



September 2021

U.S. POSTAL SERVICE

Better Use of Climate Data Could Enhance the Climate Resilience of Postal Facilities

Accessible Version

GAO Highlights

Highlights of [GAO-21-104152](#), a report to congressional requesters

Why GAO Did This Study

USPS has one of the largest asset portfolios in the United States. Its post offices and other facilities are essential to the processing and delivery of mail, which millions of Americans rely on for communication and commerce. Weather-related natural disasters resulting from extreme weather events, such as hurricanes, can damage USPS's facilities and present financial and operational risks. According to a recent study, some extreme weather events are projected to become more frequent and intense due to climate change. Investing in climate resilience—taking actions to reduce potential damage by planning for extreme weather events—can help to manage climate change risks.

GAO was asked to review the climate resilience of USPS's facilities. This report addresses: (1) how USPS's facilities have been affected by recent weather-related natural disasters; (2) the extent to which USPS's facilities may be affected by climate change effects; and (3) the extent to which USPS has taken steps to incorporate climate resilience into its facilities.

GAO analyzed USPS facilities' data and financial data as well as federal climate data; reviewed prior GAO work on climate resilience, the *Fourth National Climate Assessment*, USPS policies and facility inspection reports; and interviewed USPS officials.

What GAO Recommends

GAO recommends that USPS assess climate data in the preliminary steps of its facility investment process. USPS generally concurred with GAO's findings and agreed to evaluate its options for assessing climate data in its facility investment process.

View [GAO-21-104152](#). For more information, contact Jill Naamane at (202) 512-2834 or NaamaneJ@gao.gov.

September 2021

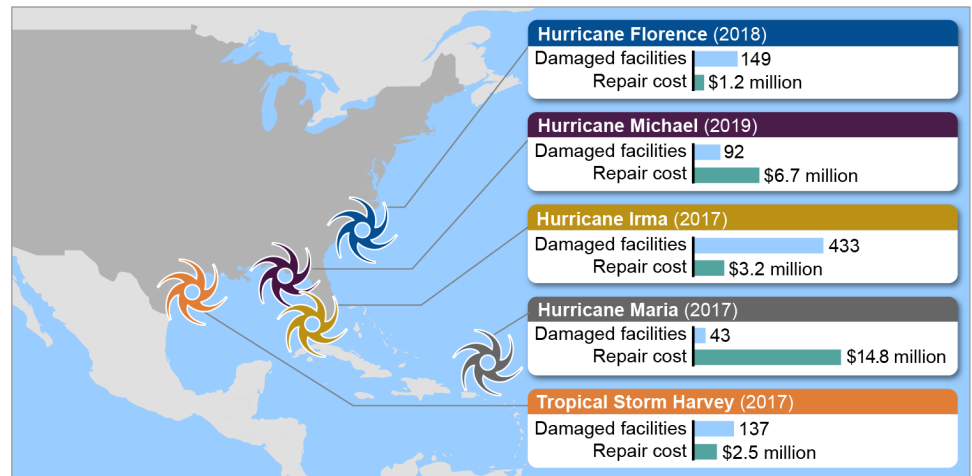
U.S. POSTAL SERVICE

Better Use of Climate Data Could Enhance the Climate Resilience of Postal Facilities

What GAO Found

GAO's analysis of the United States Postal Service's (USPS) data found that about 1,065 USPS facilities—about 3 percent of USPS's over 32,000 facilities—sustained damage from 21 weather-related natural disasters from fiscal years 2015 through 2019. The damage, from floods, hurricanes, winter storms and other disasters, cost USPS over \$30 million and ranged from broken flag poles to collapsed sections of buildings. USPS officials noted that any amount paid to repair damage is a challenge given USPS's poor financial condition.

Impact of Most Costly Weather-Related Natural Disasters on the U.S. Postal Service's Facilities, Fiscal Years 2015–2019



Source: GAO analysis of U.S. Postal Service electronic Facility Management System data; Map Resources (map). | GAO-21-104152

Accessible Data for Impact of Most Costly Weather-Related Natural Disasters on the U.S. Postal Service's Facilities, Fiscal Years 2015–2019

Event	Damaged facilities	Repair cost (in millions of dollars)
Hurricane Florence (2018)	149	1.2
Hurricane Michael (2019)	92	6.7
Hurricane Irma (2017)	433	3.2
Hurricane Maria (2017)	43	14.8
Tropical Storm Harvey (2017)	137	2.5

GAO's analysis of USPS and federal climate data found that about one-third (just over 10,000) of USPS's facilities are in areas that may be affected by one or more potential climate change effects including flooding, storm surge, sea level rise, and wildfires. Most of the facilities at risk are post offices, but about one-third of USPS's mail processing and distribution facilities, which are crucial to USPS's ability to process and deliver mail, are also at risk.

USPS has taken steps to incorporate climate resilience into its facilities, but its practices are not consistent with its policy to assess climate risk early in its investment process. Several factors can affect USPS's efforts to incorporate climate resilience into its facilities, including competing priorities for limited financial resources and a universal service mission that necessitates having facilities in all parts of the country—even in areas at heightened risk from climate change. Nevertheless, USPS has taken steps to incorporate climate resilience, such as adding resilience requirements to its facility guidance and developing a mapping tool to analyze climate data in its facility investment process. However, USPS currently uses these data at the end of the process, rather than in the preliminary planning steps, as specified in USPS policy. Using the data earlier could help USPS enhance the resilience of its facilities to climate change and ensure that Americans continue to have access to mail that they depend upon.

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Abbreviations

eFMS	electronic Facilities Management System
FDB	Facilities Database
FEMA	Federal Emergency Management Agency
NOAA	National Oceanic and Atmospheric Administration
SFHA	Special Flood Hazard Area
USGCRP	U.S. Global Change Research Program
USPS	U.S. Postal Service
WHP	wildfire hazard potential

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September 30, 2021

Congressional Requesters

The U.S. Postal Service (USPS) has one of the largest asset portfolios in the United States, including over 9,000 owned and 23,000 leased facilities. These facilities are widely dispersed across the country to support USPS's universal service mission.¹ They include post offices and other facilities central to the processing and delivery of mail to millions of Americans. Natural disasters resulting from extreme weather events, such as flooding and hurricanes, can expose these facilities to damage or destruction and present risks to USPS's ability to effectively fulfill its mission. Weather-related natural disasters can also result in additional financial burdens for USPS. According to the National Oceanic and Atmospheric Administration (NOAA), the United States experienced 22 weather-related natural disasters costing more than \$1 billion in damage in 2020—the most on record.² The U.S. Global Change Research Program (USGCRP)—a federal program responsible for coordinating climate change research—projects that disaster costs will likely increase as certain extreme weather events become more frequent and intense due to climate change.³

The cost of weather-related disasters has illustrated the need to plan for climate change risks and consequences and to invest in climate

¹USPS's universal service obligation is governed by several statutory provisions, including the requirement to provide a maximum degree of effective and regular postal services to rural areas, communities, and small towns where post offices are not self-sustaining. See 39 U.S.C. § 101.

²NOAA, National Centers for Environmental Information, *U.S. Billion-Dollar Weather and Climate Disasters: Overview*, accessed July 23, 2021, <https://www.ncdc.noaa.gov/billions/>.

³USGCRP, *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment*, Vol. II (Washington, D.C.: 2018). USGCRP coordinates and integrates global change research across 13 federal agencies. The Global Change Research Act of 1990 requires that a scientific assessment analyzing the effects of global change on the natural environment, agriculture, and energy production and use be provided to the President and Congress not less frequently than every 4 years. USGCRP prepares this National Climate Assessment, the most recent of which was released in 2018.

resilience.⁴ Investing in climate resilience can reduce the need for far more costly steps in the decades to come. In 2013, we added “Limiting the Federal Government’s Fiscal Exposure by Better Managing Climate Change Risks” as an area on our High Risk List—a list of federal programs and operations at risk of fraud, waste, abuse, and mismanagement or that need transformation to address economy, efficiency, or effectiveness challenges.⁵

USPS’s financial viability has been on our High Risk List since 2009 due to USPS’s poor financial condition, which has worsened in recent years due to declining mail volumes and rising costs. With its poor financial condition, and an expectation that USPS cover its costs primarily through its own revenues, the projected increase in extreme weather events from climate change makes climate resilience an important concern for USPS. You asked us to review issues related to the climate resilience of USPS’s facilities. This report addresses: (1) how USPS’s facilities have been affected by recent weather-related natural disasters; (2) the extent to which USPS’s facilities are in areas that may be affected by selected climate change effects; and (3) the extent to which USPS has taken steps to incorporate climate resilience into its facilities.

To determine how USPS’s facilities have been affected by recent weather-related natural disasters, we analyzed disasters resulting from extreme weather events in USPS’s electronic Facilities Management

⁴The National Academies defines resilience as the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events. We reported in May 2016 that two related sets of actions could enhance climate resilience by reducing risk. These are climate change adaptation and pre-disaster hazard mitigation. In general, climate change professionals use the term “adaptation”, and the emergency management community employs “pre-disaster hazard mitigation”, often to speak about the same thing: becoming better prepared for climate change impacts. Adaptation is defined as adjustments to natural or human systems in response to actual or expected climate change. Pre-disaster hazard mitigation refers to actions taken to reduce the loss of life and property by lessening the impacts of adverse events. It applies to all hazards, including natural hazards such as weather-related disasters. In this report, we use the term “climate resilience” for consistency and to encompass both sets of actions as they relate to addressing climate risks. See GAO, *Climate Change: Selected Governments Have Approached Adaptation through Laws and Long-Term Plans*, [GAO-16-454](#) (Washington, D.C.: May 12, 2016). The National Academies, Committee on Increasing National Resilience to Hazards and Disasters and Committee on Science, Engineering, and Public Policy, *Disaster Resilience: A National Imperative* (Washington, D.C.: 2012).

⁵GAO, *High-Risk Series: An Update*, [GAO-13-283](#) (Washington, D.C.: February 2013).

System (eFMS) data from fiscal years 2015 through 2019.⁶ We limited our scope to fiscal years 2015 through 2019 because USPS did not record data on disasters prior to January 2015 and excluded fiscal year 2020 disasters due to the lag in the completion and reporting of repair costs. We assessed the reliability of the eFMS by reviewing documentation, interviewing USPS officials, and testing the data for missing values, outliers, and obvious errors, and determined that the data were sufficiently reliable for our purpose of describing how USPS's facilities have been affected by recent weather-related natural disasters. We also selected a non-generalizable sample of four USPS facilities that experienced significant damage from weather-related natural disasters to provide illustrative examples. We selected these facilities from fiscal years 2015 through 2019 eFMS data using criteria such as the highest repair costs; facilities that sustained damage from multiple disasters; diversity in type of damage to facilities; variety in types and ownership of facilities; and geographic dispersion. We also obtained and summarized USPS documents, including Facility Assessment and Post-Cleanup Renovation Inspection reports, and interviewed USPS officials to provide insight on how the selected facilities were affected by the disasters.

To determine the extent to which USPS's facilities are in areas that may be affected by selected climate change effects, we first identified potential climate change effects and determined which of these effects may affect USPS's facilities by reviewing USPS's 2014 *Climate Change Adaptation Plan*, the *Fourth National Climate Assessment*, and our prior work.⁷ For these potential effects, we identified national-level federal data sets from the Federal Emergency Management Agency (FEMA), NOAA, and the U.S. Forest Service on flooding, storm surge and sea level rise, and wildfires, respectively. We obtained data from USPS's Facilities Database (FDB), which includes location and other data on all of USPS's facilities. We analyzed these data to identify USPS facilities located in areas that

⁶The eFMS is the official USPS management system for administering all property-related projects, including repairs. The eFMS utilizes an emergency finance code to record repair requests and tracks them from start to finish. The system also records repair costs paid for each event.

⁷USPS, *United States Postal Service Climate Change Adaptation Plan* (Washington, D.C.: June 2014); Global Change Research Program, *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment*, vol. 2 (Washington, D.C.: 2018); and GAO, *Superfund: EPA Should Take Additional Actions to Manage Risks from Climate Change*, [GAO-20-73](#), (Washington D.C.: Oct. 18, 2019).

may be affected by the selected climate change effects.⁸ To do so, we determined whether there are areas that may be affected by flooding, storm surge, sea level rise, and wildfires that overlap with the longitude and latitude of each USPS facility in the FDB.⁹ We reviewed documentation on these data and interviewed relevant officials to assess the timeliness, accuracy, and limitations of these data. We also reviewed our past reports that cited these data and determined the data were sufficiently reliable for our purpose of describing the extent to which USPS's facilities are in areas that may be affected by selected climate change effects.¹⁰ A detailed description of our scope and methodology is in appendix I.

To evaluate USPS's steps to incorporate climate resilience into its facilities, we reviewed USPS documents, including guidance (e.g., *Handbook AS-503 – Standard Design Criteria*) and policies (e.g., *Handbook F-66 General Investment Policies and Procedures*), and interviewed USPS officials. We also reviewed our prior related work that discusses factors relevant to USPS's facilities practices.¹¹ Given the focus of our review on climate resilience, we considered USPS's actions in the context of our prior related work, including our October 2019 report that established a *Disaster Resilience Framework*.¹²

⁸We analyzed a range of the potential climate change effects. For example, we used the maximum extent of storm surge from Category 1 hurricanes (the lowest category) as well as Category 4 or 5 hurricanes (the highest categories), as modeled by NOAA.

⁹FEMA's National Flood Hazard Layer includes information on coastal and riverine flooding that is related to or caused by a river, stream, or tributary overflowing its banks because of excessive rainfall, snowmelt, or ice. According to NOAA, "storm surge" is an abnormal rise of water generated by a storm, over and above the predicted tides, produced by water being pushed toward the shore by the force of the winds; and "sea level rise" refers to the extent of inundations from various heights of sea level rise.

¹⁰[GAO-20-73](#) and GAO, *U.S. Postal Service: Expanding Nonpostal Products and Services at Retail Facilities Could Result in Benefits, but May Have Limited Viability*, [GAO-20-354](#) (Washington, D.C.: Mar. 10, 2020).

