U.S. Government Accountability Office

# Weather Safety: Agencies Face Challenges Related to Multilingual Weather Alerts, and AI Project Needs Better Planning

GAO-26-107680
Q&A Report to Congressional Committees
January 26, 2026

## Why This Matters

An estimated 26 million people in the U.S. have limited ability to read, speak, write, or understand English, according to U.S. Census Bureau data. If people with limited English proficiency cannot understand emergency weather alerts provided in English, they may face greater risk during extreme weather events such as tornadoes, hurricanes, winter storms, and flash floods. These events can have major public safety impacts, including deaths and injuries, as well as major economic effects. In addition, when individuals cannot understand weather alerts or evacuation instructions, it can create confusion and slow emergency response efforts.

The National Oceanic and Atmospheric Administration's (NOAA) National Weather Service (NWS) and other alerting authorities, such as state and local governments, use alerts to warn the public about weather events. NWS is responsible for developing weather forecasts, and for issuing alerts and other weather products, such as advisories, watches, and warnings.

NWS and other alerting authorities send alerts to wireless phones and devices through Wireless Emergency Alerts (WEA) and to television and radio through the Emergency Alert System (EAS). The Federal Emergency Management Agency (FEMA) and the Federal Communications Commission (FCC) also have roles related to providing emergency alerts to the public.

A House report accompanying a bill for the Consolidated Appropriations Act, 2023 includes a provision for us to review emergency alert systems and assess relevant federal agencies' ability to provide weather alerts and products in languages other than English (H.R. Rep. No. 117-395, at 46 (2022)). Our review provides information on the languages in which weather alerts and products are available and challenges to providing alerts in languages other than English. We also examine steps NWS has taken to plan its AI language translation project and describe actions that could help federal agencies better communicate weather information in other languages.

## Key Takeaways

- NWS provides all of its WEA messages in English and Spanish but most of its EAS messages in English only. NWS also issues most of its other weather products that do not trigger alerts, such as watches and advisories, in English only. There are challenges to providing weather alerts and other products in additional languages.
- FCC has adopted requirements for participating wireless carriers to support templates for certain WEA messages in English and 14 additional languages. These requirements will become effective in June 2028.
- An ongoing NWS project uses artificial intelligence (AI) to translate some weather products into other languages. We found NWS could better manage

this project by following key practices such as setting performance goals and identifying the resources it needs and strategies to address challenges.

- We recommend that NWS develop an updated implementation plan for its AI language translation project.

## Background

The top 10 languages spoken by people in the U.S. who have limited English proficiency are Spanish, Chinese, Vietnamese, Korean, Tagalog, Arabic, Russian, Haitian, Portuguese, and French, according to 2019–2023 American Community Survey 5-year estimates.[1] Of these people, an estimated 63 percent speak Spanish as their primary language. In addition, a number of people use American Sign Language (ASL) and need access to information in that language.[2]

Executive Order 13166, issued in August 2000, directed each federal agency to develop an approach to ensure meaningful access to their programs and activities for individuals who, as a result of national origin, are limited in their English proficiency.[3] Executive Order 14224, signed on March 1, 2025, designated English as the official language of the U.S. and revoked Executive Order 13166. Executive Order 14224 specifies that it does not require or direct any change in the services provided by any agency and is to be implemented consistent with applicable law.[4]

Federal agencies manage two national systems that deliver emergency alerts to the public:

- **Wireless Emergency Alerts (WEA).** Authorized federal, tribal, state, local, and territorial government agencies can send text-like WEA messages to mobile devices in selected areas.[5] Wireless carrier participation in WEA is voluntary. The majority of wireless consumers are served by participating wireless carriers, which include the three largest nationwide carriers, according to FCC documents.[6]
- **Emergency Alert System (EAS).** EAS delivers emergency messages through media outlets, such as television and radio.[7] EAS alerts can interrupt programs with audio and text information.

Government agencies and industry have roles in providing emergency alerts:

- **FCC.** FCC is involved in establishing requirements for WEA and EAS participants. Specifically, FCC establishes technical standards, procedures, and testing protocols.[8]
- **FEMA.** FEMA is responsible for operating, maintaining, and administering access to the Integrated Public Alert and Warning System (IPAWS), which allows alerting authorities to provide emergency messages to the public through WEA and EAS. FEMA is required by statute to include in IPAWS the capability to alert, warn, and provide equivalent information to, among others, individuals with limited English proficiency, to the extent technically feasible.[9]
- **NWS.** NWS issues certain weather products that trigger alerts through WEA or EAS.[10] NWS is the primary provider of weather alerts. Only NWS has authorization to provide certain alert types, such as tornado or hurricane warnings, according to IPAWS guidance.
- **Other alerting authorities.** Government agencies such as emergency management or law enforcement agencies at the federal, tribal, state, county, city, or territorial government level provide alerts through WEA and EAS.[11]

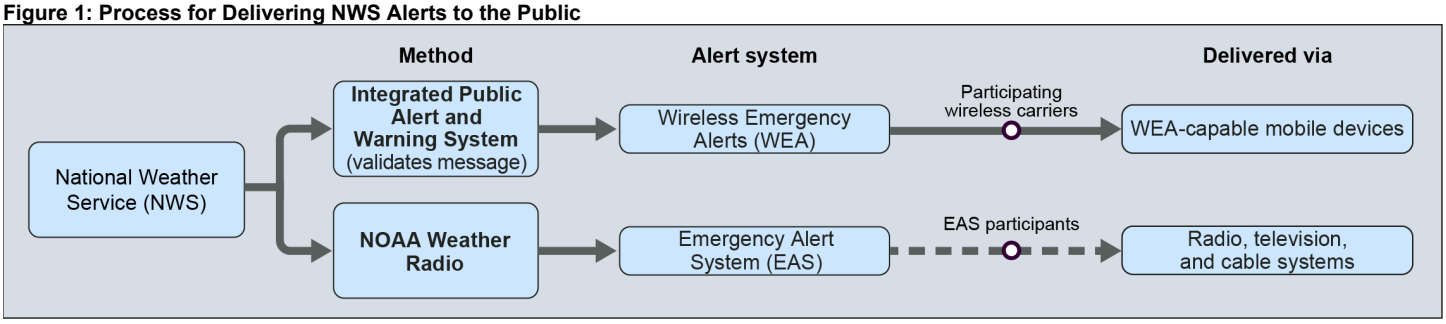
- **Industry.** Industry entities such as broadcasters, wireless carriers, and device manufacturers develop and own the infrastructure that enables alerts to be delivered to the public.

## What is the process for sending weather alerts?

NWS WEA messages are automatically triggered when a local NWS weather forecast office issues certain weather products for severe weather events.[12] These WEA messages are disseminated through FEMA's IPAWS and use pre-scripted templates that include key weather information and actions the public should take in response.

NWS uses NOAA Weather Radio All Hazards (NOAA Weather Radio) to provide EAS messages to the public.[13] Television and radio stations can monitor NOAA Weather Radio receivers and choose whether to broadcast alerts. Figure 1 shows the process for WEA and EAS messages.

**Figure 1: Process for Delivering NWS Alerts to the Public**




Source: GAO analysis of National Oceanic and Atmospheric Administration (NOAA), Federal Communications Commission, and Federal Emergency Management Agency information. | GAO-26-107680

Notes: Other federal, tribal, state, local, and territorial alerting authorities also provide WEA and EAS messages to the public. These can include alerts related to weather events. Alerting authorities other than NWS may use the Integrated Public Alert and Warning System or the legacy, broadcast-based EAS distribution system for messages. Individual broadcasters have discretion over whether to air EAS messages from NWS.

Other alerting authorities, such as state and local governments, can also send alerts related to weather events. These alerts may provide essential information that differs from what NWS provides. For example, state and local alerting authorities may issue evacuation warnings.

## What languages do national emergency alert systems use for weather alerts?

IPAWS supports WEA and EAS messages in English and Spanish, but alerting authorities choose whether to provide alerts in Spanish. NWS provides all WEA messages in English and Spanish and a limited number of EAS messages in languages other than English.

