



| A PERFECT STORM

When tropical storms meet toxic waste

U.S. PIRG | Education
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U.S. PIRG EDUCATION FUND
ENVIRONMENT AMERICA RESEARCH & POLICY CENTER
MAY 2021

ACKNOWLEDGMENTS

The author wishes to thank Danielle Melgar, Gideon Weissman, Gina Werdel, Kaitlyn Trilevsky, and Patricia Kelmar for their review of drafts of this document, as well as their insights and suggestions. The author bears responsibility for any factual errors. Policy recommendations are those of U.S. PIRG Education Fund and Environment America Research & Policy Center. The views expressed in this report are those of the authors and do not necessarily reflect the views of our funders or those who provided review.

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I EXECUTIVE SUMMARY

SINCE 1980, THE ENVIRONMENTAL Protection Agency's (EPA) "Superfund" toxic waste cleanup program has been responsible for identifying the worst toxic waste sites across the country and holding polluters accountable to cover the cost of cleaning them up.¹ When the polluting party cannot be found or afford the cleanup, the Superfund program has the authority and funds to clean up the site.²

Contaminants of concern at toxic waste sites on the National Priorities List include arsenic, lead, mercury, benzene, dioxin, and other hazardous chemicals that may increase the risk of cancer, reproductive problems, birth defects, and other serious illnesses.³ Recent research also shows that living near one of these sites can lower life expectancy.⁴ Today, one in five Americans lives within just three miles of a Superfund site.⁵ Cleanup can take a decade or more,⁶ and decreased funding over the last 20 years has led to slower cleanups.⁷

Meanwhile, each year natural disasters threaten to impact toxic waste sites.⁸

Tropical storms and hurricanes wreak havoc on impacted communities -- from dangerous and costly wind and flood damage, to knocking out power for entire communities, to contaminating drinking water, to wiping out homes and destroying essential community resources.⁹ And some of these storms cause especially hazardous damage. Hurricane Floyd (1999), Hurricane Katrina (2005), Hurricane Irene (2011), Hurricane Sandy (2012), and Hurricane Harvey (2017) have all caused flooding at Superfund sites.¹⁰ With so much devastation upending people's lives, the last thing anyone should have to worry about is the threat of toxic waste

contaminating their water, soil, and air after a storm.

To make matters worse, climate change has caused the number of tropical cyclones with higher intensities to increase, including those responsible for the "great majority of [tropical cyclone]-related damage and mortality."¹¹

In coming years, we can expect to see stronger storms more frequently, with the strongest storms becoming even stronger.¹² Warm ocean water and air is fuel for tropical storms, which makes global warming a driving force in the more intense hurricanes we've been experiencing.¹³ Like rocket fuel in a race car, hurricanes are being supercharged by these warmer temperatures, causing more destructive storms.¹⁴

Sea level rise has also made worse the most dangerous aspect of hurricanes: storm surge.¹⁵ Storm surge is the rise in tide above the normal level due to a storm, usually due to powerful winds pushing large amounts of water forward.¹⁶ Sea level rise from melting glaciers and ice sheets results in storm surge that reaches further inland, increasing the area and scale of the damage.¹⁷

In addition, increased temperatures have allowed for more moisture to collect in the air, which becomes rainfall during a storm and can cause deadly inland flooding.^{18,19}

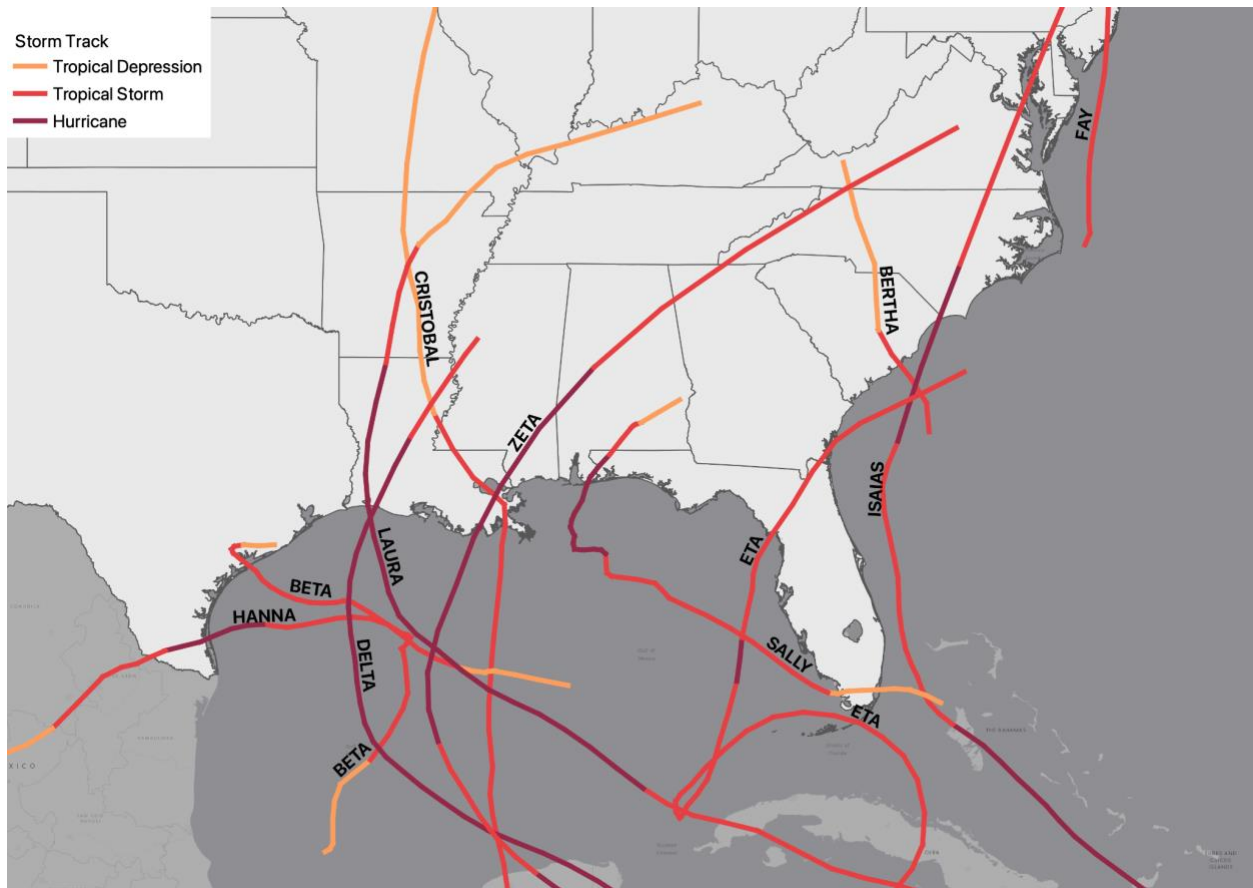
Last year's Atlantic hurricane season broke several records for the number and severity of storms, highlighting the urgent need to clean up toxic waste sites as quickly and effectively as possible.

The 2020 Atlantic hurricane season broke the records for the most named storms (tropical cyclones with maximum sustained wind

speeds greater than 39 miles per hour are classified as tropical storms and given a name). Prior to the 2020 Atlantic hurricane season, the average number of named storms per year was 18, including 6 hurricanes. The 2020 Atlantic hurricane

season had 30 named storms, 12 of which were hurricanes.²⁰ The 2020 Atlantic hurricane season also had the most named storms to make landfall in the U.S.,^{21,22} and the second-most hurricanes ever recorded in a single Atlantic hurricane season.²³

FIGURE 1. MAP OF NAMED STORMS TO MAKE U.S. LANDFALL



During the 2020 Atlantic hurricane season, 45% of all Superfund toxic waste sites on the

National Priorities List (NPL) were in areas affected by tropical storms and hurricanes.

FIGURE 2. SUPERFUND SITES IN AREAS AFFECTED BY TROPICAL STORMS & HURRICANES DURING THE 2020 ATLANTIC HURRICANE SEASON

	Both	Wind Swath Only	Weather Warning Only	Total
Proposed	11	4	0	15
Listed	415	152	32	599
Deleted	149	32	15	196
Total	575	188	47	810

To protect our communities from toxic waste spreading during a hurricane, we need to clean up these sites as quickly and effectively as possible. And clean-up plans and efforts need to take into account the risk of climate change related natural disasters to the security of toxic chemicals present at these sites to prevent their spread in the event of an impact.

Fortunately, only one NPL site was reported to be impacted during the 2020 Atlantic hurricane season. During Hurricane Isaias, the Clearview Landfill partially flooded, and areas in which cleanup was ongoing experienced erosion and required repairs.²⁴

The Clearview Landfill is on the east side of Darby Creek in Pennsylvania.²⁵ It is one of two separate landfills that make up the Lower Darby Creek Area (LDCA) Superfund site.²⁶ Much of the community near the landfill is in a 100-year floodplain, which means the area has a 1-in-100 chance of flooding in any given year, and are considered high risk areas by the Federal Emergency Management Agency (FEMA).^{27,28} Worse, depending on recent rainfall and storm surge events, a 10-year or 50-year storm event could cause the creek to flood the surrounding neighborhood.²⁹

During Hurricane Isaias, the Clearview Landfill partially flooded, and areas in which cleanup was ongoing experienced erosion and required repairs.³⁰ Prior to the flooding, the EPA had removed and replaced contaminated soil at nearly 200 residential properties,³¹ which the EPA believes lowered the risk that floodwaters in the neighborhood would become highly contaminated. The areas of Clearview Landfill in which cleanup was complete did not breach during the storm.³²

The damage to the Clearview Landfill Superfund site at areas where cleanup was ongoing highlights the importance of cleaning up Superfund sites as quickly as possible, because areas that haven't been remediated are more vulnerable to being damaged and spreading contamination during a storm.

The Environmental Protection Agency (EPA) can take steps to reduce the risk of toxic waste spreading from a Superfund site due to climate-induced natural disasters and sea level rise.

While the Superfund program has in various ways addressed the threat to sites from climate change, according to the U.S.

Government Accountability Office (GAO), the EPA has yet to clarify how efforts to manage risks from climate change at Superfund sites align with the EPA's agency-wide objectives.³³ For example, the EPA's 2018-2022 strategic plan includes no mention of the threat posed by climate change, which includes the risks to Superfund sites or any related infrastructure projects.³⁴

Failing to include the risk of climate change as an agency-wide priority undermines the ability of those conducting cleanup under the EPA to manage risks from climate change to sites undergoing cleanup or being proposed for cleanup. Those executing clean-up efforts cannot be certain that higher level officers at the EPA will support initiatives that would protect Superfund sites from the adverse effects of climate change.³⁵

Congress can also take action to expedite the cleanup of toxic waste sites to reduce

the risk of contaminating communities in the event of severe weather.

Recently, multiple bills have been introduced that would reinstate what are often referred to as "Polluter Pays" taxes to fund the Superfund program.^{36,37,38} These taxes would generate the funding necessary to implement comprehensive long-term clean-up plans at Superfund toxic waste sites, speed up the clean-up process at hundreds of sites currently undergoing construction, and identify sites that should be added to the National Priorities List for cleanup. Further, these bills would alleviate the financial burden currently resting on taxpayers and shift it to the industries that create and profit off the products that contaminate Superfund sites.

I INTRODUCTION

WITH RECORD-BREAKING WILDFIRES

in the west and hurricanes in the east, the United States is experiencing natural disasters on an unprecedented scale. Hurricanes are considered the most powerful weather events on earth,³⁹ and these storms are becoming stronger as climate change heats the atmosphere and ocean, because these storms are dependent on warm air to form.⁴⁰

Warmer air and oceans have increased the frequency of the strongest hurricanes at the same time as sea level rise has enabled storm surge to reach further inland. As a result, more areas of the United States are becoming vulnerable to hurricane-strength winds and flooding.

