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Report to Congressional Committees

March 2022

HOUSEHOLD HAZARDOUS WASTE REMOVAL

EPA Should Develop a Formal Lessons Learned Process for Its Disaster Response

GAO-22-104276

GAO Highlights

Highlights of GAO-22-104276, a report to congressional committees

March 2022

HOUSEHOLD HAZARDOUS WASTE REMOVAL

EPA Should Develop a Formal Lessons Learned Process for Its Disaster Response

Why GAO Did This Study

In 2018 and 2020, California experienced record-setting fire seasons, resulting in the damage to or destruction of over 20,000 structures. EPA plays a significant role in responding to some wildfires and coordinates federal efforts to assist with the removal of household hazardous waste. Following a fire, EPA recommends special handling and disposal for these products, particularly if their containers are compromised.

The Additional Supplemental Appropriations for Disaster Relief Act, 2019, includes a provision for GAO to review a range of response and recovery issues following the 2018 disaster season. This report examines (1) the steps EPA took to remove household hazardous waste after the 2018 and 2020 wildfires in California and (2) the extent to which EPA conducted lessons learned activities following its wildfire responses. GAO reviewed relevant agency documents related to household hazardous waste removal after wildfires and applied criteria for planning lessons learned activities. GAO interviewed representatives from federal agencies, as well as state and local officials involved in the response to the 2018 and 2020 wildfires.

What GAO Recommends

GAO is making one recommendation for EPA to develop a formal lessons learned process with written guidelines for its disaster response that incorporates key practices. EPA agrees with the recommendation.

View GAO-22-104276. For more information, contact J. Alfredo Gómez at (202) 512-3841 or gomezj@gao.gov

What GAO Found

To remove household hazardous waste—some items that can catch fire, react, or explode under certain circumstances or that are corrosive or toxic—after the 2018 and 2020 California wildfires, the Environmental Protection Agency (EPA) took steps that followed its emergency response policy. For example, EPA led coordination efforts between federal, state, and local agencies and established incident management teams. These teams developed plans for assessment, removal, transportation, and disposal of the waste. EPA removed waste from three counties in 2018 and seven counties in 2020. See figure below.

Examples of Household Hazardous Waste Removed by the Environmental Protection Agency after the 2018 and 2020 California Wildfires

Task force members removing household hazardous waste.

Empty fuel containers after the 2020 wildfires.

Source: EPA. | GAO-22-104276

Following its wildfire responses, EPA conducted lessons learned activities, such as gathering feedback from staff to identify lessons and developing corrective actions. Lessons learned provide a method to share good ideas for improving work processes, quality, and cost-effectiveness. Key practices of a lessons learned process include collecting and sharing information on positive and negative experiences and developing and tracking corrective actions.

However, GAO identified additional lessons learned activities that may have been useful. For example, GAO found that EPA does not track corrective actions in a formal, centralized way, and EPA has not implemented all of the needed corrective actions. After the 2018 wildfires, for example, EPA found that it needed to develop a proposal to increase the number of EPA On-Scene Coordinators responsible for overseeing disaster responses, but the agency did not do so.

EPA conducts lessons learned activities on a case-by-case basis and does not have a formal lessons learned process in place for wildfire or other disaster responses that specifies when and what lessons learned activities should be conducted. The National Response Framework—which describes how the federal government, states, and others should respond to disasters and emergencies—states that planning for disaster response should include a feedback loop, including through lessons learned processes. Developing a formal lessons learned process that includes key practices, such as tracking corrective actions, will help EPA be better prepared to respond to future disasters, including those that involve removing household hazardous waste.

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Abbreviations

CalRecycle	California Department of Resources Recycling and Recovery
DTSC	California Department of Toxic Substances and Control
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
RCRA	Resource Conservation and Recovery Act
Stafford Act	Robert T. Stafford Disaster Relief and Emergency Assistance Act

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Congressional Committees

In 2018 and 2020, California experienced record-setting fire seasons. On November 8, 2018, three major wildfires struck different parts of California, including the Camp Fire in Butte County—at the time the most destructive in state history.[1] The three fires resulted in 20,451 structures destroyed, 254,816 acres burned, and 89 deaths. Over 1.9 million acres burned during the 2018 wildfire season. Two years later, during the 2020 wildfire season, over 4.2 million acres burned. According to the Environmental Protection Agency (EPA), wildfires are expected to become more frequent and intense, particularly in some regions of the country.[2]

The federal government plays a significant role in responding to wildfires. Several federal agencies can become involved in responding to a disaster when response and recovery are beyond the capabilities of the state and local governments. Specifically, EPA coordinated the safe removal, transport, and disposal of household hazardous waste left behind after the three 2018 wildfires and seven 2020 wildfires, under the National Response Framework.[3] EPA considers some household products that can catch fire, react, or explode under certain circumstances or that are

[1]The other two fires were the Woolsey Fire in Los Angeles and Ventura Counties, and the Hill Fire in Ventura County.