¹¹GAO, *U.S. Postal Service: Congressional Action Is Essential to Enable a Sustainable Business Model*, [GAO-20-385](#) (Washington, D.C.: May 7, 2020).

¹²See GAO, *Federal Real Property Asset Management: Agencies Could Benefit from Additional Information on Leading Practices*, [GAO-19-57](#) (Washington D.C.: Nov. 5, 2018) and *Disaster Resilience Framework: Principles for Analyzing Federal Efforts to Facilitate and Promote Resilience to Natural Disasters*, [GAO-20-100SP](#) (Washington, D.C.: Oct. 23, 2019).

We conducted this performance audit from March 2020 to September 2021 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

USPS's Mission and Facilities

USPS plays a critical role in the nation's communication and commerce—collecting, transporting, and delivering billions of letters, bills, ballots, magazines, packages, and other types of mail to about 161 million addresses nationwide. USPS's mission requires it to have numerous facilities, many of which it must maintain and repair at its own cost. Federal law requires USPS to provide 6-days-a-week delivery and a maximum degree of effective and regular postal services to rural areas, communities, and small towns where post offices are not self-sustaining.¹³ Federal law also limits USPS's ability to close retail facilities. For example, USPS cannot close a small post office solely because it is unprofitable.¹⁴

As of November 2020, USPS's assets included 32,090 owned or leased facilities (see fig. 1). These facilities range in size from just under 70 square feet to more than 30 acres. USPS maintained a headquarters and field office structure that included seven areas and 67 districts.¹⁵ USPS is responsible for maintenance and repair of its owned facilities, whereas specific maintenance and repair responsibilities for leased facilities vary from lease to lease and are subject to change when a lease is

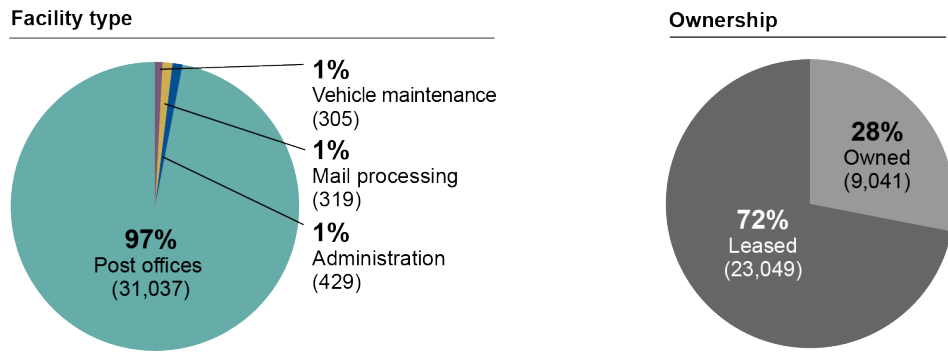
¹³See Consolidated Appropriations Act, 2021, Pub. L. No. 116-260, div. E, tit. V, 134 Stat. 1182, 1423 (2020); 39 U.S.C. § 403(b)(3) and 39 U.S.C. § 101(b).

¹⁴39 U.S.C. § 101(b).

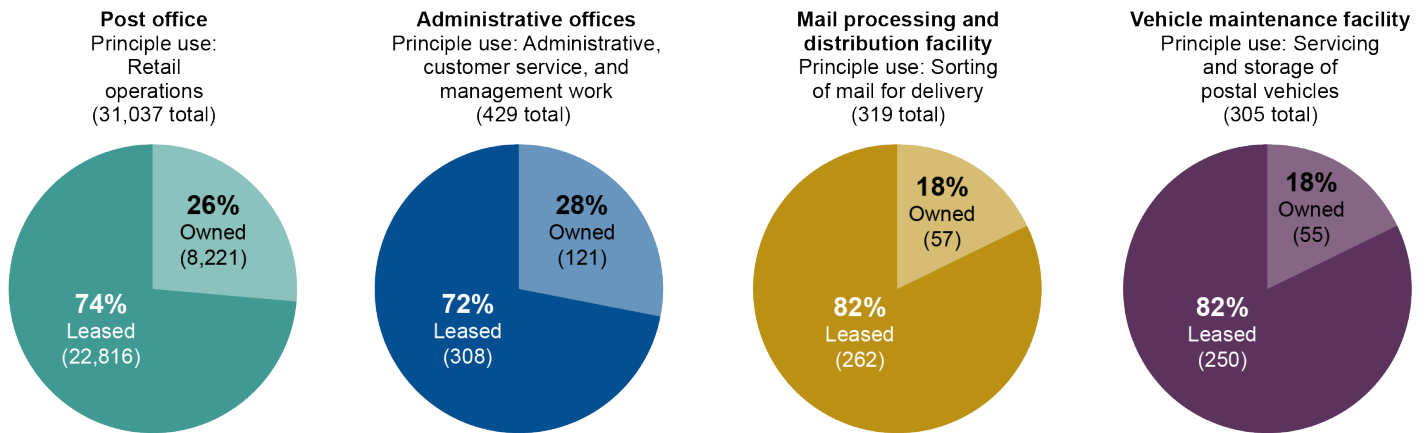
¹⁵In January 2021, USPS consolidated its seven areas to four.

renegotiated.¹⁶ For the purposes of our report, we discuss the effects of weather-related natural disasters based on USPS's seven areas, as of November 2020 (see fig.2).

Figure 1: U.S. Postal Service (USPS) Facilities, by Type of Facility, as of November 2020



Ownership by facility type



Sources: GAO analysis of U.S. Postal Service data and Map Resources. | GAO-21-104152

¹⁶A 2020 report issued by the USPS Office of Inspector General Report found that most USPS leases are renewed every 5 years and include a provision that establishes repair responsibilities between USPS and the lessor. According to this provision, if the lessor does not complete the work within the time specified, USPS has the right to perform the work and recover the cost. USPS can withhold the cost, including administrative costs and interest, from rental payments due under the lease or the landlord can repay the amount. See USPS, Office of Inspector General, *Leased Facility Maintenance*, Report Number 19SMG012SM000-R20 (Arlington, VA; May 28, 2020).

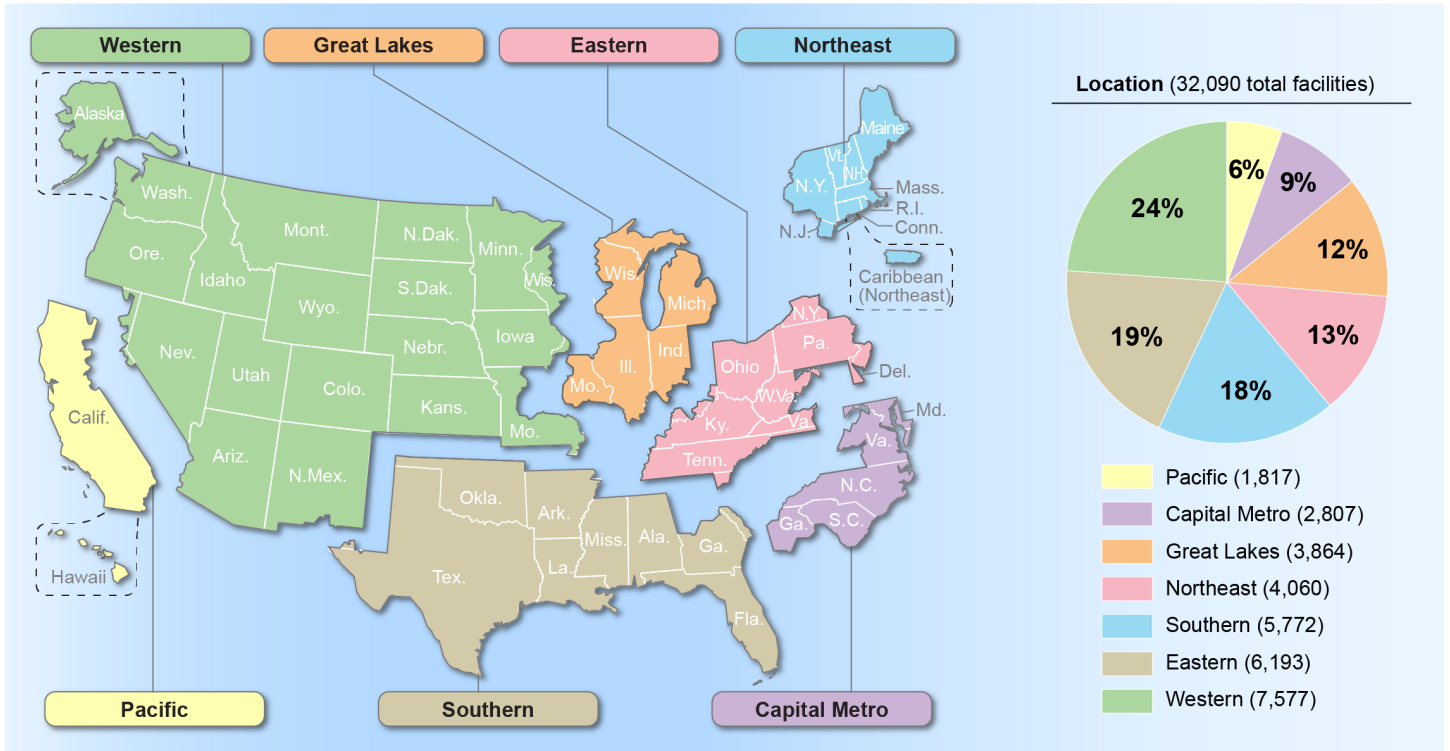
Accessible Data for Figure 1: U.S. Postal Service (USPS) Facilities, by Type of Facility, as of November 2020

Facility type	Number	Percentage
Post offices	31037	97
Administration	429	1
Mail processing	319	1
Vehicle maintenance	305	1

Letter

Facility type	Owned	Owned (percentage)	Leased	Leased (Percentage)
Post offices	8221	26	22816	74
Administration	121	28	308	72
Mail processing	57	18	262	82
Vehicle maintenance	55	18	250	82
All facilities	9041	28	23049	72

Figure 2: U.S. Postal Service (USPS) Facilities, by USPS Area, as of November 2020



Sources: GAO analysis of U.S. Postal Service data and Map Resources. | GAO-21-104152

Accessible Data for Figure 2: U.S. Postal Service (USPS) Facilities, by USPS Area, as of November 2020

Region	Pacific	Capital Metro	Great Lakes	Northeast	Southern	Eastern	Western
Number	1817	2807	3864	4060	5772	6193	7577
Percentage	6	9	12	13	18	19	24

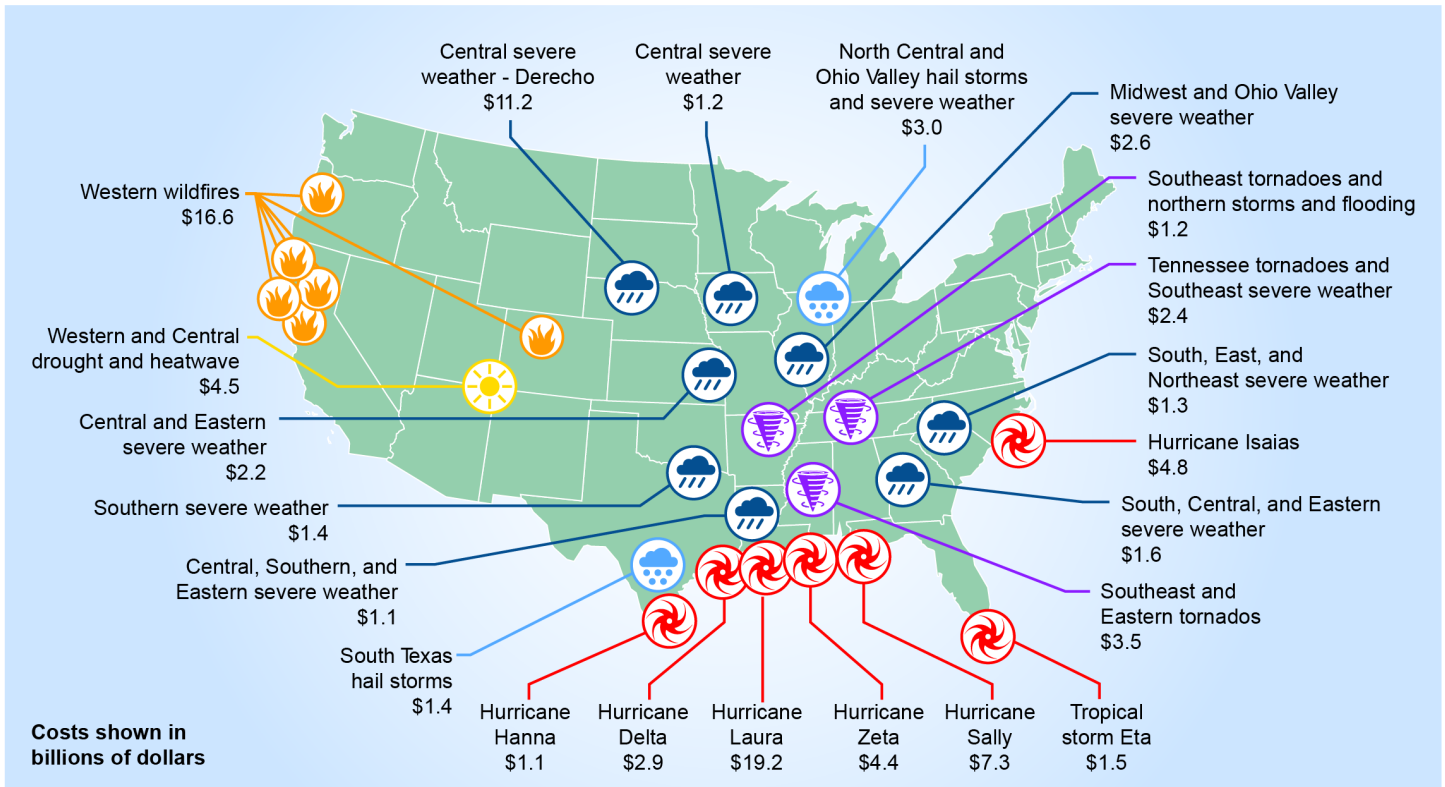
Note: This analysis is based on USPS Facilities Database as of November 2020. The Caribbean District located in the Caribbean Sea, which includes Puerto Rico and the U.S. Virgin Islands, is part of the Northeast Area. In January 2021, USPS consolidated its seven areas to four. Percentages may not total 100 due to rounding

Weather-Related Natural Disasters and Climate Change

Weather-related natural disasters can cause significant damage to infrastructure and communities, and USPS can be affected by these disasters because of its nationwide presence. According to NOAA, 2020 was the sixth consecutive year in which the U.S. experienced 10 or more weather-related natural disasters each costing more than \$1 billion in overall damages (i.e., the costs in terms of dollars that would not have been incurred had the event not taken place).¹⁷ More specifically, in 2020, the United States experienced 22 such natural disasters in various parts of the country, costing about \$96 billion in damages (see fig. 3).