In October 2019, in response to a congressional request for information on the threat of climate change to Superfund sites, the Government Accountability Office (GAO) came out with a report that found that almost 40 percent of National Priorities List (NPL) sites overlap with the Federal Emergency Management Agency's (FEMA) list of top

flood hazard regions.⁴¹ In the report, GAO encouraged the EPA and Congress to take necessary action to prevent the next chemical disaster by including the risk of climate change related threats in its agency-wide goals.⁴²

Now, this report looks at the unprecedented threat of worsening hurricanes to the containment of toxic waste at Superfund sites, with a particular focus on the threats posed by the 2020 Atlantic hurricane season. Out of an already record-breaking 30 total named storms in a single Atlantic hurricane season, a record-breaking 11 made landfall in the United States during the monstrous 2020 Atlantic hurricane season.^{43,44} These storms can rip through towns at hundreds of miles per hour, damaging everything in their path, including Superfund toxic waste sites where some of the most toxic chemicals on earth are found.⁴⁵ When Superfund sites are damaged or flooded during a storm, the chemicals can spread into surrounding communities, contaminating soil, drinking water, and air.⁴⁶

Definitions

Hurricane terms

Weather Warning: The weather phenomenon indicated by the warning is occurring or will occur in the area.⁴⁷ People in areas with weather warnings should take all necessary action immediately to protect themselves.

Weather Watch: The weather phenomenon indicated by the watch may occur in the area.⁴⁸

Area of low pressure: When warm air rises from the surface of the ocean and becomes cool, it is then pushed aside by additional warm air rising from the surface of the ocean. When there is enough warm air coming off the ocean's surface, this becomes a low pressure system with a circular wind, which is then referred to as a tropical cyclone.^{49,50}

Tropical cyclone: Blanket term for any storm that forms as a low pressure system with a circular wind pattern. Tropical depressions, tropical storms, and hurricanes are all terms used to indicate the strength of a tropical cyclone.^{51,52}

Named storm: Any tropical cyclone that reaches wind speeds eligible for categorization as a tropical storm or higher (39 miles per hour). These cyclones are given names in the order in which they are identified from a list of 21 names set by the World Meteorological Organization (WMO).⁵³

In the years up to and including 2020, when those preset names run out, any subsequent storms are named in the order of the letters in the Greek alphabet.⁵⁴ However, beginning in 2021, the WMO decided that after the pre-set list of 21 has run out, additional storms will be named from a supplemental list.⁵⁵

The names of particularly severe storms, such as "Katrina," are retired permanently.⁵⁶

Tropical Depression: A tropical cyclone with a maximum sustained wind speed of 38 miles per hour or less.⁵⁷

Tropical Storm: A tropical cyclone with a maximum sustained wind speed between 39 and 73 miles per hour.⁵⁸

Hurricane: A tropical cyclone with a maximum sustained wind speed of 74 miles per hour or greater.⁵⁹

Saffir-Simpson Hurricane Wind Scale: A scale ranging from 1 to 5 that indicates the severity of hurricanes based on sustained wind speed, with higher wind speeds resulting in higher category classifications. Hurricanes reaching categories 3 to 5 are considered "major hurricanes,"⁶⁰ and cause the most significant damage.⁶¹

- Category 1: 74-95 mph
- Category 2: 96-110 mph
- Category 3: 111-129 mph
- Category 4: 130-156 mph

- Category 5: 157 mph or higher

Typhoon: See definition of Hurricane; term used in the North Pacific.⁶² This term is not used in this report because the report focuses on the Atlantic hurricane season only.

Extratropical cyclone: A former tropical cyclone that may still carry heavy winds and stormy weather but lacks certain features, such as even temperature distribution throughout the storm system, that would make it a tropical cyclone.⁶³

Post-tropical cyclone: A former tropical cyclone that may still carry heavy winds and rain but without sufficient organization to be considered a tropical storm. Extratropical and remnant low systems are both types of post-tropical cyclones.⁶⁴

Best track: Meteorologists document the location and intensity of storms over time to understand the path of the storm. The “best track” for a storm is a combination of datasets from a variety of sources combined by forecasters and researchers to estimate the path of the storm.⁶⁵

Wind swath: The location and speed of winds, measured at the furthest point from the center of the storm in four quadrants, meeting a speed threshold of 30 knots, 50 knots, and 64 knots or 39 mph, 58 mph, and 74 mph.⁶⁶ Not every area inside the wind swath may be affected by such wind speeds, because the wind swath is identified based on the maximum wind speed anywhere in a quadrant.

Superfund terms

National Priorities List (NPL): The National Priorities List (NPL) is the list of sites of national priority among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories. This list is maintained by the U.S. Environmental Protection Agency (EPA).⁶⁷

Proposed National Priorities List site: A toxic waste site that the EPA has publicly announced it intends to add to the National Priorities List.⁶⁸

Listed National Priorities List site: A site that has been listed on the National Priorities List. Only sites that are or have been listed on the National Priorities List are eligible for long-term funding from the Superfund program.^{69,70}

Deleted National Priorities List site: A site which the EPA has determined requires no further response to protect human health or the environment. Sites that have been deleted from the NPL remain eligible for further Superfund-financed remedial action in the unlikely event that conditions in the future warrant such action.⁷¹

Remediation: Remedial actions are typically long-term clean-up actions aimed at permanently and significantly reducing contamination at a hazardous waste site. The most hazardous sites that require long-term clean-up action are referred to the National Priorities List.⁷²

History of Superfund

In 1980, in response to toxic waste disasters such as Love Canal and Valley of the Drums, Congress enacted the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), informally called "Superfund."⁷³ This bill gave the EPA the authority and funds to identify hazardous sites, which threaten public health or the environment; hold the polluting companies responsible for cleanup; and clean up the sites themselves if no Potentially Responsible Parties (PRPs) could be identified or made to pay.⁷⁴

Since the program was established in 1980, a total of 1,765 sites have been added to the Superfund's National Priorities List (NPL),⁷⁵ a list of the most seriously contaminated toxic

waste sites in the country. Approximately one quarter of all sites that have been put on the list have been fully cleaned up and deleted from the list.⁷⁶ Over the past twenty years, the pace of cleanup has slowed to a crawl.⁷⁷

Today, over 1,300 of these sites are still on the National Priorities List (NPL) managed by the EPA's Superfund program and one in five Americans live within three miles of a site that has been or is currently managed by the Superfund program.⁷⁸ Contaminants of concern at National Priorities List sites include arsenic, lead, mercury, benzene, dioxin, and other hazardous chemicals that can cause cancer, reproductive problems, birth defects, and other serious illnesses.⁷⁹

Worsening Hurricanes Due to Climate Change Threaten Superfund Sites

Hurricanes pose a serious threat to the containment of contaminants found at Superfund sites.⁸⁰ Hurricane winds and floodwaters can dislodge contaminated soil and waste that is buried, damage protective covers, and carry the contaminants off-site.⁸¹ Hurricane Floyd (1999), Hurricane Katrina (2005), Hurricane Irene (2011), Hurricane Sandy (2012), and Hurricane Harvey (2017) have all caused flooding at Superfund sites.⁸² Of the more than two dozen current and former Superfund sites in Harris County, Texas alone, approximately half were flooded or otherwise damaged during Hurricane Harvey.⁸³

Climate change has caused the number of tropical cyclones with higher intensities to increase, including those responsible for the “great majority of [tropical cyclone]-related damage and mortality.”⁸⁴ Warmer water and air temperatures provide fuel for tropical storms,⁸⁵ which has increased the frequency with which the most severe hurricanes form and raised the “speed limit” for the most severe storms.⁸⁶

Climate change has also made the most dangerous aspect of hurricanes, storm surge, more dangerous.⁸⁷ Warmer air holds more

moisture, which results in more rainfall when a storm hits.⁸⁸ At the same time, sea level rise allows storm surge to reach further inland and cause more intense flooding on the coast.⁸⁹

In 2019, the U.S. Government Accountability Office found that almost 40 percent of National Priorities List (NPL) sites overlap with the Federal Emergency Management Agency’s (FEMA) list of top flood hazard regions.⁹⁰ The 2020 Atlantic hurricane season has only emphasized how this threat continues to grow, with a record-breaking nine named storms by August 6.⁹¹ For comparison, from 1966 to 2009, the average number of named storms to form by early August was two.^{92,93}

In addition, tornadoes can cause damage to Superfund sites, blowing hazardous materials off site and into communities.⁹⁴ There are 2,000 proposed and listed Superfund sites within 25 miles of the East and Gulf Coasts,⁹⁵ where hurricanes are becoming more severe, and the ability of hurricanes to cause tornadoes over long distances increases the threat of contaminant exposure from a Superfund site during a hurricane.

Current EPA Response to the Threat of Hurricanes

Climate change has increased the intensity of our natural disasters, but our preparedness to withstand these storms and prevent chemical disasters has not kept pace. Despite the increased threat of climate-induced disasters sweeping contamination from Superfund toxic waste sites and into our communities, the number of cleanups finished at National Priorities List sites in FY 2020 dropped two-thirds below the yearly averages since the first National Priorities List.⁹⁶ As a result, more people are exposed to toxic waste for longer and the risk of a natural disaster impacting a Superfund site at some point before cleanup is completed increases.

Superfund sites take decades to clean up once they are identified.⁹⁷ Insufficient funding causes cleanups to stall, creating an unacceptable risk of individuals being exposed to hazardous chemicals. In 2020, cleanup otherwise ready to begin at 34

Superfund sites couldn't start because of a lack of funding.⁹⁸ Of these, 19 sites are in coastal states or territories such as New York, New Jersey, Louisiana, Florida, and Puerto Rico, which are threatened by sea level rise year-round and subject to the annual threat of hurricanes from May to November.⁹⁹

Agency-wide, the EPA has failed to incorporate the threat of climate change into how it determines and manages risk. For example, EPA's 2018-2022 strategic plan includes no mention of the threat posed by climate change, which would include risks to Superfund sites and related infrastructure projects.¹⁰⁰ Failing to include the risk of climate change as an agency-wide priority undermines the ability of those conducting cleanup under the EPA to manage risks from climate change to sites undergoing cleanup or being proposed for cleanup.¹⁰¹

I 2020 ATLANTIC HURRICANE SEASON

THE ATLANTIC HURRICANE SEASON officially runs from June 1st to November 30th, although storms can form outside the official hurricane season, and especially in recent years, often do.^{102,103} There were two pre-season named storms in the 2020 Atlantic hurricane season: Tropical Storm Arthur and Tropical Storm Bertha, which both formed in May.¹⁰⁴ The 2020 Atlantic hurricane season set the records for the most named storms and for the most storms to make landfall in the U.S. In addition to the two pre-season storms, a total of 28 more named storms formed.¹⁰⁵ Out of a total of 30 named storms, 11 made landfall in the United States.¹⁰⁶

The following is a list of the storms that made landfall in the U.S., in order of formation:¹⁰⁷

1. Tropical Storm Bertha
2. Tropical Storm Cristobal
3. Tropical Storm Fay
4. Hurricane Hanna
5. Hurricane Isaias
6. Hurricane Laura
7. Hurricane Sally
8. Tropical Storm Beta
9. Hurricane Delta
10. Hurricane Zeta
11. Hurricane Eta