[2]Environmental Protection Agency, "Climate Change Indicators: Wildfires" (July 21, 2021), accessed Jan. 26, 2022, https://www.epa.gov/climate-indicators/climate-change-indicators-wildfires.

[3]The National Response Framework describes how the federal government, states, localities, and other public- and private-sector institutions should respond to disasters and emergencies. In 2018 and 2020, the Federal Emergency Management Agency authorized federal agency response activities by issuing federal disaster declaration mission assignments, including for EPA. In 2018, this included EPA response activities to remove household hazardous waste after the Camp (Butte County), Hill (Ventura County), and Woolsey (Los Angeles County) wildfires. In 2020, this included EPA response activities to remove waste after the CZU Lightning (Santa Cruz and San Mateo Counties); Carmel, River, and Dolan (Monterey County); Creek (Fresno and Madera Counties); North Complex (Butte County); and SCU Lightning (Santa Clara County) wildfires. The CZU Lightning, North Complex, and SCU Lightning fires were complex fires. According to the Department of Agriculture's Forest Service, fires are defined as "complex" when two or more individual incidents are located in the same general area and are assigned to a single incident commander or unified command.

corrosive or toxic as household hazardous waste.[4] Such waste can also pollute the environment and pose a threat to human health. It can include paints, batteries, and pesticides.[5]

The Additional Supplemental Appropriations for Disaster Relief Act, 2019, includes a provision for us to review a broad range of issues related to disaster response following the 2018 disaster season, including the wildfires to which EPA responded.[6] This report examines (1) the steps EPA took to remove household hazardous waste after the 2018 and 2020 wildfires in California and (2) the extent to which EPA conducted lessons learned activities following its wildfire responses.

To identify the steps that EPA took to carry out household hazardous waste removal after the 2018 and 2020 wildfires, we reviewed EPA documents and reports related to the removal of household hazardous waste from wildfire-affected areas. These documents included EPA's Incident Management Handbook, which describes EPA officials' tasks when responding to wildfires and other disasters, and guides on removing household hazardous waste. The EPA documents we reviewed also included situation reports from EPA's Region 9—the region responsible for responding to the 2018 and 2020 wildfires in California. Specifically, these reports contained weekly updates about the region's waste removal progress, among other activities. We interviewed relevant officials from EPA Region 9 to learn about their roles, responsibilities, and activities to carry out household hazardous waste removal in response to the wildfires. We also interviewed officials from EPA Regions 6, 7, 8, and 10 to learn about their activities to support EPA Region 9's response. We spoke with officials from these regions because they provided the most staff, as compared with other regions, to assist with EPA Region 9's

[4]While hazardous waste that is ignitable, reactive, corrosive, or toxic is regulated under the Resource Conservation and Recovery Act (RCRA) and implementing regulations, household waste is generally excluded from the definition of hazardous waste and is therefore not regulated as such under federal law. 42 U.S.C. § 6921(*i*); 40 C.F.R. § 261.4(b)(1). Household waste is generally considered to be solid waste under RCRA and is therefore regulated on the state and local level.

[5]Following a fire, EPA recommends special handling and disposal of household hazardous waste, particularly if the containers of these products are compromised. Additionally, California requires household hazardous waste to be managed through a Household Hazardous Waste Program.

[6]Pub. L. No. 116-20, tit. IX, 133 Stat. 871, 892. Though the act specified audits and investigations related to the 2018 wildfires, among other natural disasters, we also included the 2020 California wildfire season in the scope of our report because it was the largest wildfire season to date.

wildfire responses in 2018 and 2020. We also spoke with officials in EPA's Office of Emergency Management, the headquarters office that develops the agency's emergency response policy, to learn about their role during a wildfire household hazardous waste removal response.