¹⁷NOAA, National Centers for Environmental Information, *U.S. Billion-Dollar Weather and Climate Disasters* (2021). <https://www.ncdc.noaa.gov/billions/>, DOI: 10.25921/stkw-7w73 and A.B. Smith, R.W. Katz, "US billion-dollar weather and climate disasters: data sources, trends, accuracy and biases," *Nat Hazards* 67, 387–410 (2013). <https://doi.org/10.1007/s11069-013-0566-5>.

Figure 3: Weather-Related Natural Disasters in the United States in 2020 Costing More Than One Billion Dollars in Damages (Dollars in Billions)



Source: National Oceanic and Atmospheric Administration's National Centers for Environmental Information. | GAO-21-104152

Note: The National Centers for Environmental Information used data from a variety of public and private sources, such as the National Weather Service or Federal Emergency Management Agency, to estimate the total costs of these events (i.e., the costs in terms of dollars that would not have been incurred had the event not taken place). Insured and uninsured losses are included in cost estimates. The estimates do not take into account losses to natural capital or assets, health care-related losses, or values associated with loss of life.

According to the *Fourth National Climate Assessment*, climate change is altering the characteristics of many extreme weather events. Some of these events have already become more frequent, intense, widespread, or longer in duration, and many are expected to continue to worsen. In the United States, for example, high temperature extremes, heavy precipitation events, high-tide flooding events along the coastline, ocean acidification and warming, and forest fires in the western United States and Alaska have been and are all projected to continue increasing. In contrast, land and sea ice cover, snowpack, and surface soil moisture have been and are expected to continue declining in the coming decades. In August 2021, the United Nation's Intergovernmental Panel on Climate Change reported that climate change is affecting all regions of the world,

with extremes ranging from heatwaves to heavy precipitation.¹⁸ The *Fourth National Climate Assessment* has reported that potential climate change effects include increased flooding, storm surge, sea level rise, and wildfires.¹⁹

The *Fourth National Climate Assessment* states that without significant reductions in global greenhouse gas emissions and regional efforts to pursue climate resilience, climate change is expected to cause substantial losses to infrastructure and property and impede the rate of economic growth over this century. The potential for losses in some economic sectors could reach hundreds of billions of dollars per year by the end of this century, according to the *Assessment*. Future climate risks are subject to several sources of uncertainty. According to the *Assessment*, the largest uncertainty in projecting future climate conditions is the level of greenhouse gas emissions going forward. Future global greenhouse gas emissions levels and resulting impacts depend on economic, political, and demographic factors can be difficult to predict with confidence far into the future.

Climate Resilience and GAO's Disaster Resilience Framework

According to the *Fourth National Climate Assessment*, enhancing climate resilience entails a continuing risk management process through which individuals and organizations become aware of and assess risks and vulnerabilities from climate and other drivers of change, take actions to reduce those risks, and learn over time. A 2018 study by the National Institute of Building Sciences concluded that disaster resilience investments could save from \$3 to \$11 per dollar invested, depending on the circumstances and type of hazard.²⁰ As we have previously reported, enhancing climate resilience can add costs upfront, but can also reduce

¹⁸Intergovernmental Panel on Climate Change, "Summary for Policymakers," in *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (2021)*.

¹⁹USGCRP, *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Vol. II* (Washington, D.C.: 2018).

²⁰Multihazard Mitigation Council, a council of the National Institute of Building Sciences, *Natural Hazard Mitigation Saves: 2018 Interim Report (Washington, D.C.: December 2018)*.

potential future costs incurred because of damage from climate-related events.²¹

In October 2019, we issued the *Disaster Resilience Framework* to serve as a guide for federal actions to facilitate and promote resilience to climate-related and other natural disasters.²² The framework is organized around three principles—information, integration, and incentives—that can help identify opportunities to enhance federal efforts to promote disaster resilience. For example, the information principle states that using natural disaster risk information that is accurate and comprehensive can help decision makers better assess their risks.

Federal Data on Selected Climate Change Effects

Various federal agencies provide nationwide data on the climate change effects. For flooding, FEMA provides flood hazard and risk information to communities nationwide. Among other information, FEMA provides data on coastal and riverine flooding in its National Flood Hazard Layer map.²³ For storm surge, NOAA maintains storm surge hazard maps developed by using the Sea, Lake, and Overland Surges from Hurricanes model, which simulates storm surge from a representative sample of hypothetical tropical cyclones.²⁴ For sea level rise, NOAA models the extent of inundations from various heights of sea level rise for the contiguous United States, Hawaii, the Pacific islands, Puerto Rico, and the U.S. Virgin Islands and provides the results in a web-mapping tool called the Sea Level Rise Viewer.²⁵ For wildfire, the U.S. Forest Service has a wildfire hazard potential map based on landscape conditions and other

²¹GAO, *High-Risk Series: Progress on Many High-Risk Areas, While Substantial Efforts Needed on Others*, [GAO-17-317](#) (Washington, D.C.: Feb. 15, 2017).

²²[GAO-20-100SP](#).

²³Riverine flooding is flooding related to or caused by a river, stream, or tributary overflowing its banks because of excessive rainfall, snowmelt, or ice.

²⁴According to a NOAA document, storm surge is an abnormal rise of water generated by a storm, over and above the predicted tides. Storm surge is produced by water being pushed toward the shore by the force of the winds.

²⁵According to NOAA, inundation is water covering normally dry land, and sea level rise inundation illustrates the scale of potential flooding.

observations.²⁶ Appendix II provides further details on available federal climate data used in this report.

Recent Weather-Related Natural Disasters Have Damaged About 1,000 USPS Facilities and Cost USPS Over \$30 Million in Repairs

About Three Percent of USPS's Facilities Were Damaged by Flooding, Hurricanes, and Other Disasters from Fiscal Years 2015–2019

Our analysis of USPS data found that 1,065 USPS facilities—about 3 percent of USPS's total facility portfolio—sustained damage from 21 weather-related natural disasters from fiscal years 2015 through 2019.²⁷ These disasters included flooding, hurricanes, tropical storms, and winter storms.²⁸ Damaged facilities were located in all seven of USPS's geographic service areas, but over half (56 percent) were located in USPS's former Southern Area (see fig. 4).²⁹ Appendix III provides further details on the impact of these events on USPS's facilities.

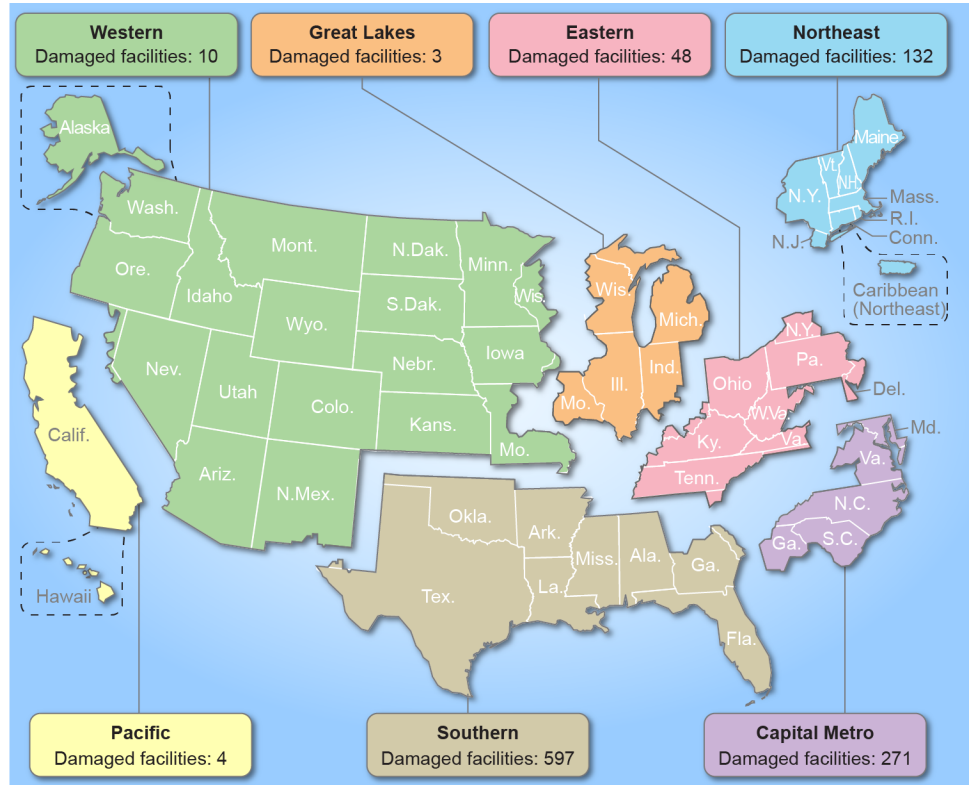
²⁶According to the U.S. Forest Service, the objective of the wildfire hazard potential map is to depict the relative potential for wildfire that would be difficult for suppression resources to contain.

²⁷This represents the number of unique facilities that sustained damage from the disasters.

²⁸According to USPS's data, from fiscal years 2015 through 2019, there were 21 events that affected USPS's facilities, including: 9 hurricanes (Dorian, Florence, Hermine, Irma, Lane, Maria, Matthew, Michael, and Nate); 4 flooding events in various areas (Appalachian District, Louisiana District, Mid-West, and Texas); 5 tropical storms (Barry, Cindy, Gordon, Harvey, and Imelda); and 3 winter storms (Jonas, Juno, and Ulmer).

²⁹This analysis is based on USPS eFMS data from fiscal years 2015–2019 with seven USPS areas. In January 2021, USPS consolidated its seven areas to four.

Figure 4: Number of the U.S. Postal Service's (USPS) Facilities Damaged by Weather-Related Natural Disasters, by USPS Area, Fiscal Years 2015 through 2019



Sources: GAO analysis of U.S. Postal Service data and Map Resources. | GAO-21-104152

Accessible Data for Figure 4: Number of the U.S. Postal Service’s (USPS) Facilities Damaged by Weather-Related Natural Disasters, by USPS Area, Fiscal Years 2015 through 2019

Region	Pacific	Capital Metro	Great Lakes	Northeast	Southern	Eastern	Western
Damaged facilities	4	271	3	132	597	48	10

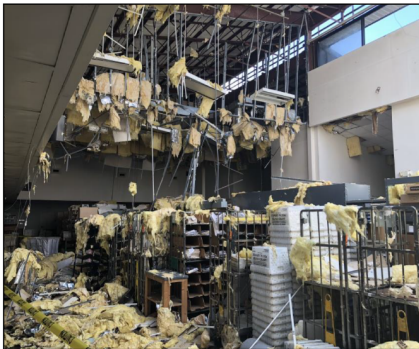
Note: This analysis is based on USPS electronic Facilities Management System data from fiscal years 2015–2019 when USPS had seven geographic service areas. The Caribbean District located in the Caribbean Sea, which includes Puerto Rico and the U.S. Virgin Islands, is part of the former Northeast Area. In January 2021, USPS consolidated its seven areas to four.

These 21 disasters caused damage to USPS’s facilities ranging from broken flagpoles and damaged ceilings to collapsed sections of buildings. The most common damage was to roofs, heating, ventilation, and air-conditioning units. For example, the Main Post Office in Rockport, Texas, sustained damage from Tropical Storm Harvey in August 2017, resulting in broken doors and windows, structural and roof damage, and water intrusion from a hole in the roof where the rooftop heating, ventilation, and air conditioning unit was once positioned. Additionally, damage led to mold in many facilities and required environmental remediation, such as to USPS’s Mail Processing and Distribution Facility in Panama City, Florida, in October 2018 following Hurricane Michael. This facility had water intrusion and mold hazards when the air-conditioning unit on the roof shifted approximately 35 feet from its location. Figure 5 shows examples of damage to USPS’s facilities from these disasters.

Figure 5: Examples of Damage to USPS's Facilities from Weather-related Natural Disasters, Fiscal Years 2015-2019



Damaged ceilings at Charlotte Amalie Veterans Annex, St. Thomas, U.S. Virgin Islands



Damaged ceilings at Lynn Haven Main Post Office, Lynn Haven, Florida



Mold on chair at Bear Creek Vehicle Maintenance Facility, Houston, Texas



Damaged doors and windows at Rockport Main Post Office, Rockport, Texas.



Collapsed ceiling and insulation debris at Panama City-Northside Station Post Office, Panama City, Florida



Source: U.S. Postal Service. | GAO-21-104152

About 14 percent of the 1,065 facilities sustained damage from multiple disasters, including 141 facilities that sustained damage from 2 disasters and 4 facilities that sustained damage from 3 disasters. For example, the main Post Office in St. Thomas, the U.S. Virgin Islands, and USPS's Mail Processing and Distribution Center and Vehicle Maintenance Facility in San Juan, Puerto Rico, sustained damage from both Hurricane Irma and Hurricane Maria in September 2017.