FIGURE 3. SUPERFUND SITES IN AREAS AFFECTED BY TROPICAL STORMS AND HURRICANES DURING THE 2020 ATLANTIC HURRICANE SEASON

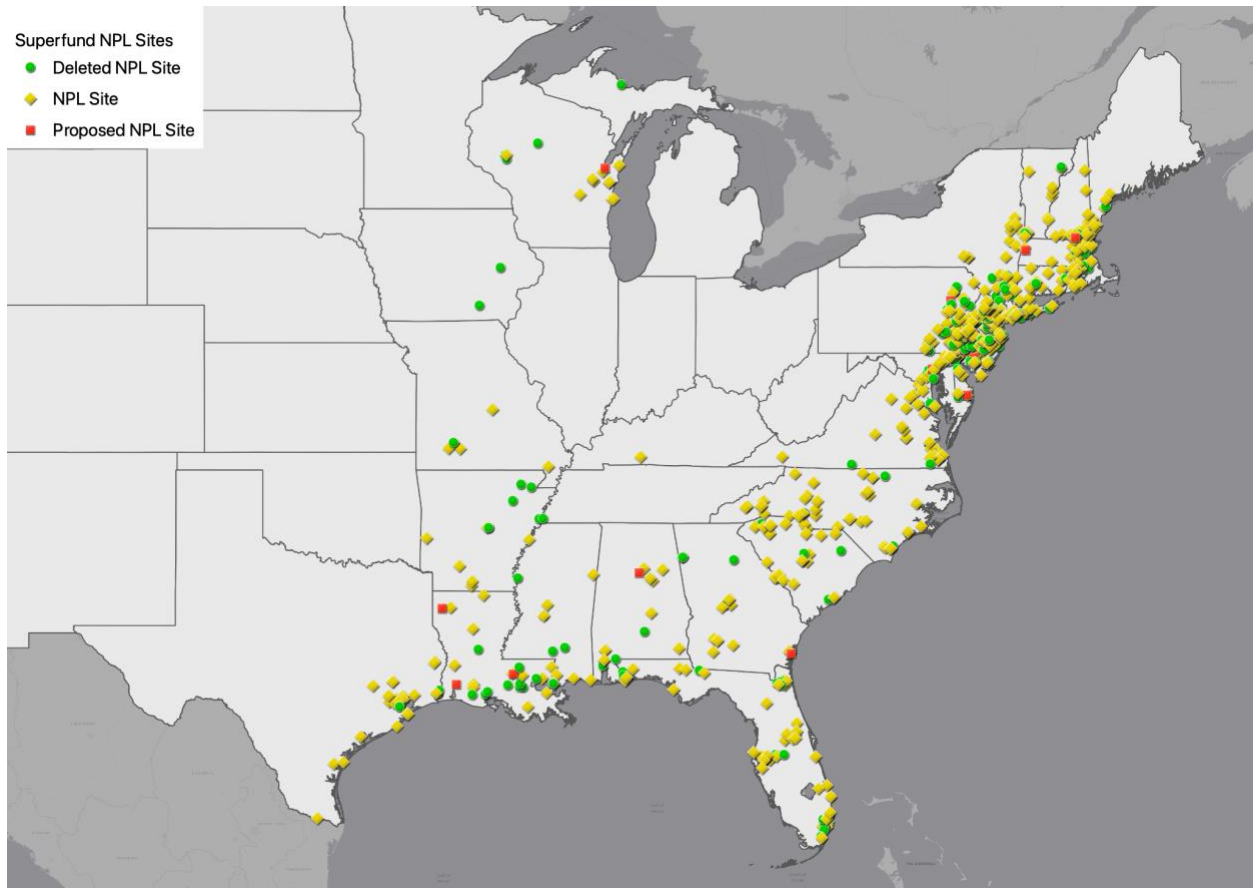


FIGURE 4: SUPERFUND SITES IN AREAS AFFECTED BY TROPICAL STORMS & HURRICANES DURING THE 2020 ATLANTIC HURRICANE SEASON

	Both	Wind Swath Only	Weather Warning Only	Total
Proposed	11	4	0	15
Listed	415	152	32	599
Deleted	149	32	15	196
Total	575	188	47	810

Methodology

In order to evaluate the risk posed by hurricanes and tropical storms to Superfund sites during the 2020 Atlantic hurricane season, we looked at the number of Superfund toxic waste sites, including those proposed, listed, and deleted from the National Priorities List (NPL), that were in areas impacted by the 11 hurricanes or tropical storms that made landfall in the U.S. in 2020.¹⁰⁸

Each of the maps in this report is an original construction based on pulling data from multiple sources. The sources used for each map include the International Best Track Archive for Climate Stewardship (IBTrACS), which was retrieved from the National Oceanic and Atmospheric Administration's (NOAA's) National Centers for Environmental Information,^{109,110} the National Hurricane Center (NHC), the Environmental Protection Agency (EPA), and the National Weather Service (NWS).

The map for each storm was built from three features related to the location and severity of that storm over time: the storm's track, its points along that track, and its wind swath. The storm's track and points come from the International Best Track Archive for Climate Stewardship (IBTrACS), which is maintained by the National Oceanic and Atmospheric Administration's (NOAA's) National Centers for Environmental Information.^{111,112} However, the points along the track identified by the IBTrACs for each storm are not displayed on the maps included in this report for clarity in presentation. The data for each storm's tracks are considered best track data, because they combine data available during and after the storm from multiple

sources to create a "best track."¹¹³ Each storm's wind swath comes from the National Hurricane Center (NHC) wind swath¹¹⁴ records for each storm.¹¹⁵ The severe weather data is the National Weather Service warnings, which have been archived in the Iowa Environmental Mesonet database.¹¹⁶

The Superfund sites that were counted as being in an area impacted by an individual storm are those that intersect with the wind swath and those in areas with relevant weather warnings that occurred during the storm in nearby areas. A wind swath represents the maximum extent of areas touched by a threshold of wind of 30 knots, 50 knots, and 64 knots or 39 mph, 58 mph, and 74 mph.¹¹⁷ A weather warning indicates that the weather event for which the warning is issued is imminent and individuals should take necessary action to protect themselves immediately.¹¹⁸ A weather watch indicates that the weather event for which the watch is issued is possible.¹¹⁹ This report looks at Superfund sites that are in areas with weather warnings, not watches, that are related to flooding (including coastal flood, flash flood, and areal flood), as well as tornadoes, storm surge, tropical storms and hurricanes.¹²⁰ The weather warnings are also limited to those that were issued from the time the storm system entered the boundaries of the U.S. territorial sea, which is 12 nautical miles offland, until it went offland in the U.S. for the last time.

The time period that the storm system was within the U.S. territorial sea is determined by using the first and last track points for each storm from the IBTrACS archive.

FIGURE 5. TIME PERIOD FOR WHICH WEATHER WARNINGS WERE SELECTED

Storm	Start Time (UTC)	End Time (UTC)
Bertha	May 25, 21:00	May 28, 12:00
Cristobal	June 7, 21:00	June 10, 6:00
Fay	July 6, 6:00	July 11, 6:00
Hanna	July 25, 21:00	July 26, 9:00
Isaias	August 4, 3:00	August 5, 00:00
Laura	August 27, 6:00	August 29, 6:00
Sally	September 12, 6:00	September 18, 00:00
Beta	September 22, 3:00	September 25, 6:00
Delta	October 10, 00:00	October 12, 00:00
Zeta	October 28, 21:00	October 29, 18:00
Eta	November 9, 6:00	November 12, 18:00

Finally, the weather warnings were limited to those that occurred in a state through which the track of the storm system passed. The relevant weather warnings used in determining the Superfund sites in areas impacted by hurricanes and tropical storms are those that meet all of the following criteria:

1. Were a weather warning, not a watch or advisory
2. Were related to flooding (including coastal flood, flash flood, and areal flood), tornadoes, storm surge, tropical storms or hurricanes
3. Occurred during the time between when the storm first made U.S. landfall and when it last went offshore from the U.S.
4. Occurred in a state through which the storm system passed

This process limits the data in at least two ways. The first is the possibility, especially in a large state, for there to be an unrelated weather warning far from the storm. For the 11 storms reviewed in this report, the weather warnings included all fell closely to the track of the storm. The second is the chance that the storm's track did not go into a state where there were many areas impacted by the storm. This almost certainly occurred, indicating that the actual number of Superfund sites in areas impacted by severe weather due to tropical storms and hurricanes was greater than this report finds.

The list and location of proposed, listed, and deleted Superfund National Priorities List (NPL) sites comes from the Environmental Protection Agency (EPA) online ArcGIS and Esri feature layer, last updated on May 6, 2021.¹²¹ The dataset from the EPA includes listed NPL sites, as well as proposed and deleted sites. Those sites that are proposed

and deleted may have contaminants present that could be impacted by hurricanes, even though they are not presently on the NPL.¹²² Sites deleted from the NPL are determined by the EPA to be fully remediated, and therefore, should theoretically no longer pose a risk. However, these sites may still have contamination present and therefore could still pose a risk under these extreme circumstances.¹²³ Although they have not yet formally been added to the NPL and the EPA

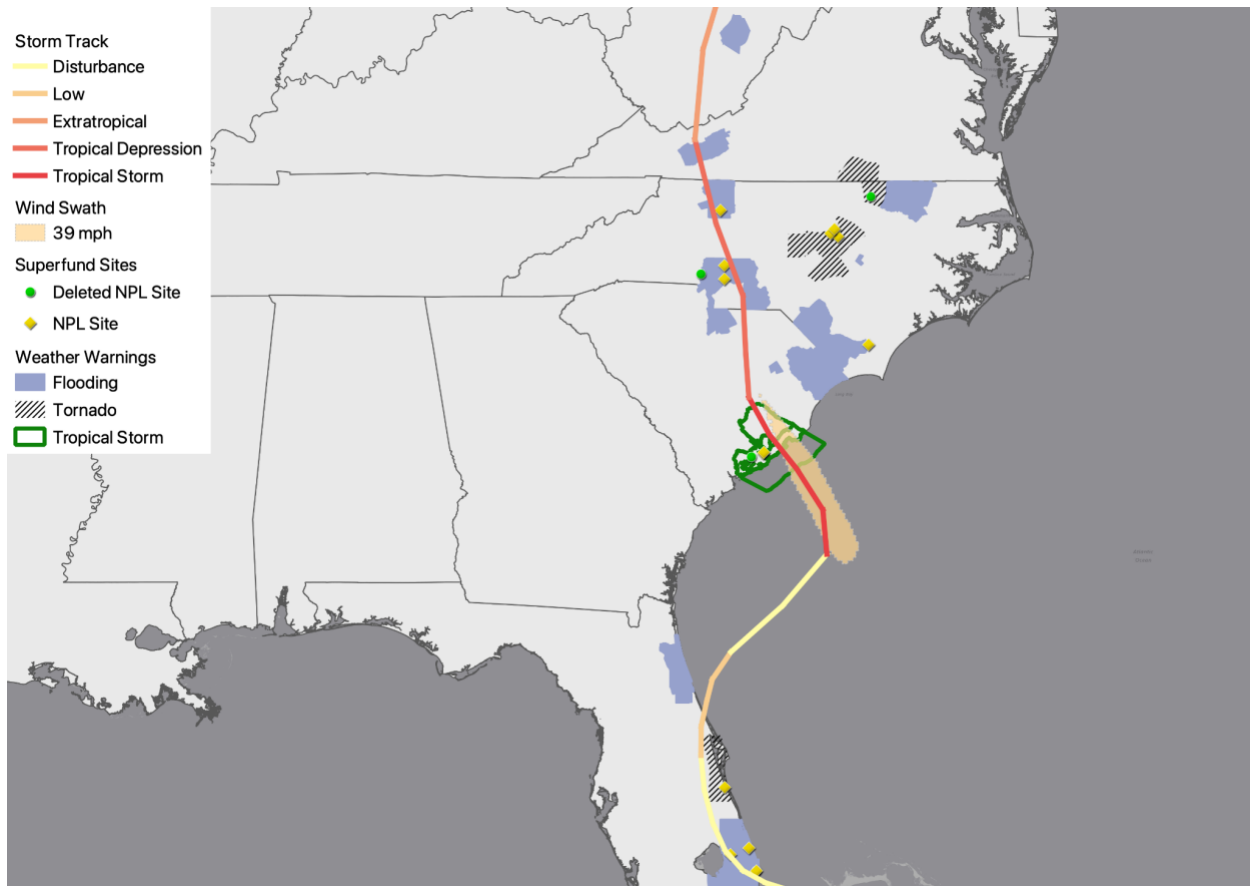
has only notified the public of its intent to do so, sites proposed to the NPL contain toxic waste.¹²⁴ As such, we included these sites in the maps because they may pose a threat to human health and be remediated through the Superfund program.

Sites included in the count for each storm include those sites in the U.S. and its territories. Not all sites included in each count are shown on each map.