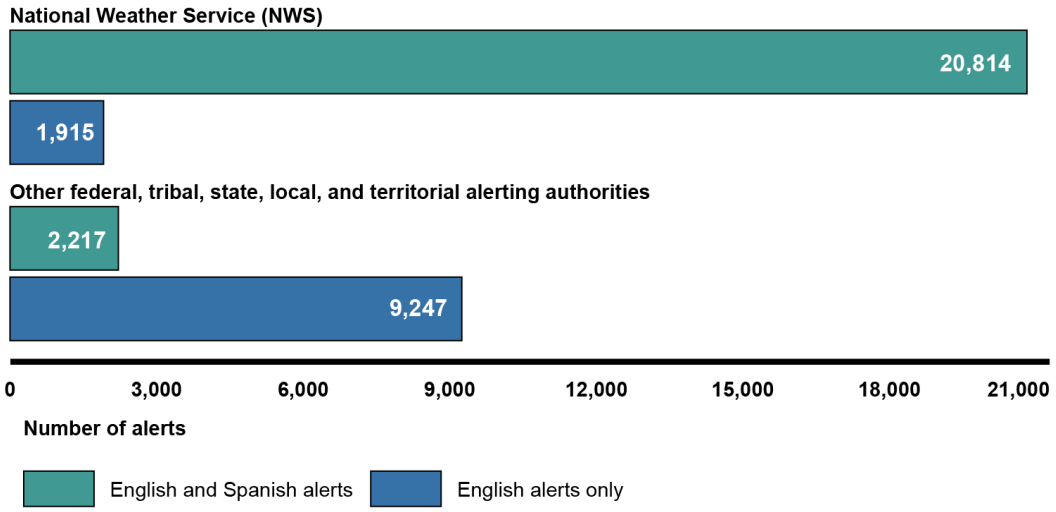
### WEA

WEA messages can be provided in English and Spanish. Specifically, IPAWS supports WEA messages in English and Spanish, but certain Spanish characters may not be displayed in WEA messages on users' phones, as discussed below. In addition, FCC requires participating wireless carriers to support WEA messages in Spanish.[14] When an alerting authority provides a WEA message in both English and Spanish, the Spanish alert is displayed on a user's device only if its default language is set to Spanish; otherwise, the device displays the message in English.[15]

NWS provided the majority of all WEA messages from December 2019 through December 2024, according to our analysis of FEMA data (see fig. 2). Specifically, NWS provided about two-thirds of all WEA messages during this time period (22,729 of 34,193 messages).[16] NWS began providing some WEA messages in Spanish in June 2020 and provided all of its WEA messages in English and Spanish from December 2020 through December 2024, according to FEMA

data.[17] Other federal, tribal, state, local, and territorial alerting authorities provided the remaining third of WEA messages from December 2019 through December 2024. About 80 percent of these messages were in English only.

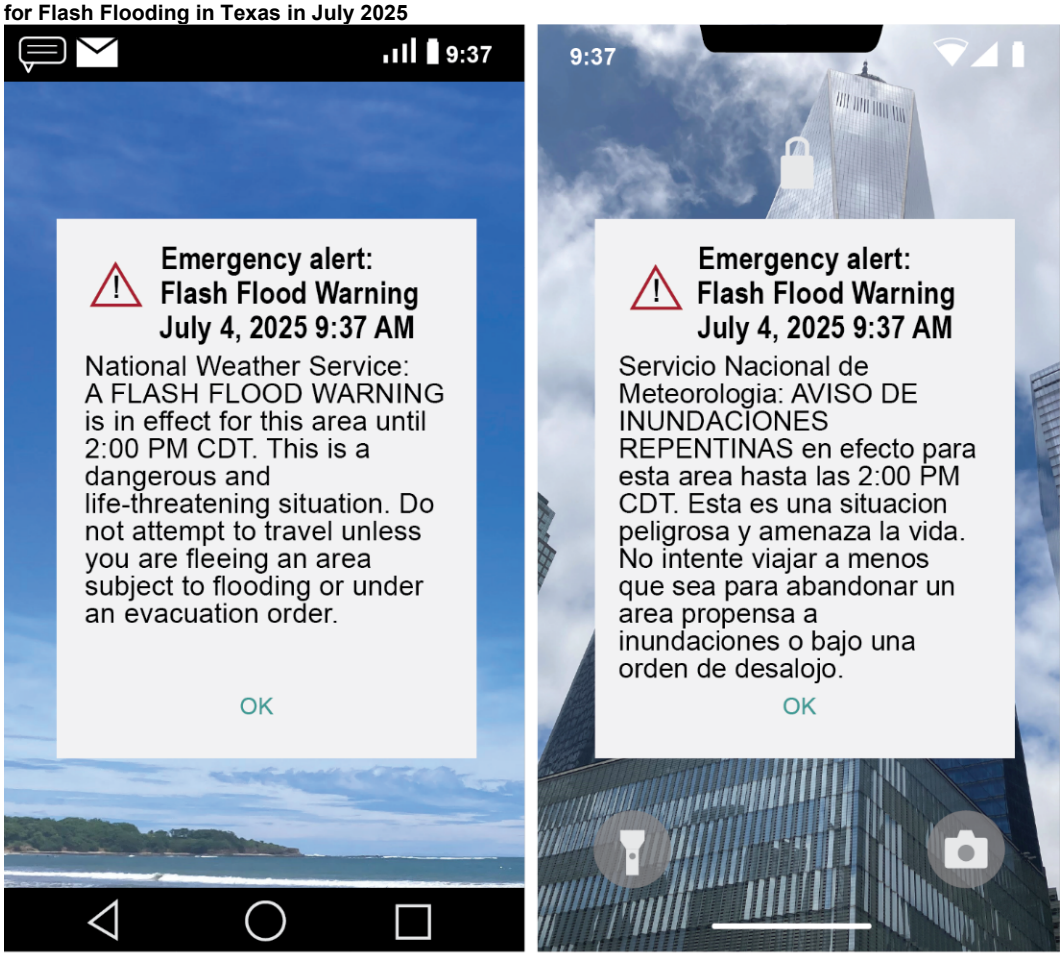
**Figure 2: Number of Wireless Emergency Alerts That Alerting Authorities Provided from December 2019–December 2024, by Language**




Source: GAO analysis of Federal Emergency Management Agency data. | GAO-26-107680

Figure 3 shows an example of an NWS WEA message provided in English and Spanish during flash flooding in Texas in July 2025.

**Figure 3: Wireless Emergency Alerts Provided by the National Weather Service in English and Spanish for Flash Flooding in Texas in July 2025**



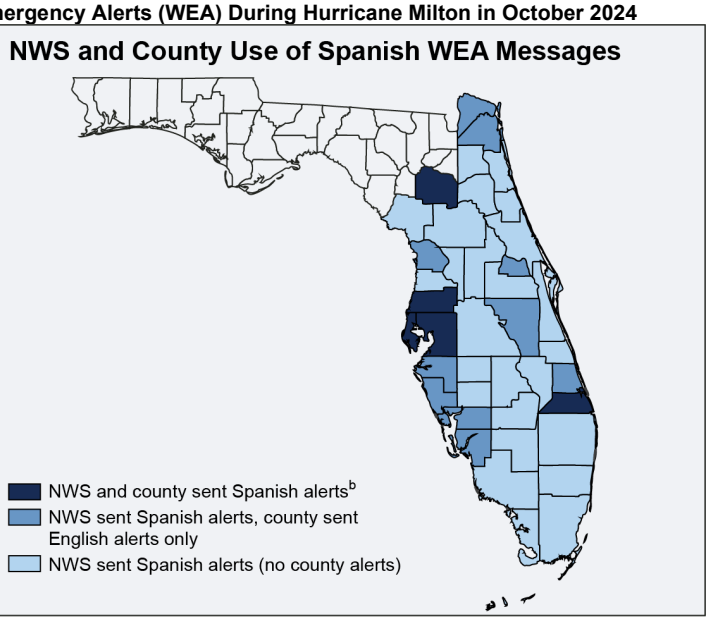

Source: GAO representation of Public Broadcasting Service Warning, Alert, and Response Network information. GAO images. | GAO-26-107680

We also reviewed WEA messages provided during Hurricane Milton in October 2024. NWS provided about 80 percent of the alerts sent in Florida during this event—all in English and Spanish—and counties issued the remaining alerts, generally in English only (see fig. 4).

**Figure 4: Languages in Which Alerting Authorities Provided Wireless Emergency Alerts (WEA) During Hurricane Milton in October 2024**

**Key Facts:**

- Hurricane Milton made landfall in Florida on October 9, 2024 as a Category 3 storm, causing over $30 billion in damage.
- NWS provided 207 of 252 total WEA messages for locations in Florida from October 5 through October 10, 2024 (in English and Spanish).
- Counties provided the remaining 45 messages during this period, largely in English only.
- An estimated 577,000 households in these counties have limited English proficiency, meaning residents may not have been able to understand WEA messages sent in English only.[a]
- An estimated 80 percent of these households with limited English proficiency spoke Spanish, and an estimated 20 percent spoke other languages.[c]




Source: GAO analysis of National Weather Service (NWS) information, Federal Emergency Management Agency data, and U.S. Census Bureau's American Community Survey data, Map Resources. | GAO-26-107680

Note: NWS and other alerting authorities provided WEA messages in English or Spanish, the two languages currently supported.