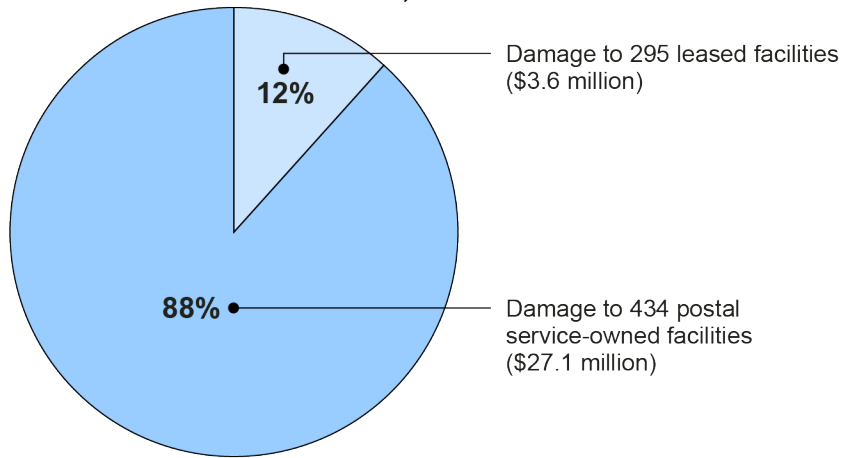
Damage to Facilities Has Cost USPS at Least \$30 Million, and USPS Has Continuity Plans to Minimize Operational Disruptions

The 21 weather-related natural disasters that struck USPS facilities from fiscal years 2015 through 2019 cost USPS at least \$30 million.³⁰ Most of these costs were to repair USPS-owned facilities (see fig. 6). However, in some cases USPS paid to repair damage to leased facilities. For example, Hurricane Irma and Hurricane Maria caused damage to the USPS's leased Mail Processing and Distribution Center and Vehicle Maintenance Facility in San Juan, Puerto Rico, in September 2017. USPS paid about \$280,000 in repair costs for both facilities following these disasters, which, according to USPS officials, covered USPS's share of the repair costs. As previously discussed, USPS is responsible for maintenance and repair of its owned facilities, whereas specific maintenance and repair responsibilities for leased facilities vary from lease to lease and are subject to change when a lease is renegotiated. USPS officials told us that for most of its leased facilities, lessors are responsible for maintenance and repairs.³¹

³⁰This figure understates the total repair costs because it excludes: (a) repair cost from 74 USPS-owned facilities we identified as being damaged between fiscal years 2015 to 2019. According to USPS officials, costs to repair these facilities were recorded in a database that USPS no longer uses and for which it does not have records and (b) 5 USPS-owned facilities that were still being repaired at the time of our review. USPS officials told us that, as of May 2021, 3 out of the 5 projects are completed, totaling an additional \$238,000 in repair costs.

³¹According to our analysis, about 12 percent of all repair costs between fiscal years 2015 and 2019 were for leased facilities. USPS officials told us that USPS does not have data to validate the extent to which its lease agreements include repair costs.

Figure 6: USPS's Known Costs to Repair Owned and Leased Facilities Damaged by Weather-Related Natural Disasters, Fiscal Years 2015-2019



Source: GAO analysis of U.S. Postal Service electronic Facility Management System data. | GAO-21-104152

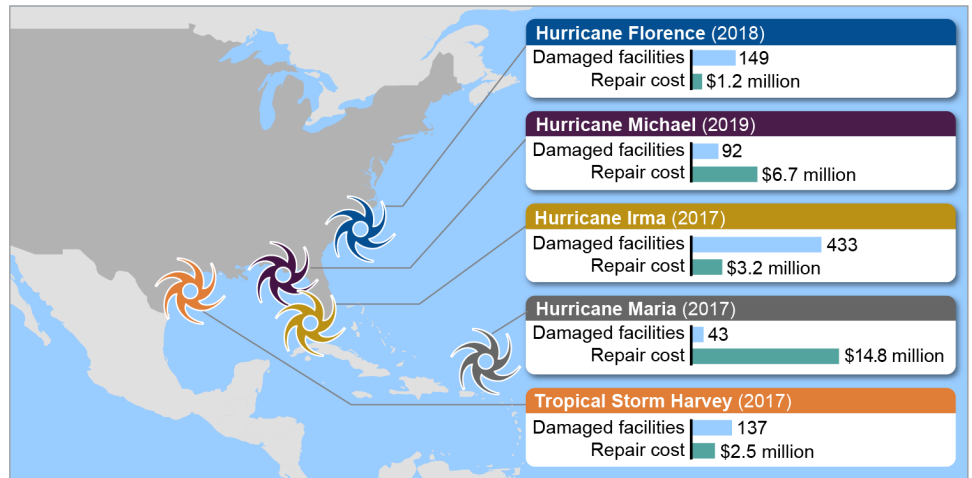
Accessible Data for Figure 6: USPS's Known Costs to Repair Owned and Leased Facilities Damaged by Weather-Related Natural Disasters, Fiscal Years 2015-2019

Number and ownership	Damage to 295 leased facilities	Damage to 434 postal-service owned facilities
Dollars (in millions)	3.6	27.1
Percentage	12	88

Note: This figure understates the total repair costs because it excludes: (a) repair cost from 74 USPS-owned facilities we identified as being damaged between fiscal years 2015 to 2019. According to USPS officials, costs to repair these facilities were recorded in a database that USPS no longer uses and for which it does not have records and (b) 5 USPS-owned facilities that were still being repaired at the time of our review. USPS officials told us that, as of May 2021, 3 out of the 5 projects are completed, totaling an additional \$238,000 in repair costs. Repair costs also excludes cost to replace equipment, retail operation equipment, vehicles, IT hardware and communications equipment damaged from the events.

Five weather-related natural disasters accounted for nearly 95 percent of the total repair costs to USPS between fiscal years 2015 and 2019 (see fig. 7). Hurricane Maria, which made landfall in September 2017, accounted for about half of the total facility repair costs to USPS.

Figure 7: Impact of the Most Costly Weather-Related Natural Disasters on USPS Facilities, Fiscal Years 2015–2019



Source: GAO analysis of U.S. Postal Service electronic Facility Management System data; Map Resources (map). | GAO-21-104152

Accessible Data for Figure 7: Impact of the Most Costly Weather-Related Natural Disasters on USPS Facilities, Fiscal Years 2015–2019

Event	Damaged facilities	Repair cost (in millions of dollars)
Hurricane Florence (2018)	149	1.2
Hurricane Michael (2019)	92	6.7
Hurricane Irma (2017)	433	3.2
Hurricane Maria (2017)	43	14.8
Tropical Storm Harvey (2017)	137	2.5

Note: This figure understates the total repair costs because it excludes: (a) repair cost from 43 USPS-owned facilities we identified as being damaged between fiscal years 2015 and 2019. According to USPS officials, costs to repair these facilities were recorded in a database that USPS no longer uses and for which it does not have records and (b) 5 USPS-owned facilities that were still being repaired at the time of our review. USPS officials told us that, as of May 2021, 3 out of the 5 projects are completed, totaling an additional \$238,000 in repair costs.

While federal agencies have received supplemental appropriations to help cover costs incurred from weather-related natural disasters, USPS has not received such appropriations.³² In addition, USPS, similar to other

³²For example, GSA received an appropriation of \$91.2 million to repair federal buildings and courthouses that suffered damage from Hurricane Florence, and \$127 million to cover damage from Hurricanes Harvey, Maria and Irma. See Pub. L. No. 116-20, 133 Stat. 871, 881 (2019); Pub. L. No. 115-123, 132 Stat. 64, 80 (2018).

federal agencies, follows a policy of self-insurance and, consequently, pays for facility repairs out of its revenues, such as sales of postage stamps. According to USPS officials, any amount paid to repair damaged facilities represents a challenge given USPS's poor financial condition. USPS officials added that while leased facilities can often cost USPS less money to repair, leased facilities are no less important to USPS's operations than owned facilities.

USPS officials added that USPS maintains plans to help ensure the continuity of postal operations in the event of damage or destruction to USPS facilities from natural disasters.³³ For example, USPS officials told us that when the main Post Office in St. Thomas was damaged after hurricanes in 2017, USPS implemented plans intended to ensure quick recovery of postal operations, including local delivery services. As a result, USPS officials said that they were able to temporarily use other facilities to maintain local delivery services and establish a temporary facility outside the Post Office for customers to collect mail from their postal boxes. USPS officials added that quickly resuming postal operations can be difficult in some cases, such as when mail processing facilities or vehicle maintenance facilities are damaged. For example, when Tropical Storm Imelda resulted in a partial roof collapse at a mail processing and distribution facility in Houston in 2019, USPS had to re-route mail destined for that facility to others in the area. In contrast, if a Post Office were damaged or destroyed, USPS could, according to officials, often quickly deploy a mobile postal unit to temporarily provide services (see fig. 8).

³³We did not evaluate the efficacy of USPS's efforts to maintain postal operations following the damage or destruction of its facilities.

Figure 8: Example of USPS Mobile Postal Unit Used to Maintain Postal Services after a Disaster



Source: U.S. Postal Service. | GAO-21-104152

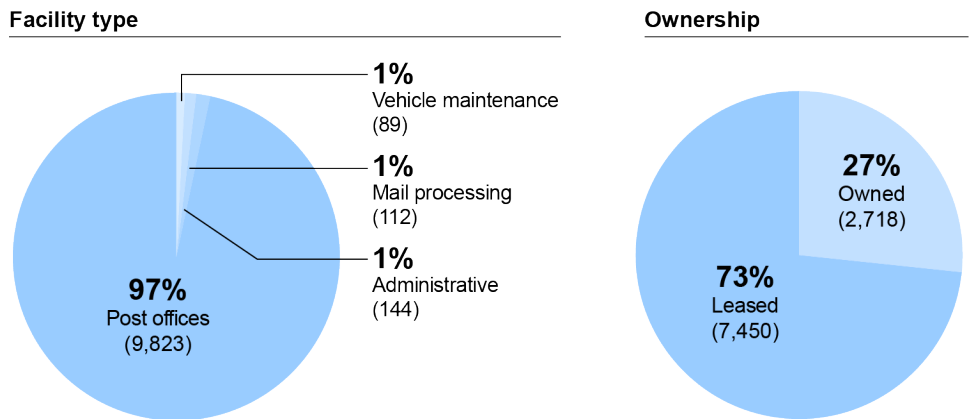
Nearly One-third of USPS's Facilities Are Located in Areas at Risk to Flooding, Storm Surge, or Other Climate Change Effects

Our analysis found that about one-third (10,168 of 32,090) of USPS's facilities are currently in areas that may be affected by one or more potential climate change effects—flooding, storm surge, sea level rise, and wildfires. Nearly all of the facilities at potential risk from climate change effects are Post Offices, of which three-quarters are leased.³⁴ As previously noted, leased facilities are important to USPS's operations, even though USPS may be less responsible for any repair costs. Further, about one-third of USPS's mail-processing and distribution facilities, which are crucial to USPS's ability to process and deliver mail, are also in

³⁴Specific maintenance and repair responsibilities for leased facilities vary from lease to lease and are subject to change when a lease is renegotiated. USPS officials told us that for most of its leased facilities, lessors are responsible for maintenance and repairs. USPS officials told us that USPS does not have data to validate the extent to which its lease agreements include repair costs.

areas at potential risk from climate change effects. As discussed earlier, it can be more difficult for USPS to resume operations from damage to these facilities. Figure 9 summarizes the facility type and ownership of the 10,168 USPS's facilities located in areas that may be affected by flooding, storm surge, sea level rise or wildfires, according to our analysis of USPS and federal climate data.

Figure 9: U.S. Postal Service's Facilities That May Be Affected by One or More of the Potential Climate Change Effects, by Facility Type and Ownership, as of December 2020



Sources: GAO analysis of U.S. Postal Service, Federal Emergency Management Agency (FEMA), National Oceanic and Atmospheric Administration (NOAA), and U.S. Forest Service data. | GAO-21-104152

Accessible Data for Figure 9: U.S. Postal Service’s Facilities That May Be Affected by One or More of the Potential Climate Change Effects, by Facility Type and Ownership, as of December 2020

Facility type	Number	Percentage
Post offices	9823	97
Administration	144	1
Mail processing	112	1
Vehicle maintenance	89	1

Ownership	Number	Percentage
Leased	7450	73
Owned	2718	27

These data, however, may not fully account for all USPS facilities that could be in areas potentially affected by climate change because: (1) data are not available for some areas; (2) federal data are generally based on current or past conditions; and (3) the *Fourth National Climate Assessment* has reported that climate change may exacerbate flooding, storm surge, and wildfires in certain regions in the future. Further, according to the *Fourth National Climate Assessment*, there may be other climate change effects that could affect postal facilities, such as drought and extreme temperatures.³⁵ The full results of our analysis and additional information on USPS’s facilities are available in appendix IV.

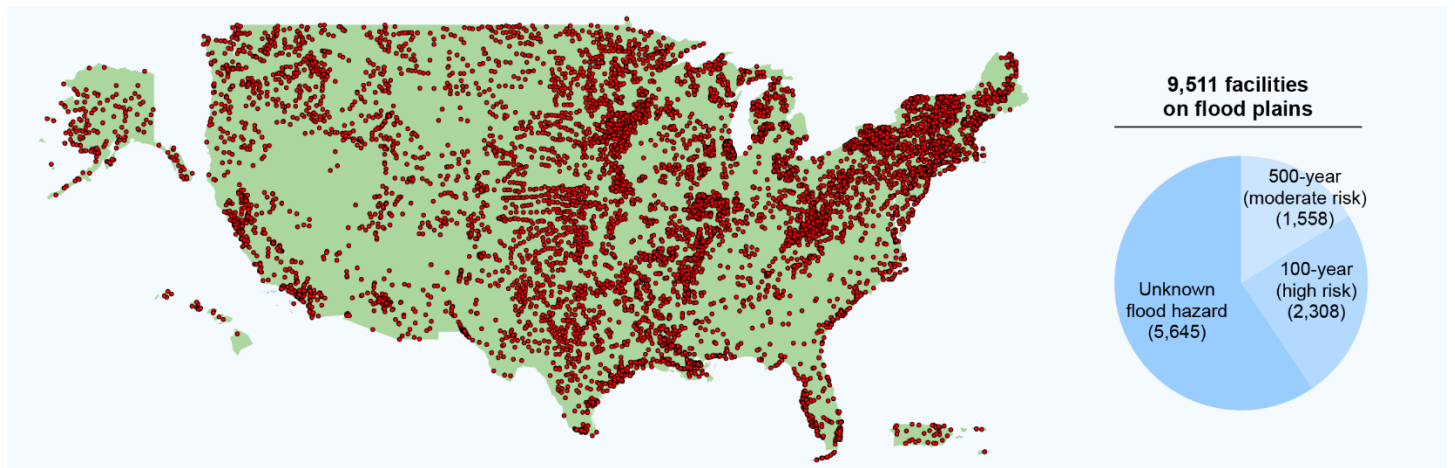
Flooding

Our analysis of FEMA and USPS data found that 9,511 USPS facilities, or about 30 percent of all facilities, are in areas that may be affected by

³⁵We did not analyze these effects because we could not identify relevant national-level federal data sets.

flooding, as of November 2020 (see fig. 10).³⁶ Of these facilities, 3,866 (about 41 percent) are in areas that FEMA identifies as having moderate or high flood hazard. Specifically, 1,558 facilities are in areas with a moderate flood hazard (a 0.2 percent or higher annual chance of flooding or 500-year flood) and 2,308 facilities are in areas with a high flood hazard (a 1 percent or higher annual chance of flooding or a 100-year flood), which is FEMA's highest flood hazard category.³⁷ As discussed below, an additional 5,645 facilities are in areas with unknown flood hazards.