Tropical Storm Bertha

Tropical Storm Bertha was the second named storm to form prior to the official start of the 2020 Atlantic hurricane season, and the first to make landfall in the United States.¹²⁵

FIGURE 6A. SUPERFUND SITES IN AREAS AFFECTED BY TROPICAL STORM BERTHA



Storm development: Bertha was identified on May 25 as a tropical disturbance, which travelled through Florida bringing rainfall and thunderstorms.¹²⁶ Off the coast of Georgia and South Carolina, Bertha developed into a tropical storm and then made landfall in Isle of Palms, South Carolina.¹²⁷

Weather impact: Even before becoming a tropical storm, the disturbance broke the record for inches of rainfall in some parts of southern Florida by more than twice the previous amount.¹²⁸ Bertha caused minor storm surge along the east coast from Florida to North Carolina, which reached approximately 1 to 1.5-feet.¹²⁹

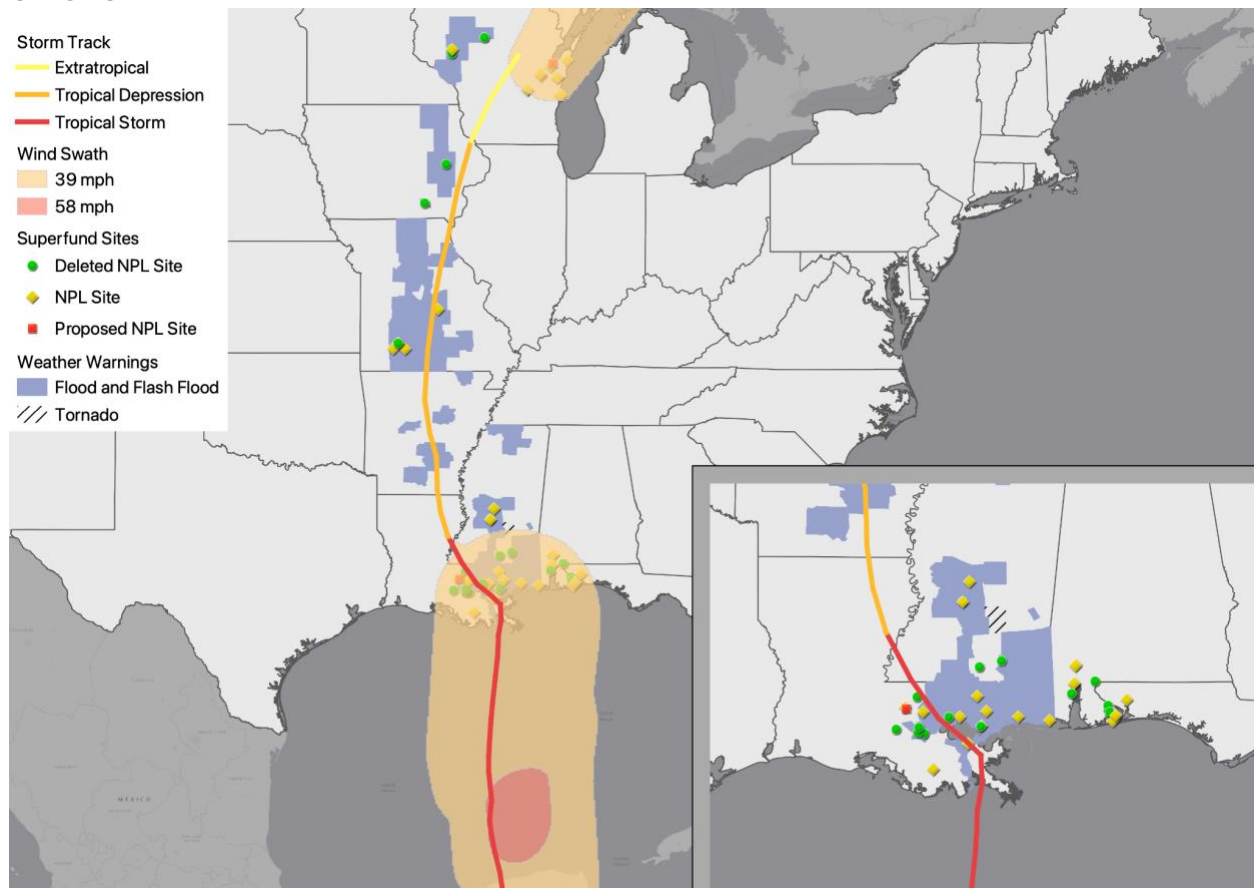
FIGURE 6B. SUPERFUND SITES IN AREAS AFFECTED BY TROPICAL STORM BERTHA

	Both	Wind Swath Only	Weather Warning Only	Total
Proposed	0	0	0	0
Listed	0	0	24	24
Deleted	0	0	15	15
Total	0	0	39	39

Tropical Storm Cristobal

Tropical Storm Cristobal was the third named storm of the 2020 Atlantic hurricane season and the second to make landfall in the U.S.¹³⁰

FIGURE 7A. SUPERFUND SITES IN AREAS AFFECTED BY TROPICAL STORM CRISTOBAL



Storm development: Tropical Storm Cristobal began as a tropical storm in the East Pacific named Amanda. But once it reached the Gulf of Mexico,¹³¹ it was renamed Tropical Storm Cristobal and considered part of the Atlantic hurricane season.¹³² Cristobal made landfall in Louisiana on June 7 as a tropical storm with maximum winds reaching approximately 50 mph and continued unusually far inland, with remnants of the storm tracking into Wisconsin until June 10.¹³³

Weather impact: Tropical Storm Cristobal brought heavy rain and flooding from Louisiana up through Wisconsin, and parts of Louisiana were inundated with water up to six feet above tide-

level.¹³⁴ Heavy rainfall also affected parts of Florida even as it made landfall in Louisiana, causing flash flooding in downtown Jacksonville.¹³⁵

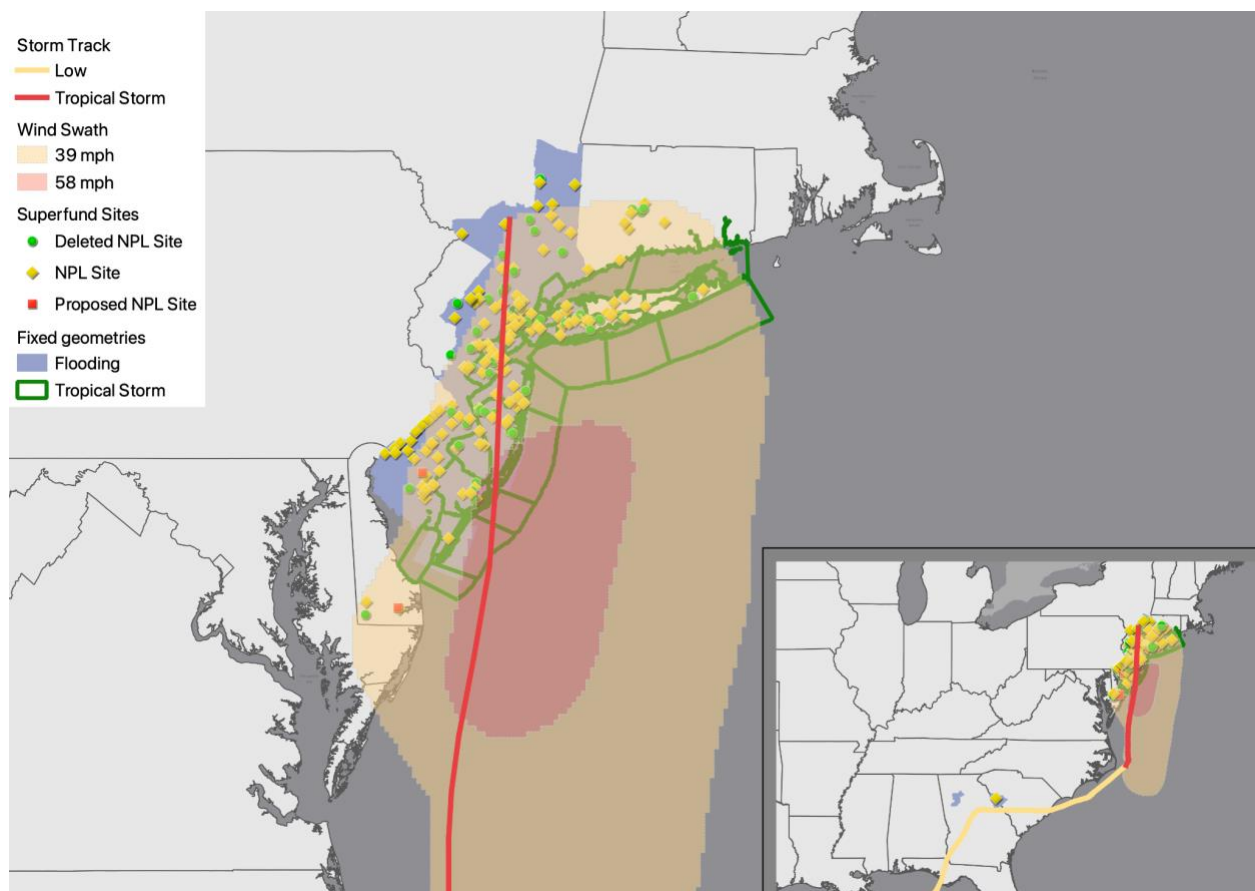
FIGURE 7B. SUPERFUND SITES IN AREAS AFFECTED BY TROPICAL STORM CRISTOBAL

	Both	Wind Swath Only	Weather Warning Only	Total
Proposed	0	2	0	2
Listed	8	20	7	35
Deleted	5	10	7	22
Total	13	32	14	59

Tropical Storm Fay

Tropical Storm Fay was the sixth named storm of the 2020 Atlantic hurricane season and the third to make landfall in the U.S.¹³⁶

FIGURE 8A. SUPERFUND SITES IN AREAS AFFECTED BY TROPICAL STORM FAY



Storm development: Tropical Storm Fay began as a disturbance in the northern Gulf of Mexico on July 1.¹³⁷ The storm split into two: Tropical Storm Edouard and Tropical Storm Fay, the fifth and sixth named storms of the 2020 Atlantic hurricane season.¹³⁸ Only Fay made landfall when it reached the Florida panhandle. It became a tropical storm once more off the coast of North Carolina¹³⁹ and made landfall again near Atlantic City, New Jersey.¹⁴⁰

Weather impact: The storm brought scattered inland and coastal flooding across the southeast United States.¹⁴¹ Tropical storm warnings were issued in states across the northeast coast, including New Jersey, New York, Connecticut, Delaware, and parts of Rhode Island.¹⁴²

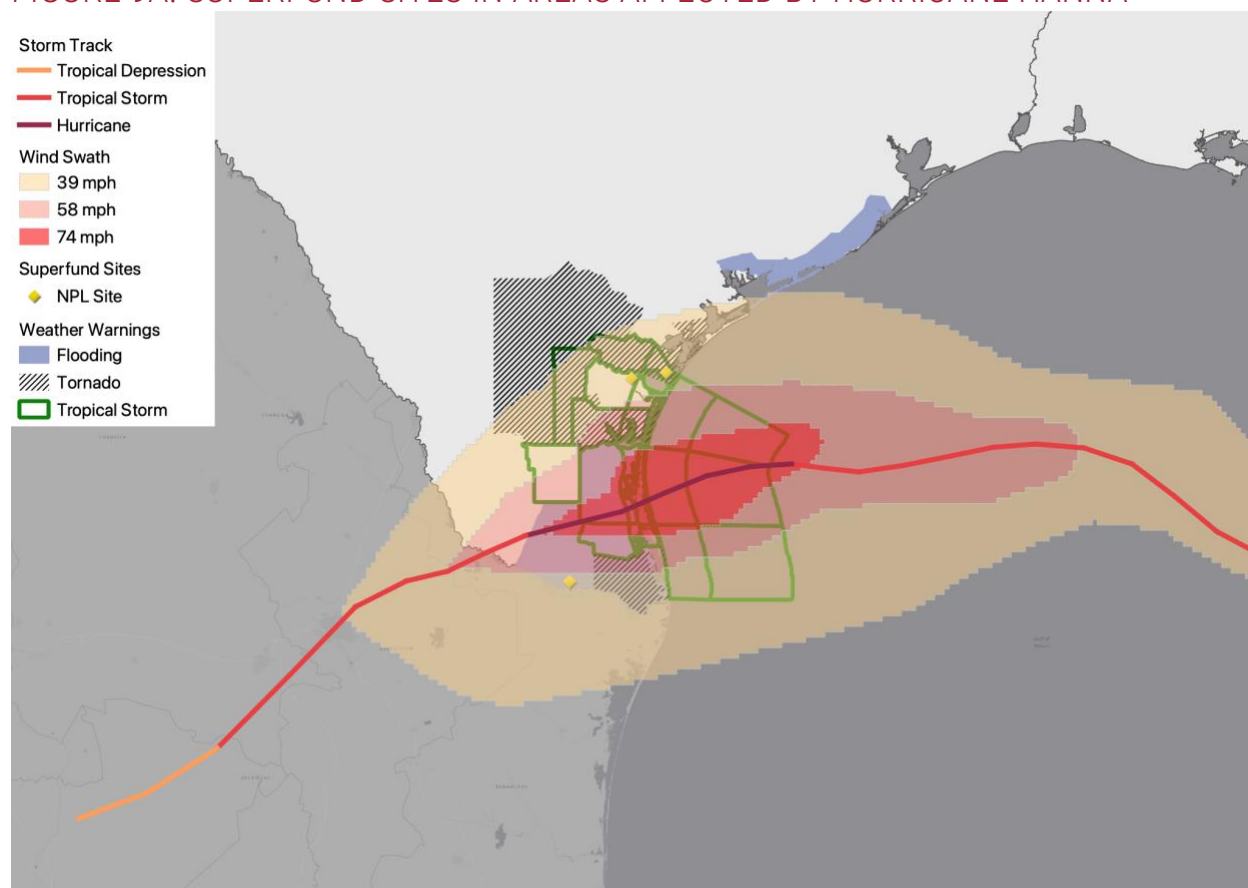
FIGURE 8B. SUPERFUND SITES IN AREAS AFFECTED BY TROPICAL STORM FAY

	Both	Wind Swath Only	Weather Warning Only	Total
Proposed	2	1	0	3
Listed	120	10	26	156
Deleted	48	4	3	55
Total	170	15	29	214