[a]For this analysis, we used 2019–2023 5-Year American Community Survey data on limited English-speaking households, defined as those in which no member 14 years old and over (1) speaks only English or (2) speaks a non-English language and speaks English "very well."

[b]In one case, the county sent a Spanish alert, but NWS did not send any alerts for the county.

[c]Percentage estimates have margins of error at the 90 percent confidence level within plus or minus 0.5 percentage points.

### EAS

Most NWS EAS messages are in English only, in part because few NOAA Weather Radio transmitters broadcast in other languages. Of NWS's 122 weather forecast offices, five have Spanish NOAA Weather Radio transmitters.[18] In addition, the Pago Pago weather service office in American Samoa has a transmitter that broadcasts in both English and Samoan, according to NWS officials.

When NWS broadcasts certain products over NOAA Weather Radio, it recommends that relevant television and radio stations provide these alerts through EAS. Individual broadcasters have discretion to decide whether to air these EAS messages. As a result, agency data are limited on the languages in which television and radio stations broadcast NWS EAS messages. However, according to an FCC notice, most EAS messages are provided in English only.[19]

## What are federal agencies doing to make weather alerts available in more languages?

FCC, FEMA, and NWS have taken some steps to make weather alerts available in additional languages. For example, NWS provides its WEA messages in Spanish—as discussed above—and FEMA provides Spanish templates for certain WEA messages on its website. FCC has adopted requirements for wireless carriers to support template WEA messages in English and 14 other languages. These requirements will become effective in 2028.

## WEA

FCC has adopted requirements for participating wireless carriers to support WEA messages in additional languages. Specifically, in October 2023, FCC adopted an order requiring participating wireless carriers to support template WEA messages in English and 14 other languages.[20] In January 2025, FCC's Public Safety and Homeland Security Bureau established specific implementation parameters for template-based multilingual WEA messages and included templates for certain alert types in the required languages (see table 1). These requirements will go into effect in June 2028, 30 months after their December 2025 publication in the *Federal Register*.[21]

**Table 1: Summary of the Federal Communications Commission's (FCC) Requirements for Multilingual Wireless Emergency Alerts (WEA)**

| | |
|---|---|
| **Languages to be supported** | Spanish, Chinese (Simplified and Traditional), Tagalog, Vietnamese, Arabic, French, Korean, Russian, Haitian Creole, German, Hindi, Portuguese, Italian, and American Sign Language |
| **Alert types** | Weather alerts: dust storm warning, extreme wind warning, flash flood emergency, flash flood warning, hurricane warning, severe thunderstorm warning, snow squall warning, storm surge warning, tornado emergency, tornado warning, and tsunami warning<br>Other alerts: avalanche warning, boil water advisory, earthquake warning, fire warning, hazardous materials warning, 911 outage alert, and test alert |
| **Format of alerts** | Templates stored on wireless devices |
| **FCC report and order issued** | January 2025 |
| **Publication in *Federal Register*** | December 2025 |
| **Implementation deadline** | June 2028 |

Source: GAO analysis of FCC documentation. | GAO-26-107680

Note: In October 2023, FCC adopted an order requiring wireless carriers who participate in WEA to support template-based messages in the additional languages listed above. In January 2025, FCC's Public Safety and Homeland Security Bureau established specific implementation parameters for template-based multilingual WEA messages, including identifying the final set of alert types to be supported and their accompanying pre-scripted templates. See *In the Matter of Wireless Emergency Alerts; Amendments to Part 11 of the Commission's Rules Regarding the Emergency Alert System,* Third Report and Order, 38 FCC Rcd. 10.116 (2023) and *In the Matter of Wireless Emergency Alerts; Amendments to Part 11 of the Commission's Rules Regarding the Emergency Alert System,* Report and Order, 40 FCC Rcd. 43 (2025).

FCC has also initiated a broader rulemaking on modernizing the nation's alerting systems, which includes content on the language capabilities of WEA and EAS. Specifically, in August 2025, FCC adopted a notice of proposed rulemaking to examine whether fundamental changes could make WEA and EAS more effective, efficient, and better able to serve the public's needs. In the notice, FCC sought comment on a variety of issues, including the objectives that WEA and EAS should serve, the type of entities that should be able to send alerts, and security measures the systems should incorporate. FCC also sought comment on whether it should take additional steps to ensure alerts effectively reach non-English speaking populations.[22]

In addition, both FEMA and FCC were providing WEA templates in languages other than English, as of December 2025:

- **FEMA.** Since about September 2024, FEMA has made Spanish WEA templates available on its website to help alerting authorities provide alerts in Spanish for certain purposes, such as notifications about flooding.
- **FCC.** In July 2025, FCC posted WEA templates on its website for 18 alert types in English and 14 other languages—the same alert types and languages included in its requirements for multilingual WEA that were published in the *Federal Register* in December 2025. FCC also published guidance encouraging alerting authorities to use clickable links in WEA messages, which would direct the user to a webpage hosting the alert

messages in additional languages using the FCC templates. These templates include video templates for ASL alerts.[23]

### EAS

FCC has taken steps related to multilingual EAS but had not issued requirements as of December 2025. In February 2024, FCC issued a notice of proposed rulemaking seeking comment on the use of pre-scripted template alerts for EAS in the same languages chosen for the multilingual WEA templates.[24] FCC also requested comments on the feasibility of developing and implementing EAS messages in ASL, which would likely require a different format (i.e., video) than written template messages proposed for the other languages.

FCC's August 2025 notice of proposed rulemaking, discussed above, also sought comment on the multilingual capabilities of EAS.

As of December 2025, FEMA and NWS were not taking steps to expand the availability of EAS in languages other than English, according to agency officials. We describe challenges to doing so below.

## What challenges exist to providing weather alerts in languages other than English?

Federal agencies face several challenges related to providing weather alerts in languages other than English, according to public comments submitted as part of FCC's rulemaking process and interviews with federal agency officials and industry representatives.

### Shared challenges

Challenges with both WEA and EAS include the following:

- **Shared authority.** Multiple federal and nonfederal entities play a role in providing emergency alerts, and some parts of the process are not under federal jurisdiction.
- **Time required for system changes.** Making changes to alerting systems can be complex and time-consuming, including updating industry standards, making changes to software and devices, and providing training to users. In the past, FCC has provided long time frames to allow for these changes. For example, FCC adopted requirements for wireless carriers to support Spanish messages in September 2016 and set an implementation deadline of December 2019 for those requirements.[25]
- **Alerting authority capacity.** Federal, tribal, state, local, and territorial alerting authorities may not have the funding, staff expertise, or other resources needed to create alerts in languages other than English. The need to provide alerts quickly during severe weather events compounds this challenge.

### WEA

Challenges specific to WEA include the following:

- **Support for Spanish characters.** While WEA can support Spanish messages, wireless carriers may not support certain Spanish characters in WEA messages.[26] Specifically, if an alerting authority provides a message that has an unsupported character, such as certain accent marks and punctuation, the unsupported text may be automatically replaced with the English letter most closely approximating the character or deleted, according to documents we reviewed from an industry standards setting body.[27] In addition, how WEA messages with Spanish characters are displayed on a

device may vary across wireless carriers, FEMA officials said. According to NWS officials, removing accent marks from Spanish words can change their meaning. These officials said that using additional Spanish characters in NWS WEA messages would make the meaning of alerts clearer and better convey urgency.

- **Cellular network bandwidth limitations.** According to industry representatives, the WEA system uses a part of the cellular network that has limited bandwidth and is designed for speed and reliability. Because of these bandwidth limitations, it could be difficult for WEA to support non-templated messages in languages other than English and Spanish, according to industry representatives.

### EAS

Challenges specific to EAS include the following:

- **NWS reliance on NOAA Weather Radio.** NWS has a limited number of Spanish NOAA Weather Radio transmitters and does not have the resources to expand coverage, according to NWS officials. In addition, NWS does not have dedicated NOAA Weather Radio transmitters for languages other than English and Spanish. According to NWS officials, broadcasting in more than one language on a single transmitter would lead to delays in users receiving information in a language they can understand.
- **Voluntary nature of EAS.** Broadcasting EAS messages from NWS is voluntary for television and radio stations, and not all broadcasters choose to translate alerts. Some broadcasters do translate alerts into multiple languages to meet community needs. For example, one public television station in Minnesota broadcasts EAS alerts in English, Spanish, Somali, and Hmong in an automated process that uses templates. However, others may be hesitant to air alerts in languages other than English because of the interruption to their programming or because of fear of mistranslation or legal risk, according to industry representatives we interviewed.