Figure 10: Locations of the U.S. Postal Service's Facilities That May Be Affected by Flooding, as of November 2020



Sources: GAO analysis of U.S. Postal Service and Federal Emergency Management Agency (FEMA) data. | GAO-21-104152

³⁶We analyzed a range of the potential climate change effects. For flooding, we used data from FEMA's 2020 National Flood Hazard Layer. FEMA identifies several flood hazards. For reporting purposes, we grouped flood hazard zones into three categories: 100-year flood plains have a high flood hazard (1 percent or higher annual chance of flooding); 500-year flood plains have a moderate flood hazard (0.2 percent or higher annual chance of flooding or other flood hazards), and unknown flood hazard which are areas where flood data are not available in a form compatible with our mapping software, such as those only available in paper maps.

³⁷FEMA provides flood hazard and risk information to communities nationwide. Among other information, FEMA provides data on coastal and riverine flooding in the National Flood Hazard Layer. Other flood hazards include areas with reduced risk because of levees as well as areas with flood hazard based on future conditions, for example, if land use plans were implemented. FEMA considers areas with at least 0.2 percent annual chance of flooding as having moderate flood hazard and those with 1 percent or higher annual chance of flooding to be Special Flood Hazard Areas (i.e., those with the highest chance of flooding).

Accessible Data for Figure 10: Locations of the U.S. Postal Service’s Facilities That May Be Affected by Flooding, as of November 2020

Risk	Number
500-year (moderate)	1558
100-year (high)	2308
Unknown	5645

Note: For reporting purposes, we grouped flood hazard zones into three categories: 100-year flood plains have a high risk (1 percent or higher annual chance of flooding); 500-year flood plains have a moderate risk (0.2 percent or higher annual chance of flooding or other flood hazards); and unknown flood hazard, which are areas where flood data are not available in a form compatible with our mapping software, such as those only available in paper maps.

We analyzed information on the number of sites in areas with moderate flood hazards because, according to the *Fourth National Climate Assessment*, areas currently designated as having a moderate flood hazard may have increased flood risk in the future due to expected increase in the intensity and frequency of heavy rainfall, and the magnitude and intensity of riverine flooding is also projected to increase in the future.³⁸ Nationwide, the number of USPS facilities in areas that may be affected by flooding currently may be higher than described in this report. Specifically, 5,645 USPS facilities or about 18 percent of all facilities, are in areas that FEMA has not assessed for flood hazards or that we did not analyze because the data were not available in a form we could use with our mapping software.³⁹ The full results of our analysis including information on the facilities in areas that may have moderate flood hazard or 0.2 percent or higher annual chance of flooding, high flood hazard or 1 percent or higher annual chance of flooding, and unknown flood hazard are available in appendix IV.

Storm Surge

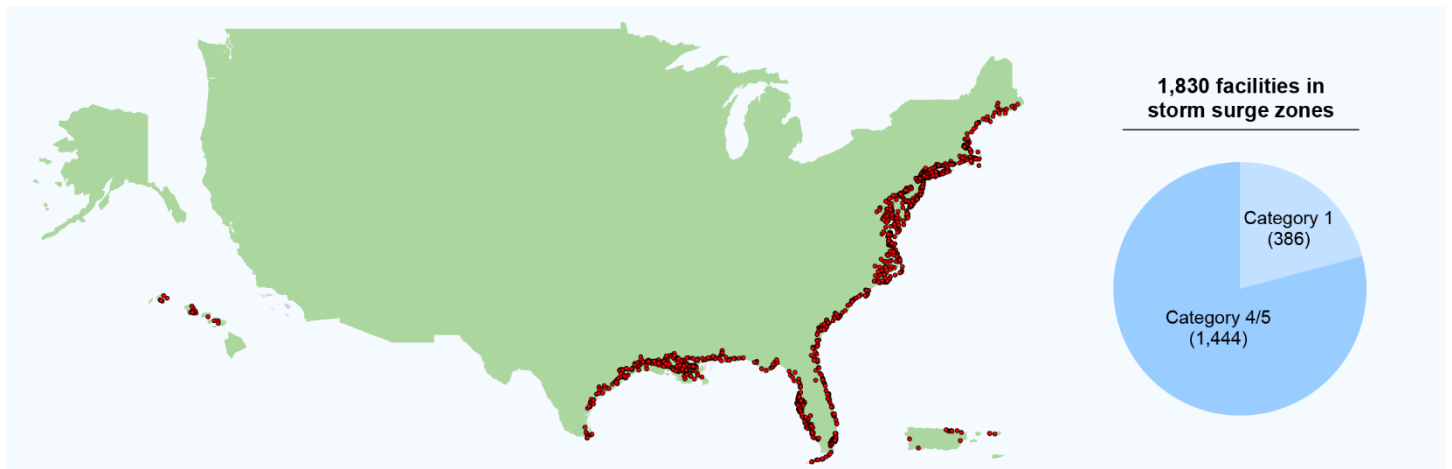
We found that 1,830 USPS facilities, or about 6 percent of all facilities, are in areas that may be inundated by storm surge, based on our analysis

³⁸Riverine flooding is flooding related to or caused by a river, stream, or tributary overflowing its banks because of excessive rainfall, snowmelt, or ice.

³⁹Unknown flood hazard includes zones D (undetermined flood hazards, as no analysis of flood hazards has been conducted by FEMA), NP (area not mapped by FEMA), missing values, area not included, and no data. In addition, we considered data that we could not analyze using our mapping software, such as those available in paper-based maps, as unknown flood hazard.

of NOAA’s storm surge hazard maps and USPS data, as of November 2020 (see fig. 11).⁴⁰ Of these facilities, 386 (about 21 percent) are in areas that may be inundated by a storm surge corresponding to a category 1 hurricane, and 1,444 (about 79 percent) are in areas that may be inundated by storm surge corresponding to Category 4 or 5, the highest categories.

Figure 11: Location of the U.S. Postal Service’s Facilities That May Be Affected by Storm Surge, as of November 2020



Sources: GAO analysis of U.S. Postal Service and National Oceanic and Atmospheric Administration (NOAA) data. | GAO-21-104152

⁴⁰We analyzed a range of the potential climate change effects. For example, we used the maximum extent of storm surge from Category 1 hurricanes as well as Category 4 or 5 hurricanes, the highest categories, as modeled by NOAA.

Accessible Data for Figure 11: Location of the U.S. Postal Service’s Facilities That May Be Affected by Storm Surge, as of November 2020

Zone	Number
Category 1	386
Category 2	1444

Note: We analyzed a range of the potential climate change effects. For example, we used the maximum extent of storm surge from Category 1 hurricanes, the lowest category, as well as Category 4 or 5 hurricanes, the highest categories, as modeled by NOAA.

We analyzed areas that may be inundated by a storm surge corresponding to the highest category of hurricanes because, according to the *Fourth National Climate Assessment*, a projected increase in the intensity of hurricanes in the North Atlantic could increase the probability of extreme flooding along most of the Atlantic and Gulf Coast states, beyond what would be projected based solely on relative sea level rise. Nationwide, the number of USPS facilities in areas that may be affected by storm surges may be higher than 1,830 because NOAA has not modeled areas along the West Coast and Pacific islands other than Hawaii.⁴¹ The full results of our analysis are available in appendix IV. These results include information on the number of USPS facilities in areas that may be inundated by storm surge from Category 1 and from Category 4 or 5 hurricanes.

Sea Level Rise

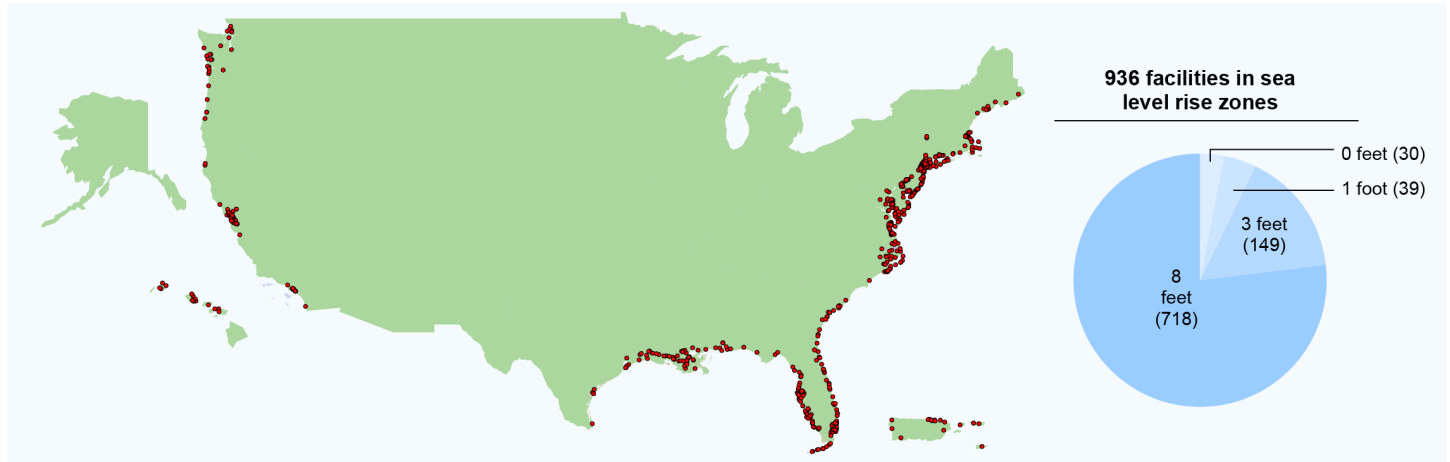
We found that 936 USPS facilities, or about 3 percent of all facilities, are located in areas that would be inundated by sea level rise of up to 8 feet, based on our analysis of USPS data and NOAA data as of September 2020 (see fig. 12).⁴² Of these facilities, 218 are located in areas that would be inundated by sea level rise of up to 3 feet, and if sea level rose

⁴¹The number of facilities in areas that may be affected by storm surge includes 21 facilities in Hawaii. Our analysis may not accurately account for the impacts of storm surge because we included sites in areas that are protected by levees. NOAA officials told us that storm surge in these areas is difficult to model.

⁴²We analyzed a range of the potential climate change effects. For example, we analyzed NOAA’s inundation data on 0, 1, 3, and 8 feet of sea level rise because according to the *Fourth National Climate Assessment*, the global mean sea level rise of 1 foot under a low risk scenario, about 3 feet under an intermediate risk scenario, and about 8 feet under an extreme risk scenario. Facilities in areas at 0-foot sea level rise may already be inundated at high tide, which according to NOAA is equivalent to the water level at the average of the higher of the two daily tides from 1983 to 2001.

by 8 feet, 718 facilities would be inundated.⁴³ We analyzed the number of facilities in areas that may be affected by several different sea level rise heights because, according to the *Fourth National Climate Assessment*, global average sea levels are likely to continue to rise by at least several inches in the next 15 years and by 1.0 to 4.3 feet by 2100. Further, the *Assessment* states that a rise of as much as 8 feet by 2100 cannot be ruled out. Nationally, the number of USPS facilities that may be inundated by various heights of sea level rise will vary from the results of our analysis because different parts of the United States may experience higher or lower sea level rise than the global average. For example, the *Assessment* states that sea level rise will be higher than the global average on the East and Gulf Coasts of the United States and lower than the global average in most of the Pacific Northwest and in Alaska. The full results of our analysis on the number of USPS facilities in areas that would be inundated if sea level rose by 0-feet, 1 foot, 3 feet, and 8 feet are available in appendix IV.

Figure 12: Location of the U.S. Postal Service’s Facilities That May Be Affected by Sea Level Rise, as of September 2020



Sources: GAO analysis of U.S. Postal Service and National Oceanic and Atmospheric Administration (NOAA) data. | GAO-21-104152

⁴³The 218 facilities are cumulative total of facilities likely to be inundated by a sea level rise of 0-feet (30 facilities or 0.09 percent); 1 foot (39 facilities or 0.12 percent); and 3 feet (149 facilities or 0.46 percent).