Hurricane Hanna

Hurricane Hanna was the first hurricane of the 2020 Atlantic hurricane season, eighth named storm of the 2020 Atlantic hurricane season, and fourth storm to make landfall in the U.S.¹⁴³

FIGURE 9A. SUPERFUND SITES IN AREAS AFFECTED BY HURRICANE HANNA



Storm development: Hanna was first identified as a tropical depression on July 22.¹⁴⁴ On July 25 it made landfall as a strong Category 1 hurricane¹⁴⁵ on a non-populated island off the coast of southern Texas.¹⁴⁶ Hurricane Hanna then made landfall again in Kenedy County, Texas.¹⁴⁷

Weather impact: Hanna resulted in massive amounts of rainfall and widespread flash flooding. Some areas were inundated with up to four feet of water.^{148,149} Various areas along the southeastern coast of Texas were issued warnings of life-threatening storm surge, and portions of southern Texas were warned of life-threatening flash flooding and isolated river flooding.¹⁵⁰

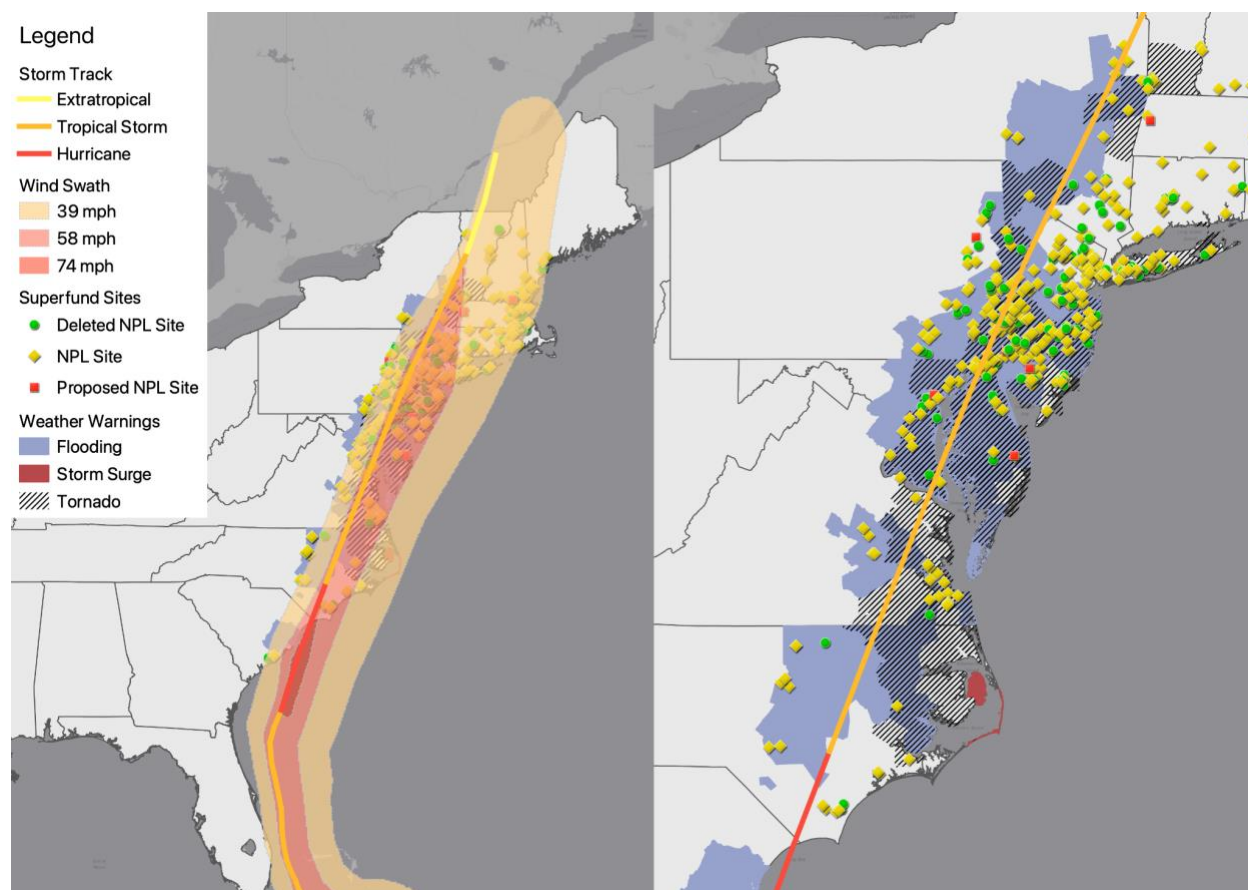
FIGURE 9B. SUPERFUND SITES IN AREAS AFFECTED BY HURRICANE HANNA

	Both	Wind Swath Only	Weather Warning Only	Total
Proposed	0	0	0	0
Listed	3	0	0	3
Deleted	0	0	0	0
Total	3	0	0	3

Hurricane Isaias

Hurricane Isaias was the ninth named storm of the 2020 Atlantic hurricane season and fifth to make landfall in the U.S..¹⁵¹

FIGURE 10A. SUPERFUND SITES IN AREAS AFFECTED BY HURRICANE ISAIAS



Storm development: Hurricane Isaias was first identified off the western coast of Africa as a vigorous tropical wave on July 24.¹⁵² As it traveled west, it developed into a hurricane.¹⁵³ It traveled up the U.S. coast¹⁵⁴ and then made landfall in North Carolina as a Category 1 hurricane.¹⁵⁵

Weather impact: Isaias produced heavy rainfall, minor storm surge, and tornadoes while moving at 40 mph,¹⁵⁶ approximately four times the average speed of a tropical cyclone.^{157,158} Its speed increased the threat of tornadoes dropping with little to no warning but decreased the chance of flooding due to a shorter period of rainfall per area as the storm moved.¹⁵⁹ There were 36

tornadoes across 260 miles spawned from Hurricane Isaias, showcasing the widespread threat posed by a single hurricane.¹⁶⁰

Across the New York tri-state area, millions were left without power and Governor Cuomo issued a State of Emergency in downtown New York to aid local officials contending with the immense clean-up operation.¹⁶¹

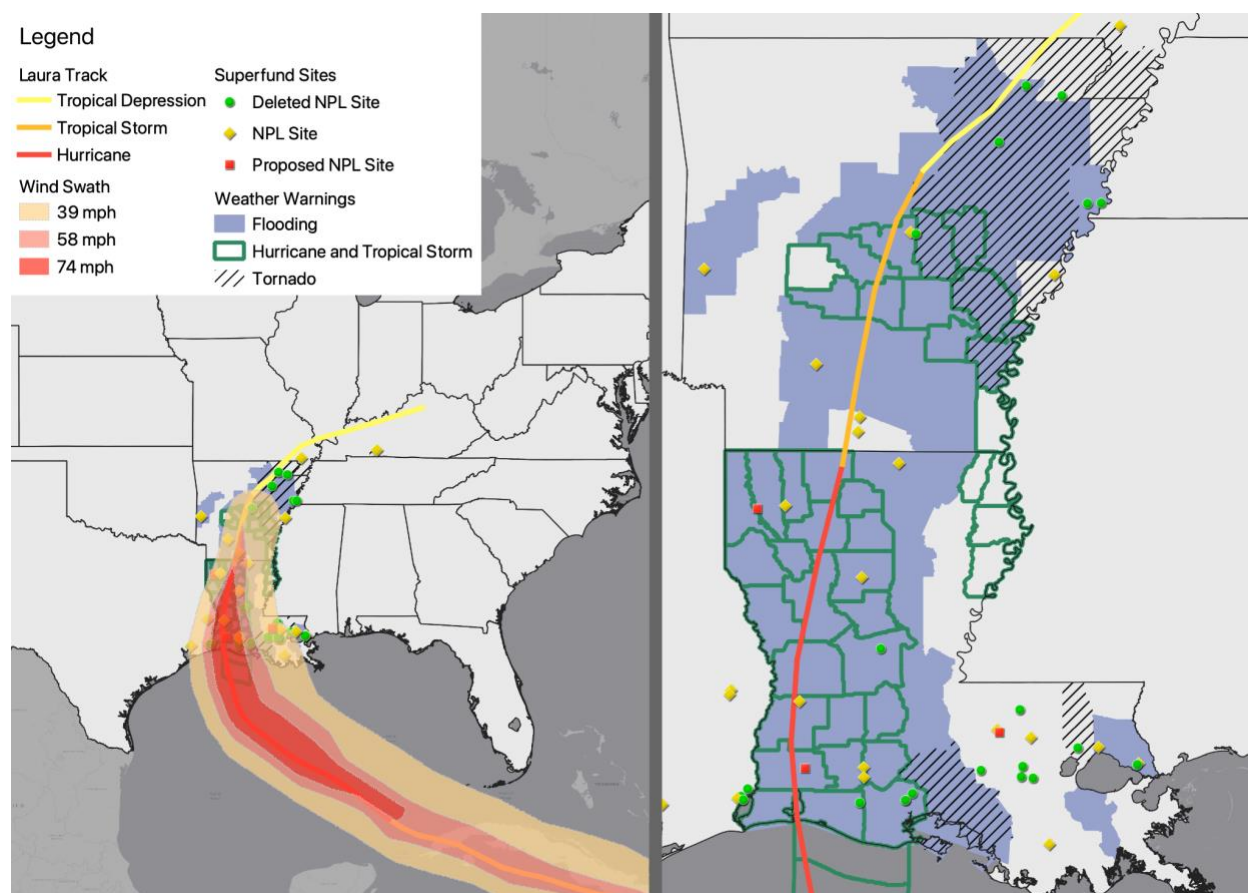
FIGURE 10B. SUPERFUND SITES IN AREAS AFFECTED BY HURRICANE ISAIAS

	Both	Wind Swath Only	Weather Warning Only	Total
Proposed	5	3	0	8
Listed	214	180	13	407
Deleted	68	49	1	118
Total	287	232	14	533

Hurricane Laura

Hurricane Laura was the 12th named storm of the 2020 Atlantic hurricane season and sixth to make landfall in the U.S.¹⁶²

FIGURE 11A. SUPERFUND SITES IN AREAS AFFECTED BY HURRICANE LAURA



Storm development: Hurricane Laura developed into a tropical storm on August 21.¹⁶³ The storm quickly strengthened into a Category 1 hurricane,^{164,165} then continued to intensify at near record pace into a Category 4 hurricane,¹⁶⁶ tying Hurricane Karl (2010) for the most rapidly intensifying storm ever in the Gulf of Mexico.¹⁶⁷

Hurricane Laura made landfall near Cameron, Louisiana as a Category 4 hurricane.¹⁶⁸

Weather impact: Upon landfall in Louisiana, Hurricane Laura brought widespread wind damage, destroying fundamental infrastructure, including water and electricity infrastructure in parts of Louisiana.¹⁶⁹ The National Hurricane Center warned of unsurvivable storm surge across the coasts of Louisiana and Texas, which could travel up to 40 miles inland and persist for several days.¹⁷⁰