## In what languages does NWS distribute its other weather products?

In addition to its WEA and EAS messages, NWS's local weather forecast offices and national centers issue a variety of weather products, most in English only. These weather products include local forecasts, severe weather warnings, aviation and marine forecasts, and drought information.[28] The offices distribute these products through their individual websites and other methods, such as social media and NOAA Weather Radio. In a typical year, NWS issues about 1.5 million forecasts and 50,000 weather warnings.

Some weather forecast offices and national centers translate selected weather information manually or using commercial translation software (see table 2).

**Table 2: Examples of Information National Weather Service (NWS) Offices Have Translated**

| Language | Type of information | Example |
|---|---|---|
| Spanish | Weather forecast office and national center webpages | Some offices and national centers provide Spanish information on their webpages. For example, staff from the Louisville weather forecast office created a Spanish webpage with manually translated content. |
| Spanish | Automated social media posts | More than 50 weather forecast offices automatically post content for certain types of watches or warnings in Spanish to their X feeds, according to NWS documentation. |
| Spanish | Television and radio interviews | Staff from the Miami weather forecast office do interviews in Spanish, according to NWS officials. |
| Spanish | Multimedia assistance in Spanish team and Spanish outreach team | Two groups of Spanish-speaking NWS staff translate weather information on request from weather forecast offices. |
| Samoan | Manual translation of products | The Pago Pago office provides selected forecasts in both English and Samoan for its forecast area in American Samoa. |

Source: GAO analysis of NWS documentation and interviews with agency officials. | GAO-26-107680

More recently, through its AI language translation project, NWS has used AI to translate some of its weather products into other languages. NWS started this project in 2021 and has provided translated products on a public website since October 2023. As of December 2025, NWS was using AI to translate selected products issued by about a quarter of its weather forecast offices and the National Hurricane Center into five languages, as table 3 shows.

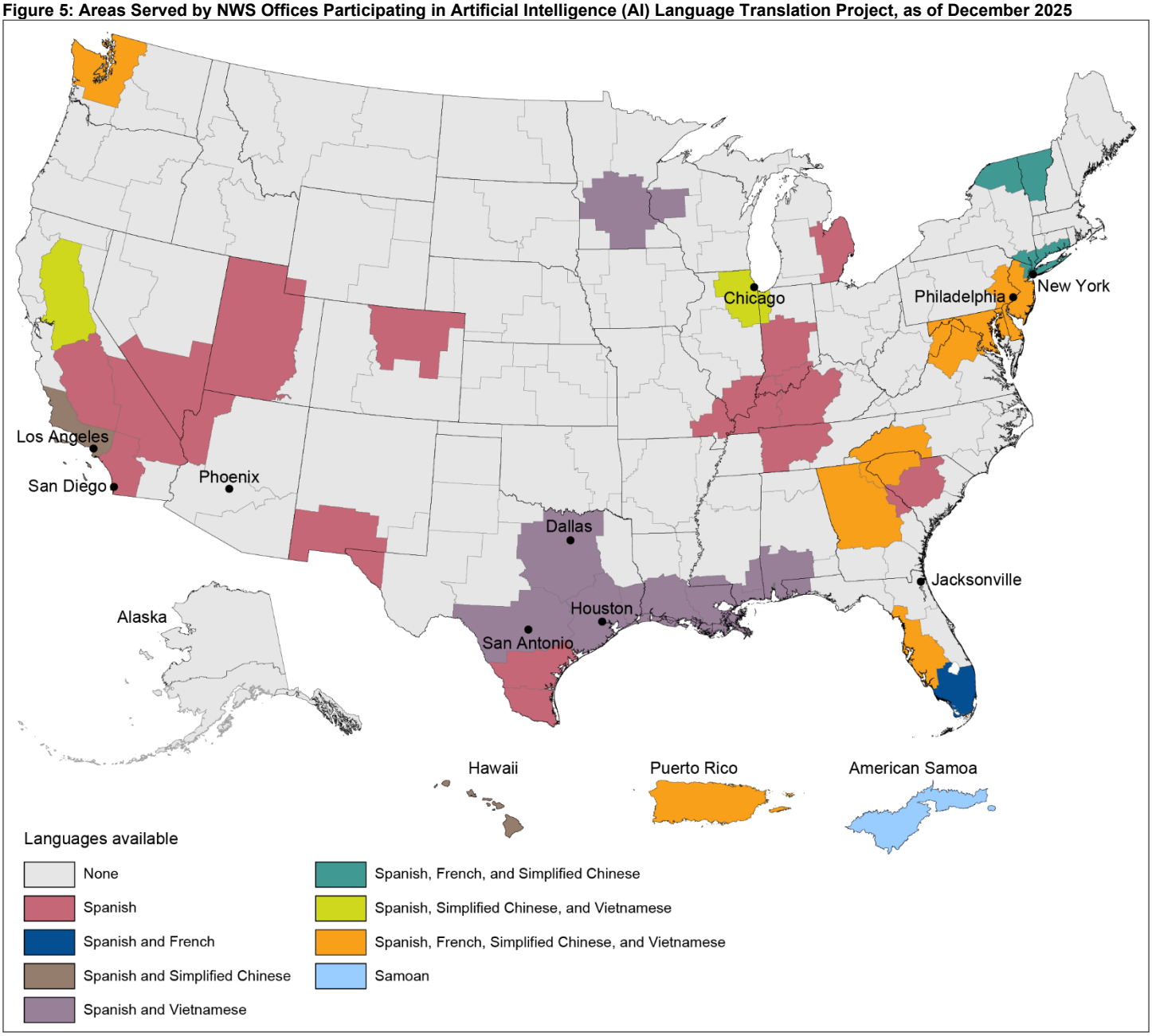
**Table 3: Summary of NWS Artificial Intelligence (AI) Language Translation Project, as of December 2025**

| | |
|---|---|
| **Offices participating** | 36 local National Weather Service (NWS) offices and the National Hurricane Center |
| **Product types** | Approximately 30 product types for participating offices, including selected forecasts; watches; warnings; hazard messages; other weather statements; and selected National Hurricane Center products, such as tropical weather outlooks |
| **Languages available** | Spanish, Simplified Chinese, Vietnamese, French, and Samoan |
| **Dissemination method** | www.weather.gov/translate/ and www.nhc.noaa.gov/ |

Source: GAO analysis of NWS documentation. | GAO-26-107680

Each NWS office participating in the AI translation project provides translations in one to four languages (see fig. 5). According to NWS officials, the AI translation models vary in quality and accuracy, with the Spanish model considered to be the most accurate. This is in part because it was the first model developed and has been trained for the longest time.

**Figure 5: Areas Served by NWS Offices Participating in Artificial Intelligence (AI) Language Translation Project, as of December 2025**




Source: GAO analysis of National Weather Service (NWS) information. | GAO-26-107680

Note: NWS's National Hurricane Center also provides AI-translated products in Spanish.

NWS also provides translations into seven languages for its nationwide weather forecast and hazards map, which shows the active warnings, watches, and advisories across the country.[29]

## How is NWS using AI to translate its weather products?

NWS has been using AI in an experimental capacity to automatically generate translations for selected weather products at participating offices. The translation process generally takes about 1 minute and is integrated into the system that forecasters use to generate weather products, according to NWS officials.

NWS chose to use AI to translate products most critical to the protection of life and property, according to NWS's October 2023 report to Congress on its translation project.[30] NWS selected geographic areas that have high proportions of people with limited English proficiency for its initial AI translations. NWS plans

to expand translations for operational use in the future, according to NWS documents we reviewed.

NWS has contracted with a commercial vendor to develop and operate this capability and relies on internal bilingual NWS staff to help train the AI models. In fiscal years 2022 through 2025, NWS obligated about $2.7 million total on the AI language translation contract.

According to NWS officials, it takes about 3 months to initially train the AI model for a new language, and models are trained and improved over time. To train the models, NWS bilingual staff and the contractor's linguists review translations of weather products and provide corrections to the model.

NWS officials identified several benefits to AI language translation, including the following:

- **Cost.** Using AI is less costly than employing the human translators needed to translate products 24 hours a day in multiple languages. NWS has limited bilingual staff, and AI allows weather forecast offices to provide translated products regardless of whether they employ staff that speak a certain language.
- **Speed.** The speed of AI translation allows NWS to quickly provide information in languages other than English during severe weather events. Officials from two NWS regional offices said AI was the only approach that would allow NWS to provide translations of its weather products effectively in real time.

In early April 2025, NWS briefly paused its AI translations and subsequently reduced the scope and funding for the project, according to NWS headquarters officials. According to these officials, the contract with its vendor lapsed on March 31, 2025, because of a requirement for department-level approval of NOAA contracts for more than $100,000. NWS halted its AI translation capabilities until a revised contract was signed about 3 weeks later.