To better understand EPA's roles and responsibilities to respond to wildfires, we reviewed the Department of Homeland Security's National Response Framework—a guide to how the nation responds to all types of disasters and emergencies—and the framework's Emergency Support Function Annex 10, which identifies EPA as a primary agency for providing a coordinated federal response to actual or potential oil and hazardous materials incidents. We also spoke with Federal Emergency Management Agency (FEMA) officials about EPA's roles and responsibilities to remove household hazardous waste in response to wildfires and EPA's wildfire response activities. To learn how EPA Region 9 coordinated with state and local officials, we met with California state and county officials. Specifically, we spoke with officials at the California Department of Toxic Substances and Control (DTSC) and the California Department of Resources Recycling and Recovery (CalRecycle). We selected these entities and spoke with these officials because they worked closely with EPA to respond to wildfires in 2018 and 2020 and because the entities were recommended by others we interviewed. Additionally, we spoke with officials in all three counties affected by the 2018 wildfires that involved EPA household hazardous waste removal response activities (Butte, Los Angeles, Ventura) and the two counties with the greatest number of properties with household hazardous waste removed in response to the 2020 wildfires (Butte, Santa Cruz). The views of state and local officials add important context to our findings but cannot be generalized to those entities we did not select.

To determine the extent to which EPA conducted lessons learned activities for its household hazardous waste removal response to the wildfires, we reviewed EPA documents and interviewed federal, state, and local officials. Specifically, we collected and analyzed available after-action reports for 2018 and 2020 and other after-action documents related to EPA's wildfire responses. To understand EPA's agency-wide practices regarding lessons learned, we interviewed officials from EPA's Office of Emergency Management, the headquarters office that develops the agency's emergency response policy, and reviewed the Office of Emergency Management's 2017 Hurricane and Wildfire Response After-Action Report, which identified strengths and areas for improvement

related to the agency's disaster response activities.[7] We also interviewed officials from EPA Regions 6, 7, 8, 9, and 10 about their involvement in Region 9's 2018 and 2020 wildfire response and lessons learned activities and to understand their lessons learned processes.

To assess the extent to which EPA's lessons learned activities followed lessons learned practices for federal disaster responses, we reviewed the Department of Homeland Security's National Response Framework and Response Federal Interagency Operational Plan.[8] The National Response Framework and the Response Federal Interagency Operation Plan, which builds on the National Response Framework and describes how the federal government delivers core capabilities for the response mission area, discuss how lessons learned activities and processes inform disaster response. To identify applicable key practices of lessons learned processes and to assess EPA's lessons learned approach, we reviewed and applied the Center for Army Lessons Learned handbook on Establishing a Lessons Learned Program. The handbook is intended to assist any government or civilian organization that wants to develop a lessons learned capability. We also reviewed prior GAO reports that identify and discuss key practices of a lessons learned process.[9]

We conducted this performance audit from April 2020 to March 2022 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.

[7]Environmental Protection Agency, 2017 Hurricane and Wildfire Response After-Action Report (September 2018).

[8]Department of Homeland Security, *National Response Framework,* 4th ed. (Washington, D.C.: October 2019); and *Response Federal Interagency Operational Plan,* 2nd ed. (Washington, D.C.: August 2016).

[9]GAO, *Project Management: DOE and NNSA Should Improve Their Lessons Learned Process for Capital Asset Projects*, GAO-19-25 (Washington, D.C.: Dec. 21, 2018); *Telecommunications: GSA Needs to Share and Prioritize Lessons Learned to Avoid Future Transition Delays*, GAO-14-63 (Washington, D.C.: Dec. 5, 2013); and *NASA: Better Mechanisms Needed for Sharing Lessons Learned*, GAO-02-195 (Washington, D.C.: Jan. 30, 2002). Center for Army Lessons Learned, *Establishing a Lessons Learned Program: Observations, Insights, and Lessons* (Fort Leavenworth, KS: June 2011).