Laura also caused widespread flash flooding in Arkansas.¹⁷¹

Laura was the strongest storm to hit Louisiana in more than 150 years.¹⁷² Due to the devastating effects of Hurricane Laura in 2020, the World Meteorological Organization (WMO) will no longer use the name “Laura” to name future storms.¹⁷³

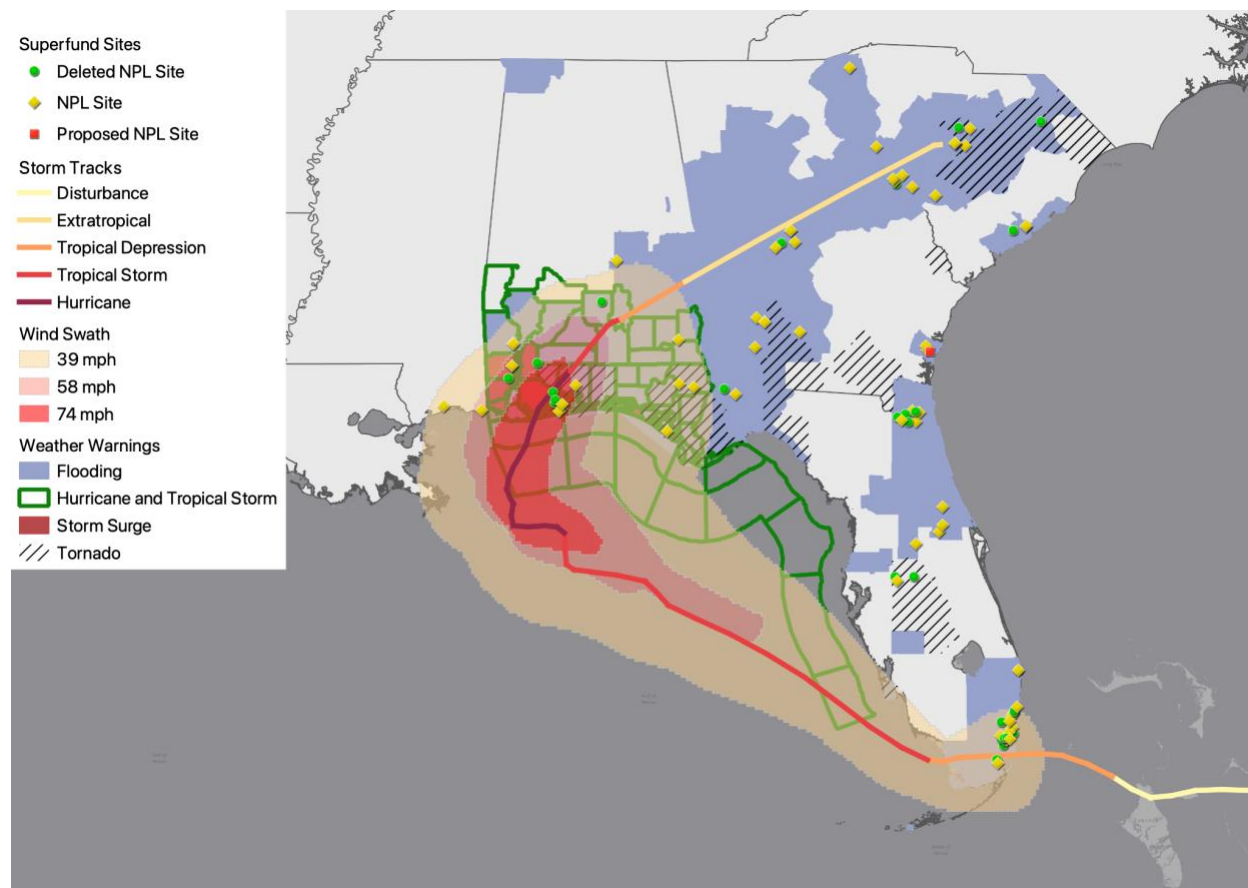
FIGURE 11B. SUPERFUND SITES IN AREAS AFFECTED BY HURRICANE LAURA

	Both	Wind Swath Only	Weather Warning Only	Total
Proposed	2	1	0	3
Listed	8	28	6	42
Deleted	10	15	6	31
Total	20	44	12	76

Hurricane Sally

Hurricane Sally was the 18th named storm in the 2020 Atlantic hurricane season and seventh to make landfall in the U.S.¹⁷⁴

FIGURE 12A. SUPERFUND SITES IN AREAS AFFECTED BY HURRICANE SALLY



Storm development: On September 11, Sally was identified as a tropical depression.¹⁷⁵ The following day, Sally made landfall in southern Florida as a tropical storm.^{176,177} On September 16, it made landfall again near Gulf Shores, Alabama as a Category 2 hurricane.¹⁷⁸ Sally weakened as it moved through Alabama and North Carolina.^{179,180}

Weather impact: The most destructive aspect of Sally was its slow pace, pouring down up to 30 inches of rain in some areas of the Florida panhandle, Alabama, and Louisiana as it crawled northward.^{181,182} To put this number in perspective, that is four months worth of rain over the course of four hours.¹⁸³ Even once downgraded to a tropical storm, the National Hurricane Center

(NHC) called Sally a “prodigious rain producer.”¹⁸⁴ Sally brought damaging thunderstorms and wind to parts of Illinois and Michigan, as well as flash flooding in parts of Minnesota and Wisconsin.¹⁸⁵

Sally also dropped at least five tornadoes in South Carolina,¹⁸⁶ which uprooted trees and damaged multiple structures.¹⁸⁷

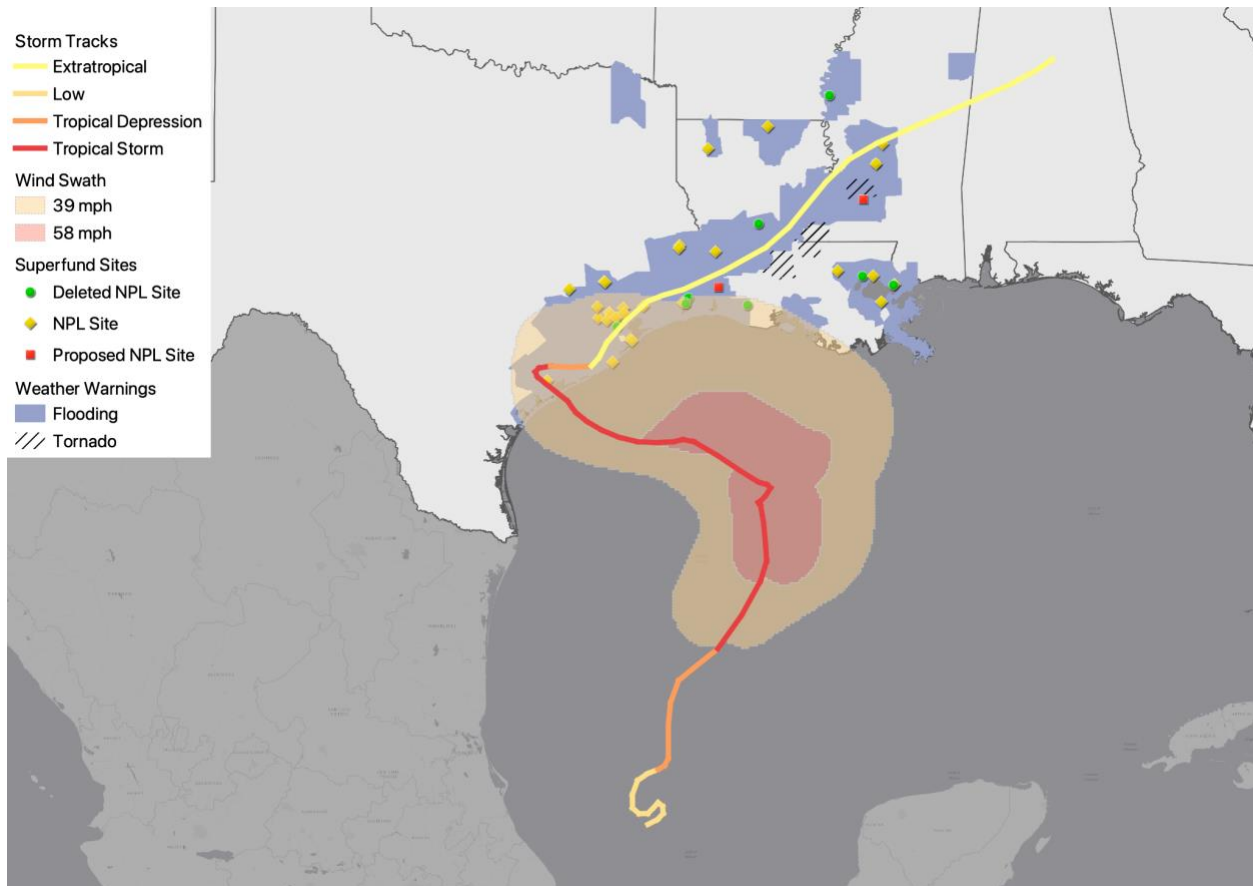
FIGURE 12B. SUPERFUND SITES IN AREAS AFFECTED BY HURRICANE SALLY

	Both	Wind Swath Only	Weather Warning Only	Total
Proposed	0	0	1	1
Listed	23	2	39	64
Deleted	17	0	14	31
Total	40	2	54	96

Tropical Storm Beta

Tropical Storm Beta was the 23rd named storm of the 2020 Atlantic hurricane season and eighth to make landfall in the U.S.¹⁸⁸

FIGURE 13A. SUPERFUND SITES IN AREAS AFFECTED BY TROPICAL STORM BETA



Storm development: Beta developed into a tropical storm on September 18. It made landfall at Matagorda Bay, Texas on September 21.¹⁸⁹

Weather impact: Even before Beta made landfall, the storm caused significant coastal flooding in Cameron, Louisiana.¹⁹⁰ It brought heavy rainfall and prompted flash flood warnings along the Texas and Louisiana coasts.¹⁹¹ Ultimately, Governor Abbott issued a disaster declaration for 29 Texas counties,¹⁹² which enables the Governor to use state resources to provide aid.¹⁹³

FIGURE 13B. SUPERFUND SITES IN AREAS AFFECTED BY TROPICAL STORM BETA

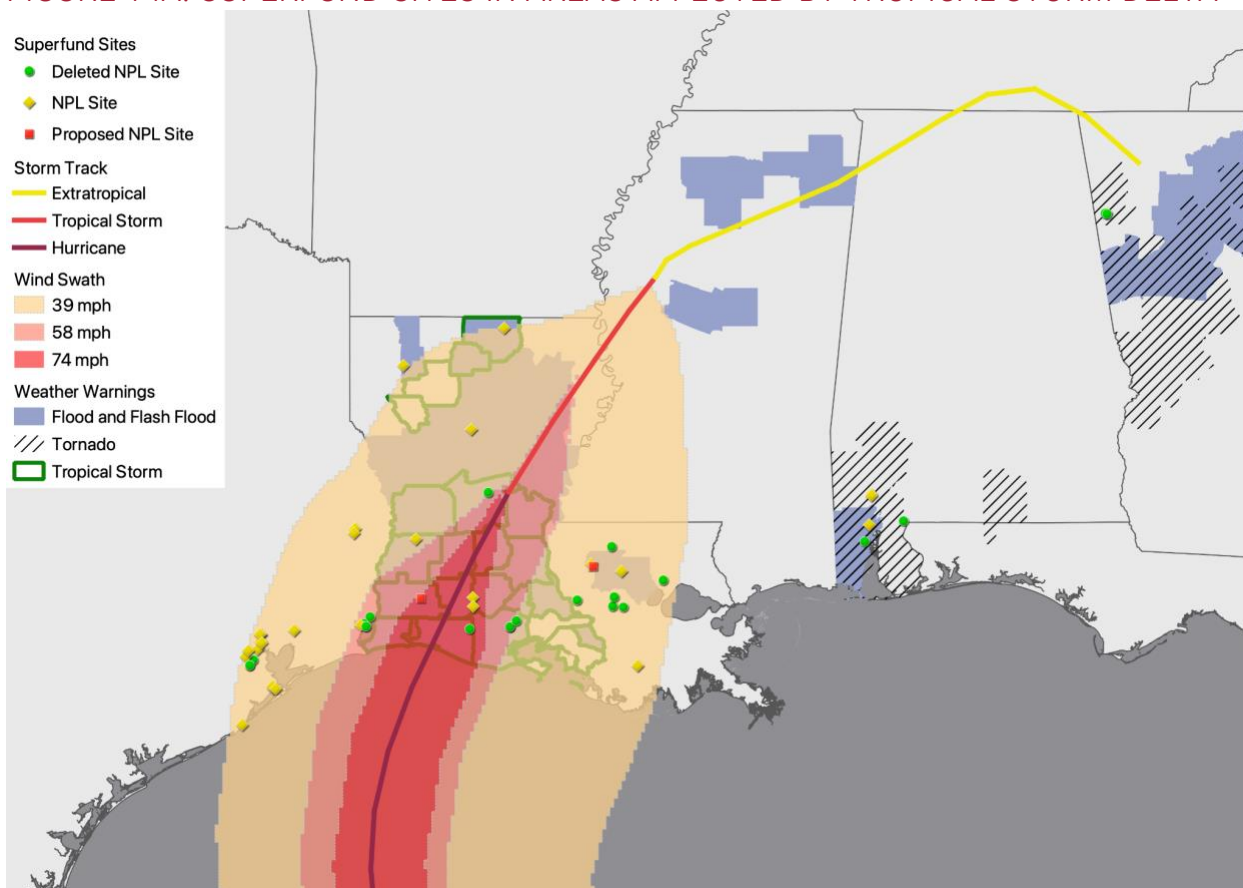
	Both	Wind Swath Only	Weather Warning Only	Total
Proposed	0	0	1	1
Listed	20	0	14	34
Deleted	5	2	6	13
Total	25	2	21	48