The revised contract has a reduced scope, and the annual contract amount decreased from about $1 million to $600,000, NWS headquarters officials said. NWS plans to continue translations in the five previously supported languages, but the agency will not be able to start developing AI models for additional languages before April 2026. NWS also has limited ability to update and improve the language translation models under the new contract, according to the officials.

## What challenges does NWS face with providing translated weather products?

NWS faces several challenges with providing weather products in languages other than English, according to our review of NWS documents and interviews with NWS officials. These challenges include the following:

### Staff capacity

Staff capacity is a major challenge to providing translated weather products because significant time and effort are required for manual translations and to train AI language models.

A typical weather forecast office has about 20 to 25 staff, including forecasters responsible for issuing weather products around the clock. Translating products is an additional duty and NWS has a limited number of bilingual staff. For example, as of August 2025, NWS had just one staff member fluent in French who could help translate weather information into French. However, according to NWS officials, over time, as AI translation capability has improved, the need for manual translation by NWS staff has decreased.

NWS has previously acknowledged staffing challenges, and we and others have reported on them.[31] In addition, current workforce reduction initiatives, such as deferred resignations, have contributed to decreases in NWS staff capacity, according to agency officials.

### Funding

NWS's plans to add translation capabilities for additional languages depend on available funding, according to NWS's 2023 report to Congress and officials we spoke with. NWS did not request funds for the AI language translation project in its fiscal year 2024, 2025, or 2026 congressional budget justifications, according to our review of these justifications.[32]

According to headquarters officials, NWS did not request funds for the AI language translation project in fiscal year 2026 because it was awaiting guidance on the implementation of Executive Order 14224, which designated English as the official language of the U.S.

However, NOAA's fiscal year 2026 congressional budget justification stated that NWS would continue to translate key products into Spanish, Samoan, Chinese, Vietnamese, and French.

### Limited dissemination of translated products

Users seeking AI-translated weather products must take additional steps to find them because they are not available on NWS's main website or weather forecast office webpages. Instead, users must first find the translation website and use a series of drop-down menus to choose their preferred language, weather forecast office, and weather products of interest.

NWS is developing a new version of its main website (weather.gov), with the goal of incorporating translated content, according to agency officials.[33] NWS headquarters officials said an outreach campaign to improve awareness of translated NWS products would also be beneficial.

### Integrating AI translations into WEA alerts

NWS does not use AI translations to provide Spanish WEA messages because of limitations on the characters that wireless carriers support, as discussed above. Instead, NWS collaborated with FEMA and FCC to develop templates for its Spanish WEA messages that avoid using unsupported characters.

## What are NWS's plans for providing translated weather products in the future?

NWS has developed a plan for expanding the translation of its weather products, but this plan would benefit from updates and additional details.

According to its October 2023 report to Congress, NWS is committed to investing in technological capabilities to serve all people regardless of the language they speak.[34] The report described NWS's use of AI translation to date and future plans for the project, such as expanding the number of languages.

Through our prior work, we have identified key practices for effectively implementing federal evidence-building and performance-management activities. Specifically, we identified three key practices that can help a federal agency plan by providing a clear picture of what the agency is trying to achieve, how the agency will achieve it, and any obstacles that may affect the agency's ability to do so.[35]

NWS has partially followed these three practices for its AI language translation project, as table 4 shows.

**Table 4: Extent to Which the National Weather Service (NWS) Has Followed Selected Key Planning Practices for Its Artificial Intelligence (AI) Language Translation Project**

| Key practice | Summary of NWS actions to address key practice |
|---|---|
| **Define goals:** Federal organizations should identify results they seek to achieve, including long-term outcomes and near-term measurable results | In its October 2023 report to Congress, NWS identified long-term outcomes for the project and activities for fiscal years 2023 to 2028. However, NWS has not documented measurable performance goals for the project tied to specific time frames. |
| **Identify strategies and resources:** Federal organizations should identify how they plan to achieve their goals, including the resources needed | In its October 2023 report to Congress, NWS documented some strategies to meet the goals of the project, and NWS officials told us about additional strategies and resource needs. However, NWS has not documented strategies for achieving all of its goals or the funding, workforce, and IT resources needed for the project. |
| **Assess the environment:** Federal organizations should identify internal and external factors that could affect goal achievement and define strategies to address or mitigate the factors | In its October 2023 report to Congress, NWS documented some challenges and strategies to address them. NWS officials told us about additional internal and external factors that could affect goal achievement for the project. However, NWS has not documented all of these factors or strategies to address or mitigate them. |

Source: GAO analysis of NWS documentation and interviews. | GAO-26-107680

Note: For NWS's October 2023 report to Congress, see National Oceanic and Atmospheric Administration, *Report to Congress: The National Oceanic and Atmospheric Administration's Plan and Timeline to Provide Translations of its Weather Products and Warnings* (Oct. 11, 2023). For selected key management and assessment practices, see GAO, *Evidence-Based Policymaking: Practices to Help Manage and Assess the Results of Federal Efforts*, GAO-23-105460 (Washington, D.C.: July 12, 2023).

Officials said that the long-term vision for the project is to make AI translations available through NWS's normal dissemination channels, such as the NWS website and NOAA Weather Radio. According to these officials, NWS has not developed a long-term plan for the AI translation project because of current uncertainty on how the project will fit into broader NWS efforts, such as the redesign of its website. Furthermore, NWS has not updated its plan for translating its weather products because it has not been required to do so by Congress, according to the officials.

NWS's AI language translation project could play a key role in expanding the accessibility of weather products, in turn helping reduce risks to public health and safety during extreme weather events. However, the project has faced some recent challenges, including staff capacity and funding, as noted above.

NWS could better manage the project by establishing and communicating measurable performance goals, resource needs, and strategies to address internal and external challenges. Specifically, an updated implementation plan could help NWS use its existing resources to support the highest priority activities, realistically plan for the future of the project, and communicate resource needs to Congress. Such a plan could also help NWS gather information to track its progress in implementing AI language translation and identify opportunities to improve the project. Without an updated plan, NWS risks spreading resources thin, missing critical milestones, or being unprepared to address challenges.

## How could agencies better communicate weather information in other languages?

Several actions could help federal agencies better communicate weather information in languages other than English, according to our interviews with stakeholders and review of the literature.[36] These actions could improve access to emergency weather information for people with limited English proficiency.

As part of our literature search, we identified 10 relevant publications, which we describe in more detail in appendix I.

### Making more weather information available in other languages

According to stakeholders, there is a need for weather information in languages other than English, and these needs vary by local area. According to one stakeholder, because of this lack of information in other languages, people may not know where to find safety or support during emergencies.

For Spanish, there is a need for more detailed information equivalent to what is provided in English, according to stakeholders. For example, one stakeholder said that translated messages often contain links to other resources, which are generally in English only, limiting their usefulness.

One study investigated experiences of Hispanic and Latino immigrants affected by a 2021 multistate tornado outbreak, including by interviewing immigrants and their community leaders.[37] The study reported that even when participants received weather alerts in Spanish, they did not always receive the detailed information they needed to take appropriate action.

### Improving quality of translations

Stakeholders discussed the need for quality translations. For example, one stakeholder said they could not rely on AI for translations and that someone who speaks the language must also review translations for accuracy. Another stakeholder recommended that agencies create dedicated departments for translation services, rather than relying on volunteers.

One study surveyed English and Spanish speakers about a 2019 NWS brochure on rip current safety that was in English and Spanish.[38] Spanish-speaking participants explained that literally translated phrases did not always make sense. For example, the brochure used *corrientes de resaca* for rip current, which for certain Spanish speakers translates to “hangover current.”

### Developing content that is easier to understand

Using simple terms and providing information using pictures or in audio recordings can help make translated weather information easier to understand, according to stakeholders. Some immigrants may not understand certain weather terms, and simplifying language could help people take the correct action in response to an alert, according to one stakeholder. For example, according to the stakeholder, some Guatemalan immigrants in their community were not familiar with hurricanes, and as a result, it was hard for them to understand information about Hurricane Milton and take the actions needed to prepare.

Another stakeholder said that images can make information more accessible to more people, such as those with low literacy and speakers of less common languages. Some stakeholders said that hearing an alert instead of reading it could be helpful. For example, according to one stakeholder, some Guatemalans in their community cannot read but would understand spoken Spanish.

One study surveyed a sample of English and Spanish speakers about their understanding of weather forecast information.[39] The results indicated that Spanish speakers had difficulty interpreting and understanding the urgency associated with the Spanish terms that NWS and FEMA use to convey weather watches and warnings.