Accessible Data for Figure 12: Location of the U.S. Postal Service’s Facilities That May Be Affected by Sea Level Rise, as of September 2020

Zone	Number
0 feet	30
1 foot	39
3 feet	149
8 feet	718

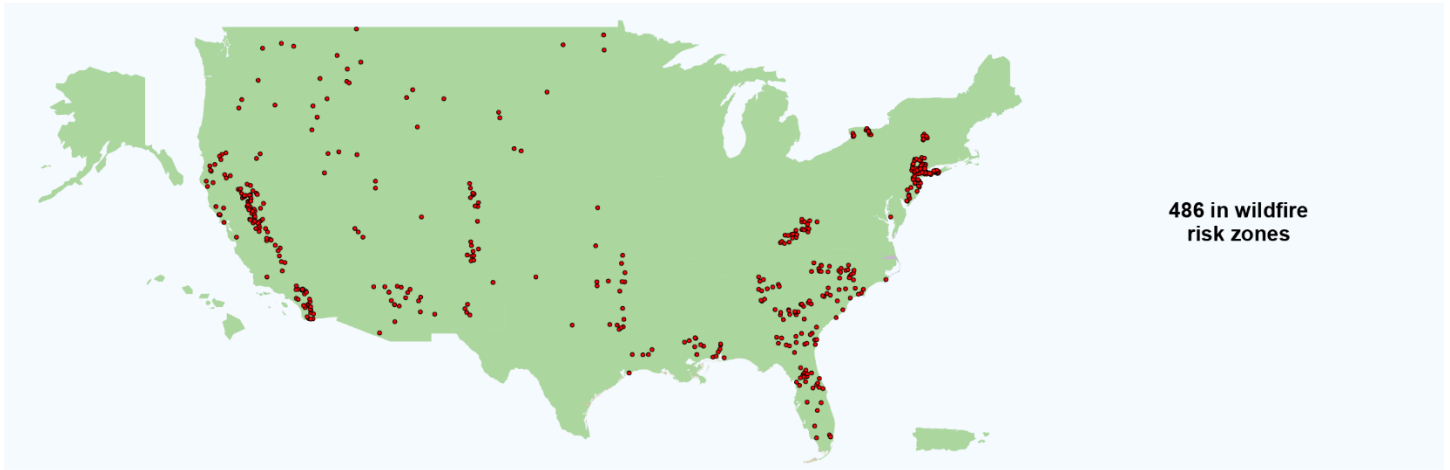
Note: We analyzed NOAA’s inundation data on 0, 1, 3, and 8 feet of sea level rise because according to the Fourth National Climate Assessment, the global mean sea level rise of 1 foot is a low risk scenario, about 3 feet is an intermediate scenario, and about 8 feet is an extreme scenario. Facilities in areas at 0-foot sea level rise may already be inundated at high tide, which according to NOAA is equivalent to the water level at the average of the higher of the two daily tides from 1983 to 2001.

Wildfires

We found that 486 USPS facilities, less than 2 percent of all facilities, are in areas that have high or very high wildfire hazard potential—those more likely to burn with a higher intensity—based on our analysis of USPS and U.S. Forest Service data as of October 2020 (see fig. 13).⁴⁴ Nationwide, the number of USPS facilities in areas that currently have high wildfire hazard potential may be higher than 486 because wildfire hazard data are only available for the contiguous United States (i.e., there are no data for Alaska, Hawaii and other Pacific islands, Puerto Rico, and the U.S. Virgin Islands). According to the *Fourth National Climate Assessment*, the incidence of large forest fires in the western United States and Alaska has increased since the early 1980s and is projected to further increase in those regions as the climate changes. The *Assessment* states that analyses regarding the effect of climate change on the incidence of wildfire in other parts of the United States are not readily available, so it is unknown how climate change will affect USPS facilities in these areas. The full results of our analysis on the number of USPS facilities in areas with high or very high wildfire hazard potential are available in appendix IV.

⁴⁴We combined “high” and “very high” wildfire hazard potentials (WHP), which correspond to areas at the 85 percentile or greater of WHP. We did not analyze data for areas with lower WHP because unlike the other hazards, a low WHP rating means that an area is unlikely to experience intense wildfires (for the other hazard classes, the lower end-point may result in some damage to USPS facilities

Figure 13: Location of the U.S. Postal Service’s Facilities That May Be Affected by Wildfire, as of October 2020



Sources: GAO analysis of U.S. Postal Service and U.S. Forest Service data. | GAO-21-104152

Accessible Data for Figure 13: Location of the U.S. Postal Service’s Facilities That May Be Affected by Wildfire, as of October 2020

Risk	Number
Wildfire	486

Note: We combined layers of “high” and “very high” wildfire hazard potentials (WHP), which correspond to areas at the 85 percentile or greater of WHP. We did not analyze data for areas with lower WHP because unlike the other hazards, a low WHP rating means that an area is unlikely to experience intense wildfires (for the other hazard classes, the lower end-point may result in some damage to USPS facilities. For example, a lower-category hurricane and lower level sea-level rise may still result in flooding).

USPS Has Taken Some Steps to Incorporate Climate Resilience into Its Facilities, but Does Not Use Climate Data Early in Its Facility Investment Process

USPS improves the climate resilience of the Charlotte Amalie Main Post Office

In September 2017, Hurricane Irma and Hurricane Maria significantly damaged USPS's main post office in St. Thomas, the U.S. Virgin Islands. During its assessment of the damage, USPS determined that part of the building needed to be reconstructed and a new roofing system was needed to meet the current building code of withstanding hurricane-force winds of up to 200 mph. The total repair cost USPS over \$7.6 million—the most costly repair from a weather-related disaster from fiscal years 2015 through 2019.





Source: U.S. Postal Service. | GAO-21-104152

A variety of factors can affect USPS's efforts to incorporate climate resilience into its facilities, such as competing priorities for limited financial resources, a universal service mission that necessitates having a network of facilities in all parts of the country, and difficulties closing some facilities due to statutory limitations and stakeholder opposition.⁴⁵ Nevertheless, USPS has taken some steps to incorporate climate resilience into its facilities. For example, in its 2014 Climate Change Adaption Plan, USPS identified a need to collect and incorporate climate information in its facility assessments and design standards.⁴⁶ The plan also identified a need for USPS to ensure that climate-related forecasts and impact projections were used in facility planning decisions. In 2017, USPS developed a mapping tool that uses climate information, including real-time climate data from FEMA and NOAA, to assess facility or site exposure to flooding, storm surge, and sea level rise. USPS officials told us that if a leased facility is up for renewal in an area at high risk to a

⁴⁵We have previously reported on challenges facing USPS and the need for congressional action to help address them. For example, in May 2020, we suggested that Congress consider reassessing and determining the level of postal services that the nation requires and the extent to which USPS should be financially self-sustaining. See, [GAO-20-385](#).

⁴⁶According to USPS officials, USPS expect to issue an updated Climate Change Adaptation Plan by September of 2021.

natural disaster, the tool can be used to identify that risk and USPS could then consider relocating or modifying the facility to make it more resilient. In 2019, USPS also added a requirement in its investment policies and procedures to include a climate assessment in the preliminary steps of developing a facility investment proposal.⁴⁷ According to this policy, these assessments must illustrate the potential impacts associated with climate change of the proposed investment.⁴⁸

We found that USPS's facility investment process is not consistent with this 2019 policy change. Specifically, USPS officials told us that the preliminary steps of developing a facility investment proposal, such as for repairs or new construction, are based upon USPS's design standards and relevant building codes, not a climate assessment. USPS officials told us they primarily make individual facilities more resilient to weather-related natural disasters by using current, applicable design standards and building codes in their new construction and repair projects for both owned and leased facilities. In particular, USPS's design standards include a requirement that all of its facilities be designed in accordance with the most stringent applicable requirements from current federal, state, and local building codes. Building codes are minimum safeguards intended to ensure the public, safety, and general welfare of the occupants of new and existing buildings, according to the International Code Council, a standards-developing organization.⁴⁹ For example, building codes may help ensure that exterior walls and roofs include flashing and drainage so that they are resistant to heavy wind and rain. USPS's design standards also include design and construction requirements intended to ensure that facilities resist climate-related hazards, such as hurricanes and floods. USPS updated its design standards in 2019 to include specific resilience requirements, such as a requirement in certain hurricane risk areas for all rooftop equipment to be secured to its facilities in accordance with the more stringent applicable requirements of local building codes. USPS officials told us that USPS relies on standards and codes to address future risk from climate-related

⁴⁷USPS, *Handbook F-66 General Investment Policies and Procedures* (Washington, D.C.: November 2019).

⁴⁸GAO's *Disaster Resilience Framework* notes that the use of accurate and comprehensive natural disaster risk data can help decision makers understand the extent of their risks and help inform facility investment decisions.

⁴⁹The International Code Council is an association that helps the building safety community and construction industry provide safe, sustainable, and affordable construction through the development of model codes and standards used in the design, construction, and compliance process.

hazards and that they consider these standards and codes sufficient to meet the policy requirement to conduct a climate assessment for proposed facility investments.

While the use of design standards and building codes can help make individual projects more resilient to weather-related natural disasters, we have previously found that standards and codes generally incorporate climate information from historical observations, such as average seasonal temperatures, rather than forward-looking climate information, such as projected rainfall rates.⁵⁰ Thus, standards and codes may not be fully effective for ensuring that facilities and other infrastructure are resilient to extreme weather events or changes in climate conditions.⁵¹ We concluded that using the best available climate information can help organizations support risk-based decisions and investments.⁵²

According to USPS officials, USPS assesses climate data in its facility investment process, but at the end of its process, rather than in the preliminary steps, as required by its 2019 policy. Specifically, officials noted that USPS currently uses its mapping tool during the final steps of proposed facility investments, often after many months have been spent developing proposals based primarily on local building codes and design standards, and sometimes only one week before a final investment decision is expected. As a result, USPS risks developing proposals without key information on climate-related risks and possibly spending money on projects that are not sound from a climate risk perspective. Assessing climate data in the preliminary steps of USPS's facility investment process—as required in its policy—could help USPS to better manage climate-related risks in its facility investments process. These

⁵⁰GAO, *Climate Change: Improved Federal Coordination Could Facilitate Use of Forward-Looking Climate Information in Design Standards, Building Codes, and Certifications*, [GAO-17-3](#) (Washington, D.C.: Nov. 30, 2016). Standards-developing organizations, such as the International Code Council and the American Society of Civil Engineers, develop certain design standards and building codes through a formal, consensus-based process.

⁵¹[GAO-17-3](#). The Secretary of Commerce is responsible for coordinating and fostering executive branch implementation of a policy on federal participation in the development of voluntary consensus standards, including design standards and building codes. We recommended that the Secretary of Commerce coordinate a government-wide effort to provide the best available forward-looking climate information to standards-developing organizations for their consideration in the development of design standards and building codes. As of April 2021, the Secretary of Commerce had not taken this action.

⁵²GAO, *Climate Information: A National System Could Help Federal, State, Local, and Private Sector Decision Makers Use Climate Information*, [GAO-16-37](#) (Washington, D.C.: Nov. 23, 2015).

assessments, in turn, could help USPS enhance the resilience of its facilities to climate change and ensure that Americans continue to have access to mail that they depend upon.

Conclusions

Millions of Americans rely on USPS's mail services for communication and commerce, and USPS's facilities are key to its ability to meet these needs. Climate change may result in more frequent or intense extreme weather events, such as flooding, storm surge, and wildfires that could damage these facilities and pose serious operational and financial risks to USPS. To help ensure the long-term climate resilience of its operations and mitigate financial risks, it is important for USPS to understand and address these potential effects. USPS has taken some steps to do this, including the addition of specific climate resilience requirements in its facilities guidance, development of a mapping tool that uses climate data to help inform facility decisions, and a new requirement in its investment policies and procedures to assess potential impact of climate change early in the facility planning process. Currently, however, USPS assesses climate data in the end stage of its facility planning process, often when decisions are nearly final. If USPS were to assess these data earlier in its process, consistent with its updated policy, USPS could better manage the potential risks of climate change effects to its facilities and make appropriate adjustments to enhance the facilities' resilience.

Recommendation for Executive Action

We are making the following recommendation to USPS:

The Postmaster General should ensure that executive leaders incorporate climate information, such as available real-time climate data, in the preliminary steps of USPS's process for making facility investments, consistent with the requirements of USPS policy. (Recommendation 1)

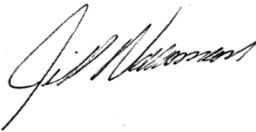
Agency Comments

We provided a draft of this report to USPS, FEMA, NOAA, and the U.S. Forest Service for comment. In written comments provided by USPS (reproduced in appendix V), USPS generally concurred with our findings

and agreed to evaluate options for incorporating climate information into its facility investment process. FEMA, NOAA, and the U.S. Forest Service had no comments.

We are sending copies of this report to the appropriate congressional committees, the Postmaster General and other interested parties. In addition, the report is available at no charge on the GAO website at <https://www.gao.gov>.

If you or your staff have any questions about this report, please contact me at (202) 512-2834 or naamanej@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix VI.



Jill Naamane, Acting Director
Physical Infrastructure Issues

List of Requesters

The Honorable Carolyn B. Maloney
Chairwoman
Committee on Oversight and Reform
House of Representatives

The Honorable Gerald E. Connolly
Chairman
Subcommittee on Government Operations
Committee on Oversight and Reform
House of Representatives

The Honorable Stephen F. Lynch
Chairman
Subcommittee on National Security
Committee on Oversight and Reform
House of Representatives

The Honorable Brenda L. Lawrence
House of Representatives

Appendix I: Objectives, Scope, and Methodology

This report addresses: (1) how U.S. Postal Service (USPS) facilities have been affected by weather-related natural disasters; (2) the extent to which USPS's facilities are in areas that may be affected by selected climate change effects; and (3) the extent to which USPS has taken steps to incorporate climate resilience into its facilities.

To determine how USPS's facilities have been affected by recent weather-related natural disasters, we (1) reviewed our past work and relevant publications from USPS and the USPS Office of Inspector General and (2) obtained and analyzed USPS's electronic Facilities Management System (eFMS) data from fiscal years 2015 through 2019.¹ We limited our scope to fiscal years 2015 through 2019 because USPS did not record events in the eFMS system prior to January 2015. We excluded fiscal year 2020 events due to the lag in completing and reporting of repair costs from disasters.

We assessed the reliability of the eFMS by reviewing documentation related to the system, including data dictionaries that defined data elements; interviewing USPS officials responsible for the data; conducting manual testing for missing data, outliers, and obvious errors; and reviewing the Structured Query Language used by USPS to query and collate the data. We found that the data from eFMS were sufficiently reliable for the purpose of describing how USPS's facilities have been affected by recent weather-related natural disasters.