Hurricane Delta

Hurricane Delta was the 25th named storm of the 2020 Atlantic hurricane season and ninth to make landfall in the U.S.¹⁹⁴ Hurricane Delta broke the record for the most named storms to make landfall in a single Atlantic hurricane season, which had previously been set in 1916 when nine named storms made landfall.¹⁹⁵

The storm battered Louisiana a little more than a month after Hurricane Laura, one of the strongest hurricanes to ever hit the U.S., made landfall and brought massive destruction as a Category 4 hurricane in the same area.¹⁹⁶

FIGURE 14A. SUPERFUND SITES IN AREAS AFFECTED BY TROPICAL STORM DELTA



Storm Development: On October 4, the National Hurricane Center (NHC) reported on a potential tropical cyclone from an area of low pressure in the central Caribbean Sea.¹⁹⁷ By the time it made landfall in Creole, Louisiana, it was a Category 2 hurricane.¹⁹⁸

Weather impact: Storm surge caused record-high water levels in Louisiana and flash flood warnings were issued across the coasts of Texas and Louisiana.¹⁹⁹ It also brought rain as far east as Georgia.²⁰⁰

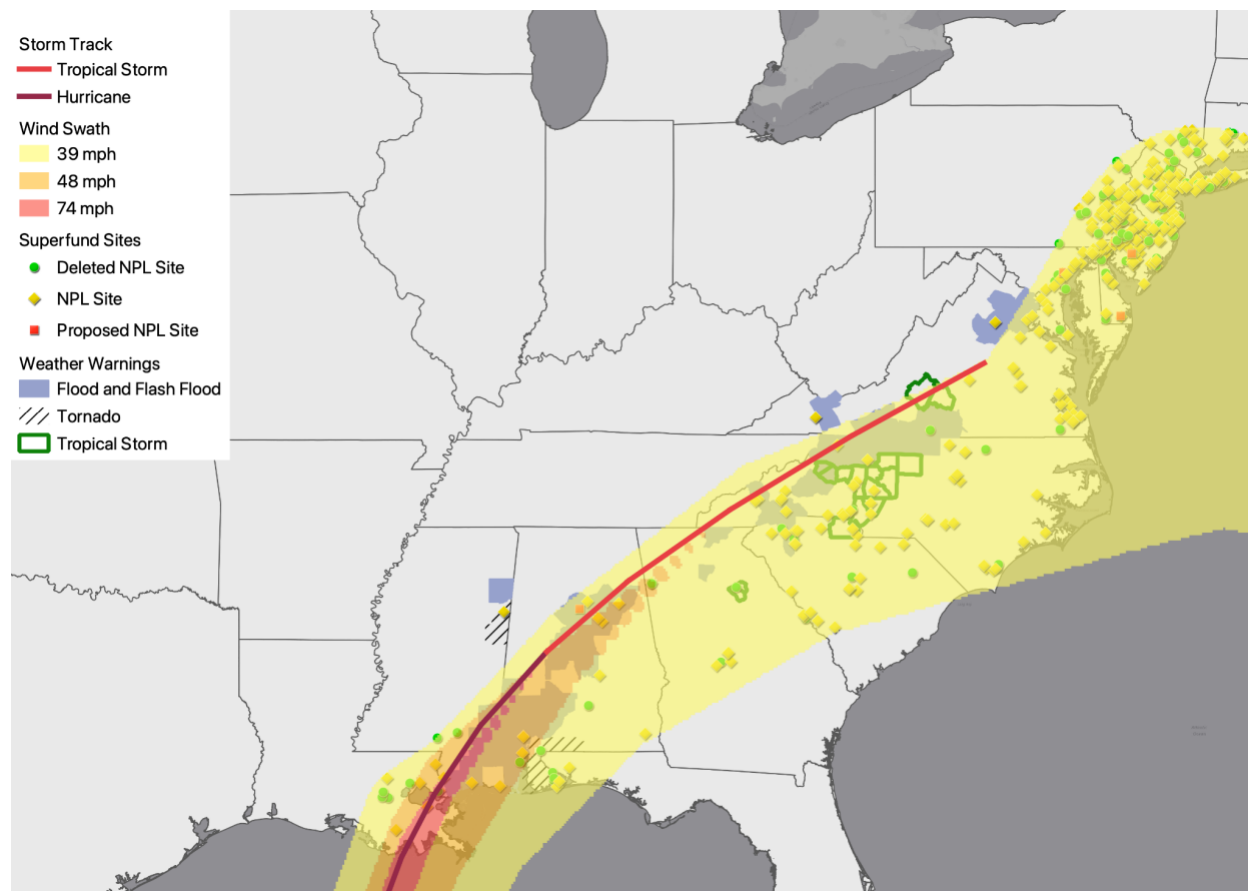
FIGURE 14B. SUPERFUND SITES IN AREAS AFFECTED BY HURRICANE DELTA

	Both	Wind Swath Only	Weather Warning Only	Total
Proposed	2	0	0	2
Listed	6	16	7	29
Deleted	5	13	4	22
Total	13	29	11	53

Hurricane Zeta

Hurricane Zeta was the 27th named storm of the 2020 Atlantic hurricane season and 10th to make landfall in the U.S.²⁰¹

FIGURE 15A. SUPERFUND SITES IN AREAS AFFECTED BY HURRICANE ZETA



Storm development: Hurricane Zeta began as a weather disturbance in the Western Caribbean Sea on October 21.²⁰² By the time it made landfall in Louisiana on October 28, it was a Category 2 hurricane.²⁰³

Weather impact: Zeta knocked out power lines and uprooted trees and other structures due to its wind speeds both in Louisiana and further inland.^{204,205} It also brought life-threatening storm surge and heavy rainfall in areas across the Gulf Coast.²⁰⁶

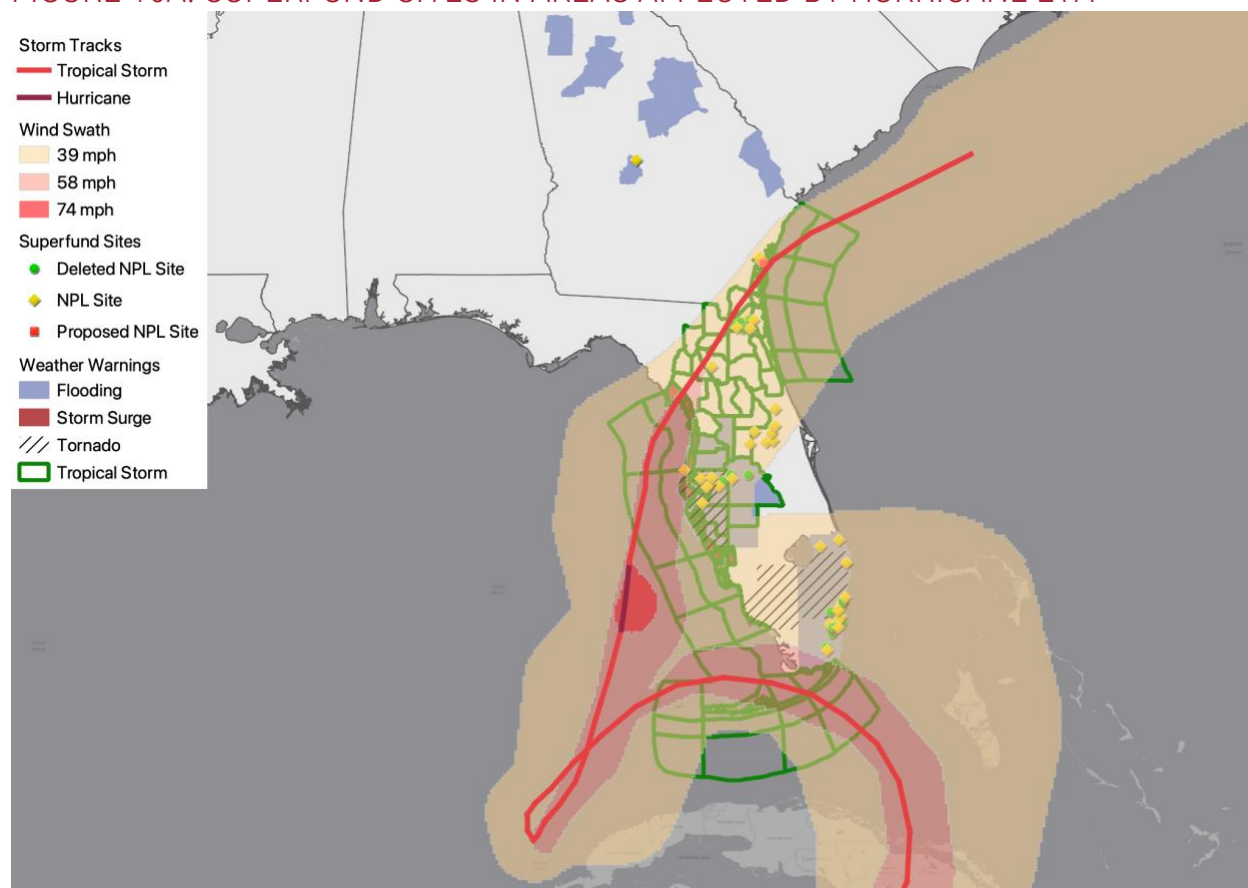
FIGURE 15B. SUPERFUND SITES IN AREAS AFFECTED BY HURRICANE ZETA

	Both	Wind Swath Only	Weather Warning Only	Total
Proposed	1	5	0	6
Listed	25	332	3	360
Deleted	7	103	0	110
Total	33	440	3	476

Hurricane Eta

Hurricane Eta was the 28th named storm of the 2020 Atlantic hurricane season and 11th to make landfall in the U.S.²⁰⁷

FIGURE 16A. SUPERFUND SITES IN AREAS AFFECTED BY HURRICANE ETA



Storm development: Hurricane Eta made landfall in Central America as a Category 4 hurricane,²⁰⁸ but by the time it made landfall in southern Florida, it was a strong tropical storm.²⁰⁹ Four days later, on November 12, it made landfall again near Cedar Key, Florida as a moderate strength tropical storm.²¹⁰

Weather impact: Hurricane Eta dropped 14 inches of rain in parts of southern Florida, approximately four times the amount that would usually fall over the course of a month.²¹¹ It also caused storm surge and flooding along the coast of southern Florida.^{212,213}

The World Meteorological Organization (WMO) has retired the name “Eta” due to the hurricane’s devastating impacts across Central America.²¹⁴

FIGURE 16B. SUPERFUND SITES IN AREAS AFFECTED BY HURRICANE ETA

	Both	Wind Swath Only	Weather Warning Only	Total
Proposed	1	1	0	2
Listed	34	9	1	44
Deleted	23	0	0	23
Total	58	10	1	69

Disaster

In total, 810 superfund sites were in the path of at least one hurricane or tropical storm during the 2020 Atlantic hurricane season. Thankfully, only one of those sites is known to have suffered damage: the Clearview Landfill at the Lower Darby Creek Area Superfund site in Pennsylvania.