### Engaging with communities

It is important for alerting authorities to engage with communities and provide information through trusted, community-based sources, according to

stakeholders. One of the main challenges to communicating emergency information to people with limited English proficiency is that many such individuals do not trust government sources, according to stakeholders from two community organizations.

In the study of Hispanic and Latino immigrants' experiences during a 2021 multi-state tornado outbreak, some participants said local school districts, community organizations, and surrounding churches were important as trusted sources of information during severe weather events.[40]

## Conclusions

People with limited English proficiency may not be able to understand emergency weather information in English. This can cause them to face higher risks during severe weather events.

Federal agencies have taken some actions to make weather alerts and other products available in languages other than English. However, agencies also face challenges providing weather alerts in other languages. For example, NWS faces some challenges with its project using AI to automatically translate some weather products into languages other than English. This experimental project could help reduce risks to public health and safety during extreme weather events. NWS developed a plan and timeline for its AI translation project and has stated it intends to continue these efforts.

However, NWS has not updated its plan for the longer term. Incorporating certain key practices such as developing measurable performance goals and identifying resource needs and strategies to address internal and external challenges would help NWS better manage the project, plan for its future, and communicate resource needs to Congress. Such a plan could also help NWS gather information to track its progress implementing AI language translation and identify opportunities to improve the project.

## Recommendation for Executive Action

The Director of NWS should develop an updated implementation plan for NWS's AI language translation project. The updated plan should document (1) measurable performance goals tied to specific time frames; (2) resources needed to achieve each goal, such as funding, workforce, and IT needs; and (3) internal and external factors that could affect NWS's ability to achieve its goals and strategies to address these factors. (Recommendation 1)

## Agency Comments

We provided a draft of this report to the Department of Commerce, the Department of Homeland Security, and FCC for review and comment. The Department of Commerce's NOAA agreed with our recommendation, stating that it would develop an updated implementation plan for the AI language translation project as part of a comprehensive language access plan. NOAA, the Department of Homeland Security, and FCC provided technical comments, which we incorporated as appropriate.

## How GAO Did This Study

We reviewed relevant laws, regulations, executive orders, policies, and guidance on emergency alerting and federal agencies' responsibilities for providing information to individuals with limited English proficiency. We reviewed FCC, FEMA, and NWS documents related to providing alerts and weather products in languages other than English. These documents included those adopted by FCC during its rulemaking processes for multilingual WEA and EAS, IPAWS guidance, and documentation of NWS's contract with its AI translation vendor.[41] We also conducted a literature review of research studies and government reports related to communicating weather and other emergency information in languages other

than English (see app. I).[42] We reviewed NWS webpages and social media for examples of how NWS provides translated weather information.

We analyzed FEMA IPAWS data on WEA messages sent from December 2019 through December 2024 by NWS and other alerting authorities, the most recent 5-year period for which data were available. To assess the reliability of these data, we performed electronic testing for obvious errors in accuracy and completeness, reviewed related documentation, and reviewed written responses from agency officials. We determined that the data were sufficiently reliable for the purpose of reporting trends in WEA messages and the languages of the alerts.

We also analyzed the Census Bureau's 2019 to 2023 5-year American Community Survey public use microdata archived by IPUMS to produce estimates of individuals with limited English proficiency in the U.S.[43] We used 2019 to 2023 5-year American Community Survey data from data.census.gov to acquire estimates of households with limited English proficiency in selected counties, the most recent 5-year period for which data were available. We assessed the reliability of the American Community Survey data by reviewing related Census documentation and determined the data were sufficiently reliable for our purposes of reporting the number of households with limited English proficiency.

We interviewed and obtained written responses from FCC, FEMA, and NWS headquarters officials about their agencies' roles related to WEA and EAS, including actions taken to facilitate alerts in other languages. We also interviewed NWS officials about the agency's use of AI and other methods to provide non-English weather products. Specifically, we interviewed officials from NWS headquarters—including from the NWS AI Language Translation Team—all six regional offices, one national center, and at least two weather forecast offices in each of the five NWS regions with language translation activities.[44]

We have previously identified 13 key practices that can help federal agency leaders develop and use evidence to effectively manage and assess the performance of federal programs.[45] Because NWS's AI language translation project is relatively new and these translations are experimental, we selected three key practices related to planning for results and assessed NWS actions against these three practices.

We also interviewed representatives from state and local alerting authorities, industry, and advocacy groups and community organizations.[46] The results of these interviews are not generalizable to all stakeholders but provide insight on emergency alerting and the use of WEA and EAS messages in languages other than English, including challenges.

We conducted some of these interviews as part of site visits to New York and Florida. During these visits, we spoke to officials from NWS and local alerting authorities about their processes for translating and providing alerts and other products in languages other than English. We also spoke to representatives from a community organization that operates a local radio station that airs alerts and other content in languages other than English.

We conducted this performance audit from July 2024 to January 2026 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.

## List of Addressees

The Honorable Jerry Moran
Chair
The Honorable Chris Van Hollen
Ranking Member
Subcommittee on Commerce, Justice, Science, and Related Agencies
Committee on Appropriations
United States Senate

The Honorable Hal Rogers
Chair
The Honorable Grace Meng
Ranking Member
Subcommittee on Commerce, Justice, Science, and Related Agencies
Committee on Appropriations
House of Representatives

We are sending copies of this report to the appropriate congressional committees, the Secretary of Commerce, the Secretary of Homeland Security, the Chaiman of the Federal Communications Commission, and other interested parties. In addition, the report is available at no charge on the GAO website at https://www.gao.gov.

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## Appendix I: Publications Identified in Our Literature Search

We conducted a literature search to identify research studies and government reports that met the following criteria:

(1) issued within the past 10 years;

(2) contained information on weather alerts, emergency alerts, or emergency-related public communications;

(3) contained information related to individuals with limited English proficiency or speakers of languages other than English; and

(4) were published in a peer-reviewed journal or by a research organization or governmental entity.

For each research study, we reviewed the methodology and determined whether it was suitable for examining actions that could help federal agencies improve

their communication of weather information in languages other than English. We identified 10 publications that met these criteria. Our analysis identified four common themes across the studies: improving the quality of translations, developing content that is easier to understand, making more information available in other languages, and engaging with communities. See table 5.