We also selected a non-generalizable sample of four USPS facilities that experienced significant damage from weather-related natural disasters to provide illustrative examples. We selected these facilities based on eFMS data using criteria such as the most costly disasters that affected USPS facilities from fiscal years 2015 through 2019; the highest repair cost; facilities that sustained damage from multiple events; diversity in type of

¹The electronic Facilities Management System (eFMS) is the official USPS management system for administering all property-related projects, including repairs. eFMS utilizes an emergency finance code to record repair requests and tracks them from start to finish. The system also records repair paid costs for each transaction and disaster event. The eFMS data from fiscal years 2015-2019 included seven USPS areas. In January 2021, USPS consolidated its seven areas to four.

damage to facilities; variety in types and ownership of facilities; and geographic dispersion. We obtained and summarized USPS documents, such as Facility Assessment Tool and Facility Post-Cleanup/Renovation Inspection Checklist, and interviewed USPS officials to provide insight on how the selected facilities were affected by these disasters.

To determine the extent USPS's facilities are in areas that may be affected by selected climate change effects, we first identified potential climate change effects and determined which of these effects may affect USPS facilities by reviewing USPS's 2014 *Climate Change Adaptation Plan*, the *Fourth National Climate Assessment*, and our prior work.² Based on our review, we identified the following potential climate change effects:

- sea level rise, which may lead to increased frequency and extent of extreme flooding from coastal storms;
- increased intensity and frequency of heavy precipitation events, which may lead to increased local flooding;
- increased incidence of large wildfires; and
- increased intensity—including higher wind speeds and precipitation rates—and frequency of very intense hurricanes and typhoons.

From our prior work, we identified available national federal datasets on these hazards—flooding, storm surge and sea level rise, and wildfires—from the Federal Emergency Management Agency (FEMA), the National Oceanic and Atmospheric Administration (NOAA), and the U.S. Forest Service, respectively.

In this report, we refer to (1) flooding, (2) storm surge, (3) sea level rise, and (4) wildfires as potential climate change effects. We used the most recently available data for each of these climate change effects; these data do not provide estimates of the projected changes in the future.³ To the extent that data were available, we analyzed a range of these potential climate change effects. For example, we used the maximum extent of storm surge from Category 1 hurricanes as well as Category 4 or 5 hurricanes, the highest categories, as modeled by NOAA. We

²GAO, *Superfund: EPA Should Take Additional Actions to Manage Risks from Climate Change*, [GAO-20-73](#), (Washington D.C.: Oct. 18, 2019).

³We did not include forward-looking data or projections in our analysis on flooding, storm surge, and wildfire because these data are not available at a national level. NOAA models the extent of inundation for various heights of sea level rise compared to the most recently available data on average high tide.

focused on a range because, for three of the four effects, we had data on current hazards, which may become more intense and frequent in the future, according to the *Fourth National Climate Assessment*. The range of estimates we provide in our report is as follows:

- For flooding, we used data from FEMA's 2020 National Flood Hazard Layer. FEMA identifies several flood hazards. For reporting purposes, we grouped flood hazard zones into three categories: 1 percent or higher annual chance of flooding,⁴ 0.2 percent or higher annual chance of flooding or other flood hazards,⁵ and unknown flood hazards.⁶
- For storm surge, we used NOAA's 2020 storm surge hazard maps for Category 1 and Category 4 or 5 hurricanes. The storm surge hazard maps were developed using the Sea, Lake, and Overland Surges from Hurricanes model which simulated storm surge from a representative sample of hypothetical tropical cyclones.
- For sea level rise, we used NOAA data as of 2020. We downloaded inundation data on 0, 1, 3, and 8 feet of sea level rise.⁷
- For wildfire, we used data from the U.S. Forest Service's 2020 wildfire hazard potential map. We used areas with high or very high wildfire

⁴According to FEMA, high flood hazard areas identified on the Flood Insurance Rate Map are identified as a Special Flood Hazard Area (SFHA). SFHAs are defined as the area that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year. The 1-percent annual chance flood is also referred to as the base flood or 100-year flood. SFHA are labeled as Zones A, AO, AH, A1-A30, AE, A99, AR, AR/AE, AR/AO, AR/A1-A30, AR/A, V, VE, and V1-V30.

⁵According to FEMA, moderate flood hazard areas, labeled Zone B or Zone X are the areas between the limits of the base flood and the 0.2-percent-annual-chance or 500-year flood.

⁶Unknown flood hazard includes zones D (undetermined flood hazards, as no analysis of flood hazards has been conducted by FEMA); NP (area not mapped by FEMA); missing values; area not included; and no data. In addition, we considered data that we could not analyze using our mapping software, such as those available in paper-based maps, as unknown flood hazard.

⁷According to the *Fourth National Climate Assessment*, the global mean sea level rise in 2100 compared to 2000 is 1 foot under a low risk scenario, about 3 feet under an intermediate risk scenario, and about 8 feet under an extreme risk scenario. Having a 0 ft. layer would allow us to show the baseline condition. Facilities in areas at 0-foot sea level rise may already be inundated at high tide, which according to NOAA is equivalent to the water level at the average of the higher of the two daily tides from 1983 to 2001.

hazard potential in our analysis.⁸ The U.S. Forest Service based the 2020 map on wildfire likelihood and intensity data and spatial fuels and vegetation data from 2014, and point locations of past fire occurrence from 1992 to 2015.

We also obtained data from USPS's Facilities Database (FDB), the integrated database that contains up-to-date information on all of USPS's facilities, including the location and other characteristics such as facility type and size.⁹ We analyzed these data to identify USPS facilities located in areas that may be affected by potential climate change effects. To do so, we determined whether there are areas that may be affected by flooding, storm surge, wildfires, and sea level rise using the longitude, latitude, and size of each facility in the database as the primary geographic coordinate of each facility.¹⁰

To analyze whether USPS facilities are located in areas that may be affected by flooding, we used ArcGIS mapping software to intersect the USPS facilities' primary coordinate with the categories we defined from the National Flood Hazard Layer. If a facility overlapped with areas in more than one of the reporting groups, we categorized the site in the group representing the highest flood hazard. For the purposes of our report, we considered the highest flood hazard to be, in descending order, 1 percent or higher annual chance of flooding, 0.2 percent or higher annual chance of flooding or other flood hazards, and unknown flood hazard. To analyze whether USPS facilities are located in areas that may be affected by storm surge, wildfires, and sea level rise, we used MapInfo-mapping software to intersect the USPS facilities' primary

⁸We combined layers of "high" and "very high" wildfire hazard potentials (WHP), which correspond to areas at the 85 percentile or greater of WHP. We did not analyze data for areas with lower WHP because unlike the other hazards, a low WHP rating means that an area is unlikely to experience intense wildfires (for the other hazard classes, the lower end-point may result in some damage to USPS facilities. For example, a lower-category hurricane and lower-level sea-level rise may still result in flooding).

⁹USPS FDB, as of November 2020 and as organized USPS facilities into seven Areas: Northeast, Capital Metro, Eastern, Southern, Great Lakes, Western, and Pacific. In January 2021, USPS consolidated its seven areas to four: Atlantic, Central, Southern and Western Pacific.

¹⁰We found that 281 out of 32,090 USPS facilities in FDB did not have information on size. Therefore, we used the median size in square feet of each type of facilities (post offices; mail processing facilities; vehicle maintenance facilities; and administrative offices) to determine the radius of the facilities.

coordinates with each of these layers. Overlap indicates that a facility is potentially in an area that may be affected.

To assess the reliability of FEMA's National Flood Hazard Layer, NOAA's data on Sea, Lake and Overland Surges from Hurricanes, the U.S. Forest Service's wildfire hazard potential data, NOAA's data on sea level rise, and USPS Facilities Database, we reviewed documentation, interviewed officials to assess the timeliness and accuracy of the data as well as any limitations of the data.¹¹ We also reviewed our past reports that cited these data and determined the datasets are sufficiently reliable for our purpose of describing the extent USPS's facilities are in areas that may be affected by selected climate change effects.¹²

To evaluate USPS's steps to incorporate climate resilience into its facilities, we reviewed USPS documents, including guidance (e.g., *Handbook AS-503 – Standard Design Criteria*) and policies (e.g., *Handbook F-66 General Investment Policies and Procedures*), and interviewed USPS officials. We also reviewed our prior related work that discusses factors relevant to USPS's facilities practices.¹³ Given the focus of our review on climate resilience, we considered USPS's actions in the context of our prior related work, including our October 2019 report that established a Disaster Resilience Framework.¹⁴ For all of our objectives we interviewed also USPS Office of Inspector General officials.

We conducted this performance audit from March 2020 to September 2021 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe

¹¹The data on flooding, storm surge and wildfire hazards are based on past conditions and do not represent future impacts from climate change and may understate hazards.

¹²[GAO-20-73](#) and GAO, *U.S. Postal Service: Expanding Nonpostal Products and Services at Retail Facilities Could Result in Benefits, but May Have Limited Viability*, [GAO-20-354](#) (Washington, D.C.: Mar.10, 2020).

¹³GAO, *U.S. Postal Service: Congressional Action Is Essential to Enable a Sustainable Business Model*, [GAO-20-385](#) (Washington, D.C.: May 7, 2020).

¹⁴See GAO, *Federal Real Property Asset Management: Agencies Could Benefit from Additional Information on Leading Practices*, [GAO-19-57](#) (Washington D.C.: Nov. 5, 2018) and *Disaster Resilience Framework: Principles for Analyzing Federal Efforts to Facilitate and Promote Resilience to Natural Disasters*, [GAO-20-100SP](#) (Washington, D.C.: Oct. 23, 2019).

**Appendix I: Objectives, Scope, and
Methodology**

that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Appendix II: Federal Climate Data

Flooding

The Federal Emergency Management Agency (FEMA) provides flood-hazard and risk information that is used for, among other things, flood insurance ratings and floodplain management nationwide.¹ FEMA also provides data on coastal and riverine flooding in the National Flood Hazard Layer, a database that contains the most current flood hazard data.² The National Flood Hazard Layer identifies areas at the highest risk of flooding, which are those that have a 1 percent or higher annual chance of flooding.³ In some locations, the National Flood Hazard Layer also identifies areas with 0.2 percent or higher annual chance of flooding, which FEMA considers to be a moderate flood hazard, as well as other flood hazards.⁴ The National Flood Hazard Layer also identifies areas with minimal flood hazard, including those with less than 0.2 percent

¹Federal law requires FEMA to assess the need to revise and update the nation's flood maps at least every 5 years. 42 U.S.C. § 4101(e).

²Riverine flooding is flooding related to or caused by a river, stream, or tributary overflowing its banks because of excessive rainfall, snowmelt, or ice. FEMA provides a tool for viewing, downloading, and printing flood maps for specific locations. We accessed the tool on November 13, 2020, at <https://www.fema.gov/national-flood-hazard-layer-nfhl>.

³According to FEMA, high flood hazard areas identified on the Flood Insurance Rate Map are identified as a Special Flood Hazard Area (SFHA). SFHAs are defined as the area that will be inundated by the flood event having a 1 percent chance of being equaled or exceeded in any given year. The 1 percent annual chance flood is also referred to as the base flood or 100-year flood. SFHA are labeled as Zones A, AO, AH, A1-A30, AE, A99, AR, AR/AE, AR/AO, AR/A1-A30, AR/A, V, VE, and V1-V30. Under federal law, in communities that participate in the National Flood Insurance Program, homeowners are required to purchase flood insurance for properties located in SFHAs that are secured by mortgages from federally regulated lenders. 42 U.S.C. § 4012a(b)(1).

⁴According to FEMA, 500-year flood plains have a moderate flood hazard or a 0.2 percent or higher annual chance of flooding. According to the *Fourth National Climate Assessment*, the magnitude and intensity of riverine flooding is projected to increase in the future, and areas with moderate flood hazard may have increased flood hazards in the future.

annual chance of flooding, and unknown flood hazard, including areas FEMA had not assessed for flood hazards.⁵

In 2019, the Technical Mapping Advisory Council noted that FEMA has produced modernized data (i.e., digital maps) for areas of the United States where 98 percent of the population resides, but has not determined the flood hazard for 40 percent of streams.⁶ In general, flood hazards are based on existing conditions in the watershed and floodplains. However, in certain cases, FEMA may include flood hazard information that is based on future conditions, according to FEMA regulations.⁷

Storm Surge

The National Oceanic and Atmospheric Administration (NOAA) provides estimates of hurricane storm surge using a model called Sea, Lake and Overland Surges from Hurricanes.⁸ Estimates are available for eastern U.S. coastal areas from Texas through Maine and other areas affected by storm surge, including Hawaii, Puerto Rico, and the U.S. Virgin Islands. As of January 2021, NOAA had not modeled storm surge for the West Coast of the United States and some Pacific islands. The model takes into account a specific locale's shoreline, incorporating bay and river configurations, water depths, bridges, roads, levees, and other physical features. It estimates the maximum extent of storm surge at high tide by

⁵We also considered areas where flood data are not available in a form compatible with our mapping software, such as those only available in paper maps, as unknown flood hazard.

⁶The Technical Mapping Advisory Council is a federal advisory committee established to review and make recommendations to FEMA on matters related to the national flood-mapping program.

⁷Future conditions refer to the flood discharges that would occur if current zoning or comprehensive land use plans were realized. See 44 C.F.R. § 59.1. For example, as planned buildings and parking lots are constructed, the amount of impervious land within the watershed increases, which can increase the amount of direct runoff. In our analysis, we categorized these areas as other flood hazards.

⁸According to a NOAA document, storm surge is an abnormal rise of water generated by a storm, over and above the predicted tides. Storm surge is produced by water being pushed toward the shore by the force of the winds. NOAA's storm surge hazard maps, accessed in November 2020, are available at <https://www.nhc.noaa.gov/nationalsurge/>

modeling hypothetical hurricanes under different storm conditions, such as landfall location, storm trajectory, and forward speed.

NOAA models storm surge from Category 1 through Category 5 hurricanes for the Atlantic coast south of the North Carolina–Virginia border, the Gulf of Mexico, Puerto Rico, and the U.S. Virgin Islands and Category 1 through Category 4 hurricanes for the Atlantic coast north of the North Carolina–Virginia border and Hawaii.⁹ According to NOAA, the storm surge hazard maps are to be used for educational purposes and awareness of the storm surge hazard at a city or community level. In accordance with federal law, the storm surge hazard maps are also used for other purposes, such as hurricane evacuation studies.¹⁰ The agency updates the storm surge hazard maps for portions of the shoreline each year to account for, among other changes, new data and the addition of flood protection devices, such as levees. The storm surge hazard maps do not account for future conditions such as erosion; subsidence (i.e., the sinking of an area of land); construction; or sea level rise.