The Clearview Landfill spans at least 50 acres and is one of two separate landfills that make up the Lower Darby Creek Area (LDCA) Superfund site.²¹⁵ It is located on the east side of Darby Creek.²¹⁶ From the 1950s until the 1970s, the Clearview Landfill accepted municipal, demolition, and hospital wastes.²¹⁷ This waste, which included hazardous chemicals, contaminated the soil, groundwater, and fish tissue in surrounding areas.²¹⁸

The entire Lower Darby Creek Area was placed on the National Priorities List in 2001.²¹⁹ After ten years of inaction, in 2011, the EPA²²⁰ excavated almost 4,000 tons of polychlorinated biphenyls (PCBs),²²¹ which are linked to a variety of cancers, birth and developmental effects, disrupted hormone function, and immune system problems.²²² Starting in 2016, the EPA excavated soil contaminated with polycyclic aromatic hydrocarbons (PAHs), which are linked to kidney and liver damage,²²³ at 33 residential

properties.²²⁴ Following these excavations, additional long-term cleanup began in 2017 and is ongoing.²²⁵

Depending on the amount of recent precipitation in the area, even a 10-year or 50-year storm event could cause the Darby and Cobbs Creeks to flood the neighborhood, including portions of the Superfund Site.²²⁶ The risk of flooding is magnified because the landfill sits on a former wetland. Historically, the wetland would have absorbed water from large storm events.²²⁷

During Hurricane Isaias, the Clearview Landfill partially flooded, and areas in which cleanup was ongoing experienced erosion and required repairs.²²⁸ Prior to the flooding, the EPA had removed contaminated soil at nearly 200 residential properties, and the areas of Clearview Landfill in which cleanup was complete did not breach during the storm.²²⁹

No yards sampled following Hurricane Isaias were found to have contamination above EPA clean-up levels, and thus did not require further cleanup.²³⁰ The cleanup of residential yards that were contaminated prior to Hurricane Isaias and construction of the on-site remedy is ongoing.

I CONCLUSIONS & POLICY

RECOMMENDATIONS

THERE WERE 810 SUPERFUND SITES in areas impacted by hurricanes in the 2020 Atlantic hurricane season. In the coming years, hurricanes and tropical storms are expected to be more frequently severe,²³¹ which could potentially put even more toxic waste sites at risk of flooding and contaminating the communities where they are located.²³² To lower the risk of that happening, we must prioritize cleaning up Superfund toxic waste sites as quickly and effectively as possible.

Recommendations for Congress

Congress needs to take action to support the Superfund toxic waste cleanup program, including the following:

A Polluter Pays Tax should be reinstated to fund the Superfund.

To clean up the more than 1,300 toxic sites currently putting millions of Americans at risk, we need to secure steady funding that won't fluctuate with the federal budget process. That funding should come from the polluting industries responsible for these messes: the chemical and petroleum industries.²³³ This is an example of what we call the Polluter Pays Principle: those who produce pollution should be held responsible for managing that pollution and accountable for any harm it causes to human health and the environment.²³⁴ The chemical and petroleum industries create and profit off products that produce harmful pollutants that threaten the health and safety of millions of people and cause millions of dollars of

damage to the environment.^{235,236,237} They should pay for the cost of cleaning up those contaminants through a "Polluter Pays" Tax.

Recommendations for the EPA

The EPA needs to take action to better prepare for natural disasters hindering cleanup efforts:

The risk of toxic waste spreading from a Superfund site due to climate-induced natural disasters and sea-level rise should be taken into account when designing the clean-up plan for a site.

In October 2019, the Government Accountability Office (GAO) came out with a report urging the EPA, and specifically the Superfund program, to take additional actions to manage the risk from climate change.²³⁸ GAO found that 945 Superfund toxic waste sites are in areas that may be impacted by climate change effects such as wildfires, flooding, hurricanes, and sea-level rise.²³⁹ Further, GAO recommended that the EPA "clarify how its actions to manage risks at nonfederal NPL sites from potential impacts of climate change align with current goals and objectives." However, the 2018-2022 EPA Strategic Plan included no mention of climate change. The EPA's lack of clarification on the necessity to manage risks from climate change in accordance with its goals of a cleaner, healthier environment fails to "ensure that officials consistently integrate climate change information into site-level risk assessments and risk response

decisions.” The EPA’s Strategic Plan must be revised to include the importance of considering the threat of contamination spilling from a toxic waste site due to the effects of climate change.

Recommendations for local & state governments

Local and state governments need to take action to protect the health and safety of the communities they serve:

States and local governments should work closely with the EPA to ensure people are aware of the Superfund sites in their communities, especially if any sites are at risk of being impacted by a severe weather event, or may have been impacted.

States and local governments have a responsibility to raise public awareness about the threats of toxic waste sites by utilizing state and local government resources.

Recommendations for individuals

Individuals need to take action to protect their own health and safety:

Individuals should find out if they live near a Superfund toxic waste site.

One in five Americans lives within just three miles of a Superfund site,²⁴⁰ and many likely don’t know it. The chemicals at Superfund toxic waste sites can increase the risk of cancer, respiratory and heart problems, and other serious illnesses. The EPA may issue warnings to not swim or fish in areas near a Superfund toxic waste site due to possible contamination, and individuals should adhere to all warnings.

Find out if you live near a Superfund toxic waste site here:

<https://www.epa.gov/superfund/sear ch-superfund-sites-where-you-live>

Individuals should heed all warnings from the EPA and their state and local government and take precautions to protect themselves in the event of a tropical storm or any related severe weather in their area, especially if it may impact nearby toxic waste sites.

I APPENDIX A

How Superfund Cleanup Works

The cleanup of a Superfund site often takes more than a decade. Initially, a Superfund site assessment is done to see whether the site needs short-term, long-term, or no cleanup, once it has been identified. Short-term cleanup involves the removal of contaminants that pose a present danger to human health. Removal actions might include removing hazardous substances from a site, fencing the area to limit human access, providing an alternative water supply to local residents, or relocating residents.²⁴¹ Following the removal action, remediation begins, in which a long-term remedy is designed and then implemented. The remediation design and implementation have an impact on whether or not a site can withstand storm winds and flooding without spreading contamination. Construction completion is the final step before NPL site deletion and means that the physical work of cleanup is done.²⁴² Once construction is complete, contaminants may still remain on site, as the remedy continues to operate. For example, it may take years for the level of contaminants in groundwater to reach clean-up levels once treatment begins.

Superfund Cleanup Process

The cleanup of a Superfund site can take a decade or more.²⁴³ Anyone -- citizens, state agencies, and EPA regional offices -- can bring the EPA's attention to a site.²⁴⁴ Next, the EPA conducts a preliminary assessment and site inspection to evaluate the threat level of the site.²⁴⁵ During the preliminary assessment, the EPA investigates any available background information on the site, and if it continues to warrant further investigation, the EPA will do a site inspection to test the water, soil, and air for contamination.^{246,247} The sites that pose the most danger to human health are placed on the National Priorities List.²⁴⁸

During the preliminary assessment and site inspection, the EPA also determines what type of clean-up action is necessary at the site or if no cleanup is necessary. The two types of cleanup at a Superfund toxic waste site are removal and remedial action.²⁴⁹ Removal actions are usually short-term clean-up actions which involve the removal of contaminants that pose a present danger to human health.²⁵⁰ Removal actions might include removing hazardous substances from a site, fencing the area to limit human access, providing an alternative water supply to local residents, or relocating residents.²⁵¹ Remedial actions are typically long-term clean-up actions aimed at permanently and significantly reducing contamination. The most hazardous sites that require long-term clean-up action are referred to the National Priorities List.²⁵² The first step for a site on the National Priorities List is to conduct a remedial investigation and feasibility study, which evaluates the type and extent of contamination, cost of cleanup, and technologies that may be used. All information collected about the site is then used to inform the Record of Decision (ROD).²⁵³ The Record of Decision describes the history and characteristics of the site, details of the type and extent of the contamination, and the plan for cleaning it up.²⁵⁴

Following the Record of Decision, the design of the cleanup and implementing the clean-up plan occur in the Remedial Design and Remedial Action stage.²⁵⁵ Once the physical work to complete the clean-up plan is complete, the site reaches the Construction Completed milestone.²⁵⁶ Once construction is complete, however, contaminants may still remain on-site, as the remedy continues to operate. For example, it may take many years after a groundwater treatment begins for all the contaminated groundwater to be treated, even though the construction of the treatment operation is complete. Alternatively, the construction plan may need to be revised based on later investigations of the extent of the contamination and effectiveness of the remediation plan. Once construction is complete, additional monitoring may continue during the Post-Construction Completion phase in order to ensure that the remedy selected continues to be effective.²⁵⁷ The final step is NPL Deletion, which occurs when the EPA is certain that all clean-up actions are complete and all clean-up goals have been achieved.²⁵⁸

I APPENDIX B

FIGURE 17. SUPERFUND SITES IN AREAS AFFECTED BY TROPICAL STORMS & HURRICANES DURING THE 2020 ATLANTIC HURRICANE SEASON – BY STORM

Storm	Both				Wind Swath Only				Weather Warning Only				Total			
	Proposed	Listed	Deleted	Total	Proposed	Listed	Deleted	Total	Proposed	Listed	Deleted	Total	Proposed	Listed	Deleted	Total
Tropical Storm Bertha	0	0	0	0	0	0	0	0	0	24	15	39	0	24	15	39
Tropical Storm Cristobal	0	8	5	13	2	20	10	32	0	7	7	14	2	35	22	59
Tropical Storm Fay	2	120	48	170	1	10	4	15	0	26	3	29	3	156	55	214
Hurricane Hanna	0	3	0	3	0	0	0	0	0	0	0	0	0	3	0	3
Hurricane Isaias	5	214	68	287	3	180	49	232	0	13	1	14	8	407	118	533
Hurricane Laura	2	8	10	20	1	28	15	44	0	6	6	12	3	42	31	76
Hurricane Sally	0	23	17	40	0	2	0	2	1	39	14	54	1	64	31	96
Tropical Storm Beta	0	20	5	25	0	0	2	2	1	14	6	21	1	34	13	48
Hurricane Delta	2	6	5	13	0	16	13	29	0	7	4	11	2	29	22	53
Hurricane Zeta	1	25	7	33	5	332	103	440	0	3	0	3	6	360	110	476
Hurricane Eta	1	34	23	58	1	9	0	10	0	1	0	1	2	44	23	69

FIGURE 18. SUPERFUND SITES IN AREAS AFFECTED BY TROPICAL STORMS & HURRICANES DURING THE 2020 ATLANTIC HURRICANE SEASON – BY STATE*

State	Proposed	Listed	Deleted	Total
Alabama	1	10	3	14
Arkansas	0	6	7	13
Connecticut	0	13	4	17
Delaware	1	16	7	24
District of Columbia	0	1	0	1
Florida	1	50	27	78
Georgia	1	15	5	21
Iowa	0	0	2	2
Kentucky	0	1	0	1
Louisiana	3	13	12	28
Maine	0	4	1	5
Maryland	1	17	4	22
Massachusetts	1	26	7	34
Michigan	0	0	1	1
Mississippi	0	6	4	10
Missouri	0	5	1	6
New Hampshire	1	20	1	22
New Jersey	2	114	35	151
New York	0	52	18	70
North Carolina	0	38	4	42
Pennsylvania	2	64	25	91
Puerto Rico	0	18	7	25
Rhode Island	0	12	1	13
South Carolina	0	23	5	28
Texas	0	28	7	35
Vermont	0	11	2	13
U.S. Virgin Islands	0	1	1	2
Virginia	0	25	2	27
Wisconsin	1	10	3	14
Totals	15	599	196	810

*Only those states that had at least one site in the path of a storm during the 2020 Atlantic hurricane season are included in the table.

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