**Table 5: Summary of Literature Review Sources**

| Citation | Method | Themes covered in study |
|---|---|---|
| Bernhardt, Jase, Kathleen Fallon, and Gregory Dusek. "Conoce Tus Opciones: The Challenges of Communicating Rip Current Information in Spanish." *Weather, Climate, and Society,* vol.16 no. 4 (2024): 597–609. | Conducted a nongeneralizable survey of 139 English and Spanish speakers to test perceptions of a brochure on rip current safety in English and Spanish. | Improving quality of translations<br><br>Developing content that is easier to understand |
| Bitterman, Abby, Makenzie J. Krocak, Joseph T. Ripberger, et al. "Assessing Public Interpretation of Original and Linguist-Suggested SPC Risk Categories in Spanish." *Weather and Forecasting*, vol. 38, no. 7 (2023): 1095–1106. | Conducted a survey of 1,050 Spanish speakers to investigate their interpretations of weather-related risk communication terms used by the National Weather Service's Storm Prediction Center. | Improving quality of translations<br><br>Developing content that is easier to understand |
| Frommberger, Lutz and Nuwan Waidyanatha. "Pictographs in Disaster Communication for Linguistically Challenged and Illiterate Populations: A Survey on Background and Existing Practices." *International Journal of Information Systems for Crisis Response and Management,* vol. 9, no.2 (2017): 37–57. | Conducted four field studies, including group discussions led by a local facilitator, with illiterate populations in international disaster areas to assess participants' understanding of sets of symbols. | Developing content that is easier to understand |
| Hopfer, Suellen, An-qi Jiao, Meng-yi Li, Anna Lisa Vargas, and Jun Wu. "Repeat Wildfire and Smoke Experiences Shared by Four Communities in Southern California: Local Impacts and Community Needs." *Environmental Research: Health,* vol. 2, no. 3 (2024). | Conducted focus groups with 118 Spanish speakers in an area of California prone to wildfires to learn about their experiences with wildfires and wildfire smoke impacts and risk communication preferences. | Making more information available in other languages<br><br>Engaging with communities |
| Ike, Brooke R., Rebecca Calhoun, Antoinette S. Angulo, Hendrika Meischke, and Kirsten D. Senturia. "Medical Interpreters and Bilingual School Staff: Potential Disaster Information Conduits?" *Journal of Emergency Management,* vol. 13, no. 4 (2015): 339–348. | Conducted interviews with 36 medical interpreters and school administrators, focus groups with 44 Latino community members, and a nongeneralizable survey of 10 organizations that employ or represent medical interpreters to investigate the ability of Spanish-speaking medical interpreters and bilingual school staff to serve as conduits of disaster information. | Making more information available in other languages<br><br>Engaging with communities |
| Intergovernmental Advisory Committee to the Federal Communications Commission. *Advisory Recommendation No: 2019-5: In the Matter of Multilingual Emergency Alerting.* Washington, D.C.: 2019. | Held a meeting in 2019 to discuss multilingual emergency alerts, including various aspects of alerting. Developed conclusions and recommendations. | No study results to analyze |
| Jung, Alice R., Kiril D. Hristovski, Jon W. Ulrich, and Albert F. Brown. "Understanding Comprehension Levels of Emergency Notifications by Limited English Proficient US Residents: Case Study of Korean-Americans in New York City." *Journal of Homeland Security and Emergency Management,* vol. 12 no. 4 (2015): 845–859. | Conducted a nongeneralizable survey of 98 native English speakers and Korean speakers with limited English proficiency to investigate readability and understanding of English alerts and notifications. | Improving quality of translations<br><br>Developing content that is easier to understand |
| MacPherson-Krutsky, Carson, Mary Angelica Painter, and Melissa Villareal. *Inclusive Emergency Alerts for Colorado: An Assessment and Recommendations for Language and Disability Considerations: Final Report.* Boulder: Natural Hazards Center, 2024. | The University of Colorado Boulder reviewed existing research literature (not included in our analysis), conducted a statewide survey of 222 emergency response personnel from 57 counties, and interviewed about 35 key stakeholders to assess inclusive emergency alerts. | Making more information available in other languages<br><br>Improving quality of translations |
| Trujillo-Falcón, Joseph E., América R. Gaviria Pabón, Justin Reedy, and Kimberly E. Klockow-McClain. "Systemic Vulnerabilities in Hispanic and Latinx Immigrant Communities Led to the Reliance on an Informal Warning System in the December 10–11, 2021, Tornado Outbreak." *Natural Hazards Review,* vol. 25 no. 2 (2024). | Interviewed 25 Hispanic and Latino immigrants and their community leaders to investigate experiences of those impacted by a 2021 multistate tornado outbreak. | Making more information available in other languages<br><br>Developing content that is easier to understand<br><br>Engaging with communities |
| Trujillo-Falcón, Joseph E., América R. Gaviria Pabón, Joseph T. Ripberger, et al. "¿Aviso O Alerta? Developing Effective, Inclusive, and Consistent Watch and Warning Translations for U.S. Spanish Speakers," *Bulletin of the American Meteorological Society*, vol. 103, no. 12 (2022): 2791–2803. | Conducted a survey of a nationwide sample of 2,600 English and Spanish speakers to investigate perception and understanding of weather forecast information in each language. | Improving quality of translations<br><br>Developing content that is easier to understand |

Source: GAO analysis of selected research studies and government reports. | GAO-26-107680

## Endnotes

[1]Estimates covering the number of individuals with limited English proficiency in the U.S. were derived from the U.S. Census Bureau's 2019–2023 5-year American Community Survey (ACS) public use microdata, archived by IPUMS-USA. For the purpose of our report, we refer to individuals who speak English less than "very well" as individuals with limited English proficiency. We also consolidated the following languages into larger language categories: Chinese includes Mandarin and Cantonese; Tagalog includes Filipino; and French includes Cajun.

[2]ASL is a visual language primarily used by Deaf and hard of hearing individuals, separate and distinct from English. The U.S. Census Bureau does not collect data on the number of ASL users in the U.S. According to the Census Bureau, it does not provide separate data about ASL use because American Community Survey questions capture languages spoken and English-speaking ability and are not designed to identify ASL users. The Rehabilitation Act of 1973 prohibits agencies from denying individuals with disabilities the benefits of federal programs and requires federal agencies to use electronic and information technology that allows individuals with disabilities to access information from the agencies. 29 U.S.C. §§ 794, 794d. While we provide some information in this report on agency efforts related to providing alerts and other products in ASL, services provided pursuant to the Rehabilitation Act of 1973 are not the focus of this report.

[3]65 Fed. Reg. 50,121, 50,121 (Aug. 16, 2000).

[4]90 Fed. Reg. 11,363, 11,363 (Mar. 6, 2025). The executive order noted that agencies should make decisions as they deem necessary to fulfill their respective agency's mission and efficiently provide government services to the American people. Additionally, under the order, agencies are not required to amend, remove, or otherwise stop production of documents, products, or other services prepared or offered in languages other than English. *Id.* In July 2025, the Attorney General issued a memorandum to federal agencies with guidance for implementing Executive Order 14224, with additional guidance expected to be released for public comment within 180 days. Office of the Attorney General, *Implementation of Executive Order No. 14224: Designating English as the Official Language of the United States of America* (July 14, 2025).

[5]To receive WEA messages, a user must (1) have a compatible mobile device, (2) have a service plan with a wireless provider that participates in WEA, (3) have their device turned on, (4) have notifications enabled, and (5) be within range of a cell tower in the area associated with the alert.

[6]For the purposes of this report, we use the term "wireless carriers" to refer to commercial mobile service providers that have elected to participate in WEA. Participation in WEA is voluntary, but wireless carriers that choose to participate must comply with the technical and operational requirements established in FCC regulations. *See* 47 C.F.R. § 10.210. According to FCC documentation, the majority of wireless consumers are served by participating wireless carriers, which include the three largest nationwide providers—AT&T, T-Mobile, and Verizon.

[7]Other media platforms that provide EAS alerts include satellite television, wireline video systems, and satellite radio. EAS participants must deliver Presidential alerts, nationwide tests, and required monthly and weekly tests. While FCC regulations require all radio, television, and cable stations to maintain equipment capable of monitoring the IPAWS EAS feed and other radio and television stations, delivery of other EAS alerts such as weather or law enforcement is voluntary. EAS participants, through their State Emergency Communications Committee, may maintain state EAS plans that contain procedures for the distribution of national-level alerts as well as other voluntary alerts generated by state and local alerting authorities and NWS. *See* 47 C.F.R pt. 11.

[8]*See* 47 C.F.R. pts. 10,11. The Warning, Alert, and Response Network Act required that, among other things, FCC adopt relevant technical standards, protocols, procedures, and other technical requirements necessary to enable commercial mobile service alerting capability for commercial mobile service providers that voluntarily elect to transmit emergency alerts. Pub. L. No. 109-347, tit. VI, § 602(a), 120 Stat. 1884, 1936 (2006) (codified as amended at 47 U.S.C. § 1201(a)).

[9]6 U.S.C. § 321o(b)(3).

[10]For the purposes of this report, we refer to alerts sent through WEA and EAS with content that originated from NWS as weather alerts "provided by" NWS. According to NWS documentation, the product types that trigger a WEA message include dust storm warning, extreme wind warning, flash flood warning, flash flood warning emergency, hurricane/typhoon warning, severe thunderstorm warning, snow squall warning, storm surge warning, tornado warning, tornado warning emergency, and tsunami warning. Flash flood, severe thunderstorm, and snow squall warnings trigger WEA only under certain conditions.

[11]These entities generally must apply to FEMA to become approved to send alerts using the IPAWS system. According to FEMA documentation, other public or private-sector organizations may also be eligible for approval, depending on their public safety mission. Entities may issue non-IPAWS EAS messages in accordance with state rules.

[12]For the purposes of this report, we refer to information sent through WEA and EAS as "messages" or "alerts." We refer to WEA and EAS messages related to weather events—provided by NWS or other alerting authorities—as "weather alerts."

[13]NOAA has identified reasons unrelated to language availability for relying on NOAA Weather Radio for EAS, rather than IPAWS, as we reported in 2023. GAO, *Emergency Alerts: NOAA Should Take Additional Actions to Help Ensure Tsunami Alerts Reach Those at Risk*, GAO-23-105961 (Washington, D.C.: May 16, 2023).

[14]*See* 47 C.F.R. § 10.480.

[15]The WEA message received also depends on the capabilities of the person's wireless device. For example, some older devices may display shorter messages or be unable to support Spanish messages.

[16]For the purposes of this analysis, we excluded WEA test messages, updates, and cancellations from the calculated total number of messages.

[17]IPAWS began accepting WEA messages in Spanish in December 2019, according to FEMA officials.

[18]There are seven Spanish NOAA Weather Radio transmitters associated with these five weather forecast offices.

[19]*In the Matter of Amendment of Part 11 of the Commission's Rules Regarding the Emergency Alert System,* Notice of Proposed Rulemaking*,* 39 FCC Rcd. 1949 (2024).