Sea Level Rise

NOAA’s web-mapping tool—the Sea Level Rise Viewer—models the extent of inundations from various heights of sea level rise (up to 10 feet above average high tides) for the contiguous United States, Hawaii, the Pacific islands, Puerto Rico, and the U.S. Virgin Islands.¹¹ NOAA models the extent of inundation for various heights of sea level rise compared to the most recently available data on average high tide. NOAA’s guidance on the Sea Level Rise Viewer states that data are not available for Alaska. According to NOAA, sea level rise data should be used strictly as a planning tool. NOAA labels areas as not mapped if elevation data of sufficient quality for the areas are not available. NOAA does not model natural processes—such as erosion, subsidence, or future construction—or forecast how much sea level is likely to rise in a given area. Rather, for

⁹According to a NOAA official, NOAA does not estimate storm surge for Category 5 hurricanes in areas where such hurricanes have not historically made landfall, such as areas north of the North Carolina–Virginia border.

¹⁰6 U.S.C. § 721.

¹¹According to NOAA, inundation is water covering normally dry land, and sea level rise inundation illustrates the scale of potential flooding NOAA’s Sea Level Rise Viewer, accessed in September 2020, is at <https://coast.noaa.gov/digitalcoast/tools/slr.html>.

various heights of local sea level rise, NOAA determines extent of inundation based on the elevation of an area and the potential for water to flow between areas.

Wildfires

The U.S. Forest Service maps wildfire hazard potential based on landscape conditions and other observations.¹² According to the U.S. Forest Service, the primary intended use of the wildfire hazard potential map is to identify priority areas for hazardous fuels treatments from a broad, national- to regional-scale perspective. The U.S. Forest Service maps an index of wildfire hazard potential for the contiguous United States, based on, among other factors, annual burn probabilities and potential intensity of large fires. The U.S. Forest Service categorizes the wildfire hazard potential index into five classes of very low, low, moderate, high, and very high. For example, the U.S. Forest Service designates as “high” those areas with wildfire hazard potential index from the 85th to the 95th percentile, and “very high” above the 95th percentile. The U.S. Forest Service also categorizes areas as non-burnable (including agricultural and developed lands) and water.

According to the U.S. Forest Service, areas with higher values of wildfire hazard potential represent vegetation that is more likely to burn with high intensity under certain weather conditions. However, areas with moderate, low, and very low wildfire hazard potential may still experience wildfire, particularly if they are near areas that have higher wildfire hazard potential. Wildfire hazard potential is not a forecast or wildfire outlook for any particular season as it does not include any information on current or forecasted weather or fuel moisture conditions.¹³

¹²According to the U.S. Forest Service, the objective of the wildfire hazard potential map is to depict the relative potential for wildfire that would be difficult for suppression resources to contain. For the 2020 map, the U.S. Forest Service used spatial data sets of wildfire likelihood and intensity generated for the conterminous U.S. with Large Fire Simulator, and spatial fuels and vegetation data from 2014, and point locations of past fire occurrence from 1992 to 2015. The U.S. Forest Service’s wildfire hazard potential map, accessed on October 16, 2020, is at <https://www.firelab.org/project/wildfire-hazard-potential>.

¹³According to a U.S. Forest Service official, the wildfire hazard potential data are not meant to substitute for local data that may more accurately capture the potential for wildfire in particular areas.

Data Considerations

Data on flooding, storm surge, and wildfires are generally based on current or past conditions. NOAA models the extent of inundation for various heights of sea level rise compared to the most recently available data on average high tide. FEMA data are the only available national data on flooding. While the data are national-level, because they are produced for flood insurance purposes, there are many areas of the U.S. that are not mapped due to low population. NOAA's storm surge hazard maps are the best national-level data on the relative risk of storm surge. The data do not account for future conditions such as erosion, subsidence (i.e., the sinking of an area of land), construction, or sea level rise. NOAA's Sea Level Rise Viewer is the most current information on the geographic extent of inundation from sea level rise. The U.S. Forest Service's wildfire hazard potential data are not a forecast or wildfire outlook for any particular season, and they do not include any information on current or forecast of weather or fuel moisture conditions. The wildfire hazard potential data are not meant to substitute for local data that may more accurately capture the potential for wildfire in particular areas. Agency officials noted the data are based on models and designed for national and regional fire-management planning. Despite these limitations, we believe these datasets are sufficiently reliable for our purposes of describing the extent to which USPS's facilities are located in areas at risk of selected climate change effects.

Appendix III: Details of Damages to USPS's
Facilities from Weather-Related Natural
Disasters, Fiscal Years 2015–2019

Appendix III: Details of Damages to USPS's Facilities from Weather-Related Natural Disasters, Fiscal Years 2015– 2019

Table 1: Impact of Weather-Related Natural Disasters on USPS's Facilities, Fiscal Years 2015 through 2019

Weather-related Natural Disasters	Number of Damaged Facilities			Number of Facilities USPS Paid to Repair			Repair Costs (dollars)		
	Owned	Leased	Total	Owned	Leased	Total	Owned	Leased	Total
n/a									
Hurricane Maria	12	31	43	12	17	29	14,459,275.71	346,040.45	14,805,316.16
Hurricane Michael	29	63	92	26	29	55	6,402,255.80	261,368.79	6,663,624.59
Hurricane Irma	209	224	433	186	102	288	1,687,978.97	1,534,171.00	3,222,149.97
Tropical Storm Harvey	65	72	137	53	31	84	2,080,837.19	465,275.56	2,546,112.75
Hurricane Florence	48	101	149	43	57	100	505,914.24	724,684.55	1,230,598.79
Hurricane Matthew	59	68	127	50	29	79	577,222.96	76,022.65	653,245.61
Louisiana District Flooding	1	8	9	1	1	2	593,102.29	20.00	593,122.29
Winter Storm Juno	22	19	41	13	4	17	267,605.92	10,232.71	277,838.63
Tropical Storm Imelda	7	9	16	5	1	6	262,111.03	9,742.66	271,853.69
Winter Storm Jonas	20	20	40	19	8	27	87,817.73	36,592.54	124,410.27
Winter Storm Ulmer	2	6	8	2	0	2	116,314.58	0.00	116,314.58
Hurricane Dorian	17	31	48	13	6	19	30,319.39	14,269.89	44,589.28
Appalachian District Flooding	5	20	25	1	3	4	811.22	36,539.71	37,350.93
Hurricane Hermine	1	7	8	1	3	4	4,638.40	25,212.02	29,850.42
Mid-West Flooding	0	2	2	0	2	2	0.00	23,134.43	23,134.43
Flooding Texas	3	4	7	2	0	2	8,134.00	0.00	8,134.00
Hurricane Nate	4	4	8	4	1	5	3,829.50	2,611.69	6,441.19
Hurricane Lane	1	2	3	1	0	1	2,753.50	0.00	2,753.50
Tropical Storm Barry	1	11	12	1	1	2	738.21	271.06	1,009.27
Tropical Storm Cindy	2	3	5	1	0	1	173.82	0.00	173.82
Tropical Storm Gordon	0	1	1	0	0	0	0.00	0.00	0.00

**Appendix III: Details of Damages to USPS's
Facilities from Weather-Related Natural
Disasters, Fiscal Years 2015–2019**

Weather-related Natural Disasters	Number of Damaged Facilities			Number of Facilities USPS Paid to Repair			Repair Costs (dollars)		
	Owned	Leased	Total	Owned	Leased	Total	Owned	Leased	Total
n/a									
Total	508	706	1214	434	295	729	27,091,834.46	3,566,189.71	30,658,024.17

Source: GAO analysis of USPS eFMS data. | GAO-21-104152

Note: Repair costs exclude (a) cost associated with repair of 74 USPS-owned facilities. According to USPS officials, costs to repair these facilities were recorded in a database that USPS no longer uses and for which it does not have records; and (b) 5 USPS-owned facilities that were still being repaired at the time of our review. USPS officials told us that, as of May 2021, 3 out of the 5 projects are completed, totaling an additional \$238,000 in repair costs.

Appendix IV: GAO Analysis of the Extent to which USPS's Facilities Are Located in Areas at Risk from Selected Climate Change Effects

Appendix IV: GAO Analysis of the Extent to which USPS's Facilities Are Located in Areas at Risk from Selected Climate Change Effects

Table 2: Overview of USPS Facilities Located in Areas at Risk to Flooding, Wildfires, Storm Surge, and Sea Level Rise

Climate Change Effects	Flooding ^a	Flooding ^a	Flooding ^a	Wildfires	Storm Surge ^b	Storm Surge ^b	Sea Level Rise ^b	Sea Level Rise ^b	Sea Level Rise ^b	Sea Level Rise ^b	Total Facilities Located in Areas at Risk to Selected Climate Change Effects
Facility Location and Number of Facilities Located in Areas at Risk to Selected Climate Change Effects	100 Year Flood Plain	500 Year Flood Plain	Unknown Flood Hazard ^c	Wildfire Risk Zone	Category 1 Zone	Category 4/5 Zone	0 foot Zone	1 foot Zone	3 feet Zone	8 foot Zone	n/a
All	2,308	1,558	5,645	486	386	1,444	30	39	149	718	10,168
All: Leased	1,610	893	4,397	390	235	878	12	23	98	442	7,450
All: Owned	698	665	1,248	96	151	566	18	16	51	276	2,718
By Area: Capital Metro	152	100	61	49	50	262	0	0	22	118	446
By Area: Eastern	704	321	387	53	43	140	1	4	22	70	1,382
By Area: Great Lakes	134	53	852	0	0	0	0	0	0	0	1,026
By Area: Northeast	299	197	929	82	117	426	10	12	32	172	1,658
By Area: Pacific	172	240	61	112	5	21	11	9	21	84	578
By Area: Southern	492	314	969	100	171	595	8	14	46	247	2,003
By Area: Western	355	333	2,386	90	0	0	0	0	6	27	3,075
By Facility Type: Post Offices	2,167	1,439	5,555	472	343	1,346	21	29	131	647	9,823
By Facility Type: Mail Processing Facilities	43	36	35	6	12	28	3	4	7	20	112
By Facility Type: Administrative Facilities	66	49	31	7	21	45	6	6	8	32	144
By Facility Type: Vehicle Maintenance Facilities	32	34	24	1	10	25	0	0	3	19	89

Source: GAO analysis of USPS, FEMA, NOAA, and the U.S. Forest Service data. | GAO-21-104152

Notes: This analysis is based on USPS data as of November 2020 and as organized into seven areas: Northeast, Capital Metro, Eastern, Southern, Great Lakes, Western, and Pacific. In January 2021, USPS consolidated its seven areas to four: Atlantic, Central, Southern and Western Pacific. The number of facilities may not add up to the total due to facilities located in areas that may be affected by one or more potential climate change effects.

Appendix IV: GAO Analysis of the Extent to which USPS's Facilities Are Located in Areas at Risk from Selected Climate Change Effects

^aFacilities in 500-year flood plains have a moderate flood hazard (0.2 percent or higher annual chance of flooding) and facilities in 100-year floodplains have a high flood hazard (1 percent or higher annual chance of flooding), according to FEMA flood hazard category. Unknown flood hazard includes zones D (undetermined flood hazards, as no analysis of flood hazards has been conducted by FEMA), NP (area not mapped by FEMA), missing values, area not included, and no data. In addition, we considered data that we could not analyze using our mapping software, such as those available in paper-based maps, as unknown flood hazard.

^bAccording to the Fourth National Climate Assessment, the global mean sea level rise in 2100 compared to 2000 is 1 foot under a low risk scenario, about 3 feet under an intermediate risk scenario, and about 8 feet under an extreme risk scenario. Facilities in areas at 0-foot sea level rise may already be inundated at high tide, which according to NOAA is equivalent to the water level at the average of the higher of the two daily tides from 1983 to 2001.

^cCategory 1 hurricanes are the lowest category and Category 4 or 5 hurricanes are the highest categories for storm surge, according to NOAA. For the purpose of this report, we analyzed a range of potential climate change effectors—i.e., we did not analyze all the risks associated with Category 2 or 3 hurricanes.

Appendix V: Comments from the United States Postal Service

**Appendix V: Comments from the United States
Postal Service**

TOM A. SAMRA
VICE PRESIDENT, FACILITIES



September 14, 2021

Jill Naamane
Acting Director, Physical Infrastructure
Government Accountability Office
441 G Street, NW
Washington, DC 20548

RE: *Climate Resilience of Postal Facilities (GAO-21-104152)*

Dear Ms. Naamane,

Thank you for providing the U.S. Postal Service with the opportunity to review and comment on the draft report titled, *Better Use of Climate Data Could Enhance the Climate Resilience of Postal Facilities. (GAO-21-104152)*

We would like to thank your office for the comprehensive study on such an important issue. We share many of the principal findings. We will evaluate climate risk assessment tools to determine whether incorporating such analyses into current postal environmental diligence and funding approval procedures can be done in a manner that is cost-effective and improves climate resiliency.

Sincerely,

A handwritten signature in black ink, appearing to read "Tom Samra".

Tom Samra

475 L'ENFANT PLAZA, SW
WASHINGTON, DC 20260-1861
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Accessible Text for Appendix V: Comments from the United States Postal Service

September 14, 2021

Jill Naamane
Acting Director, Physical Infrastructure
Government Accountability Office
441 G Street, NW
Washington, DC 20548

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Sincerely,

Tom Samra

Appendix VI: GAO Contact and Staff Acknowledgments

GAO Contact

Jill Naamane at (202) 512-2834 or naamanej@gao.gov

Staff Acknowledgments

In addition to the contact above, Kyle Browning (Assistant Director); James Leonard (Analyst-in-Charge); Frederick K. Childers; Kathryn Godfrey; Gina Hoover; Rosa Leung; John Mingus; Heidi Nelson; Silda Nikaj; Josh Ormond; Joseph Thompson; and Amelia Michelle Weathers made key contributions to this report.

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