), the height and time of the maximum wave, and the inland distance of inundation. Any other characteristics, such as the observation of water draining from bays should be included.
Volcanic Ash	Fine particles of mineral matter from a volcanic eruption which can be dispersed long distances by winds aloft, resulting in fatalities, injuries, damage, or a disruption of transportation and/or commerce.
Waterspout	A rotating column of air, pendant from a convective cloud, with its circulation extending from cloud base to the water surface of bays and waters of the Great Lakes, and other lakes with assigned Marine Forecast Zones. A condensation funnel may or may not be visible in the vortex.
Wildfire	Any significant forest fire, grassland fire, rangeland fire, or wildland-urban interface fire that consumes the natural fuels and spreads in response to its environment. "Significant" is defined as a wildfire that causes one or more fatalities, one or more significant injuries, and/or property damage (optional: include significant damages to firefighting equipment if loss estimates are available). Professional judgment should be used in deciding to include a Wildfire in Storm Data. In general, forest fires smaller than 100 acres, grassland or rangeland fires smaller than 300 acres, and wildland use fires not actively managed as wildfires should not be included. This is consistent with the definitions for significant and/or large fires utilized by most land use agencies.
Winter Storm	A winter weather event that has more than one significant hazard (i.e., heavy snow and blowing snow; snow and ice; snow and sleet; sleet and ice; or snow, sleet and ice) and meets or exceeds locally/regionally defined 12 and/or 24 hour warning criteria for at least one of the precipitation elements. If the event that occurred is considered significant, even though it affected a small area, it should be entered into Storm Data. Normally, a Winter Storm would pose a threat to life or property.
Winter Weather	A winter precipitation event that causes a death, injury, or a significant impact to commerce or transportation, but does not meet locally/regionally defined warning criteria. A Winter Weather event could result from one or more winter precipitation types (snow, or blowing/drifting snow, or freezing rain/drizzle). The Winter Weather event can also be used to document out-of-season and other unusual or rare occurrences of snow, or blowing/drifting snow, or freezing rain/drizzle. If the event that occurred is considered significant, even though it affected a small area, it should be entered into Storm Data.

This *2024 Iowa Storm Events Summary* has provided the reader with a mostly visual presentation of Iowa weather events since the year 2000. It is provided as a benefit of your membership with the **Big I Iowa**.

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All questions and comments, or need for further analysis are welcomed at the contact information below:

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