[20]*In the Matter of Wireless Emergency Alerts; Amendments to Part 11 of the Commission's Rules Regarding the Emergency Alert System,* Third Report and Order, 38 FCC Rcd. 10,116 (2023).

[21]90 Fed. Reg. 57,288 (Dec. 10, 2025).

[22]Specifically, the notice of proposed rulemaking sought comments on how the nation's alerting systems can better serve communities by delivering alerts in the languages they understand, whether FCC should take additional steps to ensure alerts effectively reach non-English-speaking populations, and how multilingual capabilities should inform the design and modernization of WEA and EAS. *In the Matter of Modernization of the Nation's Alerting Systems,* Notice of Proposed Rulemaking*,* 40 FCC Rcd. 6695 (2025).

[23]Because ASL is a visual language expressed by movements of the hands and face, ASL weather alerts and other products require a video format.

[24]39 FCC Rcd. 1949.

[25]Initially, wireless carriers would be required to support this capability within 2 years of the rule's publication in the *Federal Register*, but FCC later extended the compliance deadline, first to May 1, 2019, and later to December 19, 2019. *In the Matter of Wireless Emergency Alerts; Amendments to Part 11 of the Commission's Rules Regarding the Emergency Alert System,* Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd. 11,112 (2016); *Wireless Emergency Alerts; Amendments to Part 11 of the Commission's Rules Regarding the Emergency Alert System*, Second Report and Order and Second Order on Reconsideration, 33 FCC Rcd. (2018); and *New Enhancements to Wireless Emergency Alerts Will Be Available on December 13, 2019,* Public Notice, 34 FCC Rcd. 11,042 (2019).

[26]FCC requires participating wireless carriers to support the transmission of Spanish-language WEA messages. *See* 47 C.F.R. § 10.480.

[27]While we reviewed FEMA data on WEA messages sent from December 2019 through December 2024, we did not review any Spanish WEA messages as displayed on wireless devices.

[28]NWS issues severe weather advisories, watches, and warnings depending on the severity and timing of an event. For the purposes of this report, we refer to these as weather products. NWS also provides some preparedness information in ASL, such as safety tips and instructions for using NOAA Weather Radios. However, as discussed above, this report does not focus on services provided pursuant to the Rehabilitation Act of 1973.

[29]Translations of NWS's nationwide weather forecast and hazards map are available on its AI translation website, but it uses content generated by human translators, according to NWS officials. The map was available in French, Haitian Creole, Samoan, Simplified Chinese, Spanish, Tagalog and Vietnamese, as of December 2025.

[30]NOAA, *Report to Congress: The National Oceanic and Atmospheric Administration's Plan and Timeline to Provide Translations of its Weather Products and Warnings* (Oct. 11, 2023).

[31]See GAO, *National Weather Service: Reform Efforts Could Benefit from Additional Actions and Continued Attention*, GAO-22-105449 (Washington, D.C.: Oct. 14, 2021); *National Weather Service: Additional Actions Needed to Improve the Agency's Reform Efforts*, GAO-21-103792 (Washington, D.C.: Sept. 29, 2021); and *National Weather Service: Actions Have Been Taken to Fill Increasing Vacancies, but Opportunities Exist to Improve and Evaluate Hiring,* GAO-17-364 (Washington, D.C.: May 24, 2017). The National Academies has also reported on these challenges. See National Academy of Sciences, Committee on the Assessment of the National Weather Service's Modernization Program, *The National Weather Service Modernization and Associated Restructuring: A Retrospective Assessment* (Washington, D.C.: National Academies Press, 2012) and National Academy of Sciences, *Weather Services for the Nation: Becoming Second to None* (Washington, D.C.: National Academies Press, 2012).

[32]House Report 117-395 directed NOAA to expand its language translation efforts, noting that more steps must be taken to ensure that all weather forecast and warning products can be understood by limited English proficiency individuals. Further, the report indicated that the Committee expected the fiscal year 2024 budget request to include additional funding for this purpose. H.R. REP. No. 117-395, at 46 (2022).

[33]The National Weather Service website is at https://www.weather.gov.

[34]NOAA, *Plan and Timeline to Provide Translations*.

[35]GAO, *Evidence-Based Policymaking: Practices to Help Manage and Assess the Results of Federal Efforts*, GAO-23-105460 (Washington, D.C.: July 12, 2023). We identified key actions for planning for results: (1) define goals (define goals for all activities, identify both long-term outcomes and near-term measurable results, and align goals across organizational levels), (2) identify strategies and resources (identify strategies for each goal; coordinate with other organizations, programs, and activities contributing to the goal, when applicable; and identify the resources needed to achieve each goal), and (3) assess the environment (identify internal and external factors that could affect goal achievement and define strategies to address or mitigate the factors).

[36]Some of the views shared by external stakeholders were about communication of emergency information more generally but could also be reasonably understood to apply to a severe weather context, which is a type of emergency.

[37]Joseph E. Trujillo-Falcón, América R. Gaviria Pabón, Justin Reedy, and Kimberly E. Klockow-McClain, "Systemic Vulnerabilities in Hispanic and Latinx Immigrant Communities Led to the Reliance on an Informal Warning System in the December 10–11, 2021, Tornado Outbreak," *Nat. Hazards Rev.,* vol. 25, no. 2 (2024).

[38]Jase Bernhardt, Kathleen Fallon, and Gregory Dusek, "Conoce Tus Opciones: The Challenges of Communicating Rip Current Information in Spanish," *Weather, Climate, and Society,* vol. 16 (2024).

[39]Joseph E. Trujillo-Falcón, América R. Gaviria Pabón, Joseph T. Ripberger, Abby Bitterman, Jonathan B. Thornton, Makenzie J. Krocak, Sean R. Ernst, Estilita Cassiani Obeso, and John Lipski, "¿Aviso o Alerta? Developing Effective, Inclusive, and Consistent Watch and Warning Translations for U.S. Spanish Speakers," *Bulletin of the American Meteorological Society* vol. 103, no. 12 (2022).

[40]Joseph E. Trujillo-Falcón, América R. Gaviria Pabón, Justin Reedy, and Kimberly E. Klockow-McClain, "Systemic Vulnerabilities in Hispanic and Latinx Immigrant Communities."

[41]These documents included FCC notices of proposed rulemaking, public notices, and reports and orders related to its proceedings on multilingual WEA and EAS. We also reviewed public comments on FCC's February 2024 public notice on implementation of multilingual WEA. *Public Safety and Homeland Security Bureau Seeks Comment on Implementation of Multilingual Wireless Emergency Alerts*, Public Notice, 39 FCC Rcd. 4678 (2024).

[42]A research librarian conducted searches in January and February 2025 in the following databases: Coronavirus Research Database, Criminology Collection, Education Database, ERIC, Global Newsstream, Health & Medical Collection, Policy File Index, ProQuest Dissertations & Theses Global, PTSDpubs, Publicly Available Content Database, Research Library, SciTech Premium Collection, and Sociology Collection in ProQuest; AgeLine, Business Abstracts with Full Text (H.W. Wilson), Business Continuity & Disaster Recovery Reference Center, Business Source Corporate Plus, CINAHL with Full Text, local holdings eBook collection, EconLit with Full Text, Finance Source, Index to Legal Periodicals Retrospective: 1908–1981 (H.W. Wilson), Leadership & Management Source, Newswires, and Risk Management Reference Center in EBSCOhost; all databases in the Aerospace & Defense, Automotive, Chemistry, Diagnostics & Medical Devices, Energy & Environment, Engineering & Technology, Financial Services, Food & Agriculture, Healthcare, Pharmaceutical & Biomedical, Telecommunications & Computing, and Unassigned content collections in ProQuest Dialog; Scopus; Lexis+; and NTRL. A research librarian also conducted Google site searches on NOAA.gov and FCC.gov in February 2025.

[43]Summary statistics were produced using SAS's SURVEYFREQ procedure, employing the jackknife replication method with the 80 replicate weights supplied with the microdata. IPUMS USA, a project of the Minnesota Population Center, provides curated access to U.S. census and survey data for research and analysis. Steven Ruggles et. al, "IPUMS USA, Version 16.0 [dataset]" (Minneapolis, MN: IPUMS, 2025), https://doi.org/10.18128/D010.V16.0.

[44]According to officials from the Alaska Region, no weather forecast offices in the region provide translated weather products.

[45]GAO-23-105460.

[46]Specifically, we interviewed representatives from five state and local alerting authorities, three industry associations, the Corporation for Public Broadcasting, four television or radio stations, one EAS device manufacturer, the Alliance for Telecommunications Industry Solutions, and four advocacy groups and community organizations.