Background

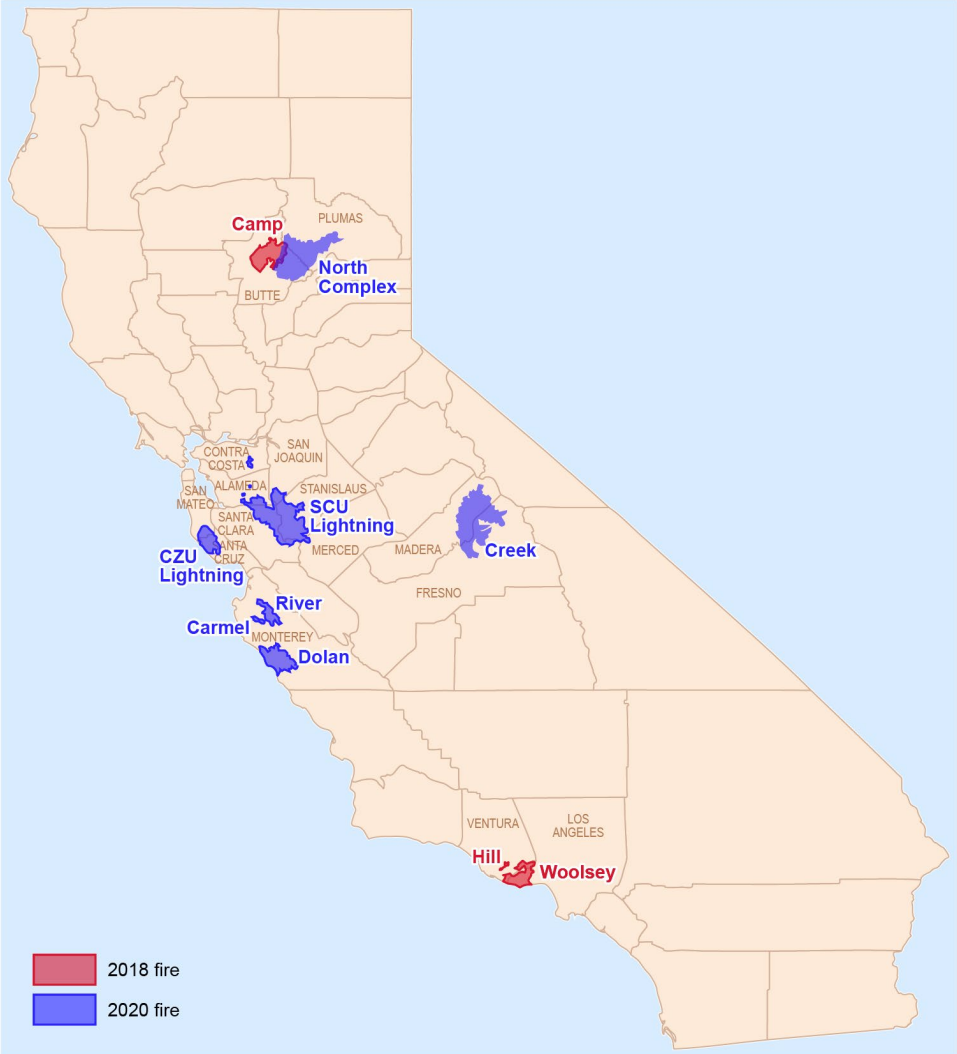
2018 and 2020 Wildfire Seasons in California

The 2018 and 2020 wildfire seasons were two of the most destructive wildfire seasons in California history. Three fires in 2018 and seven fires in 2020 were declared major disasters, and California received federal assistance for the response to and cleanup of the wildfires.[10] See figure 1 for the locations of these wildfires. In addition, these federal responses to the 2018 and 2020 wildfire seasons coincided with other incidents, including Super Typhoon Yutu in Saipan in 2018 and the COVID-19 pandemic in 2020.[11]

[10]In 2018, major disaster declarations were declared for the Camp (Butte County), Hill (Ventura County), and Woolsey (Los Angeles County) wildfires. In 2020, major disaster declarations were declared for the CZU Lightning (Santa Cruz and San Mateo Counties); Carmel, River, and Dolan (Monterey County); Creek (Fresno and Madera Counties); North Complex (Butte County); and SCU Lightning (Santa Clara County) wildfires.

[11]Super Typhoon Yutu made landfall in the Commonwealth of the Northern Mariana Islands as a Category 5 typhoon in late October 2018. FEMA issued mission assignments to EPA Region 9 in early November 2018 to remove oil and hazardous waste and restore water supplies on Saipan and Tinian. EPA Region 9's response to Typhoon Yutu coincided with its response to the 2018 wildfires. COVID-19 was characterized as a pandemic by the World Health Organization on March 11, 2020, and is ongoing as of March 2022. EPA Region 9 officials developed and implemented COVID-19 testing procedures for staff during the 2020 wildfire response.

Figure 1: Map of California Wildfires, 2018 and 2020



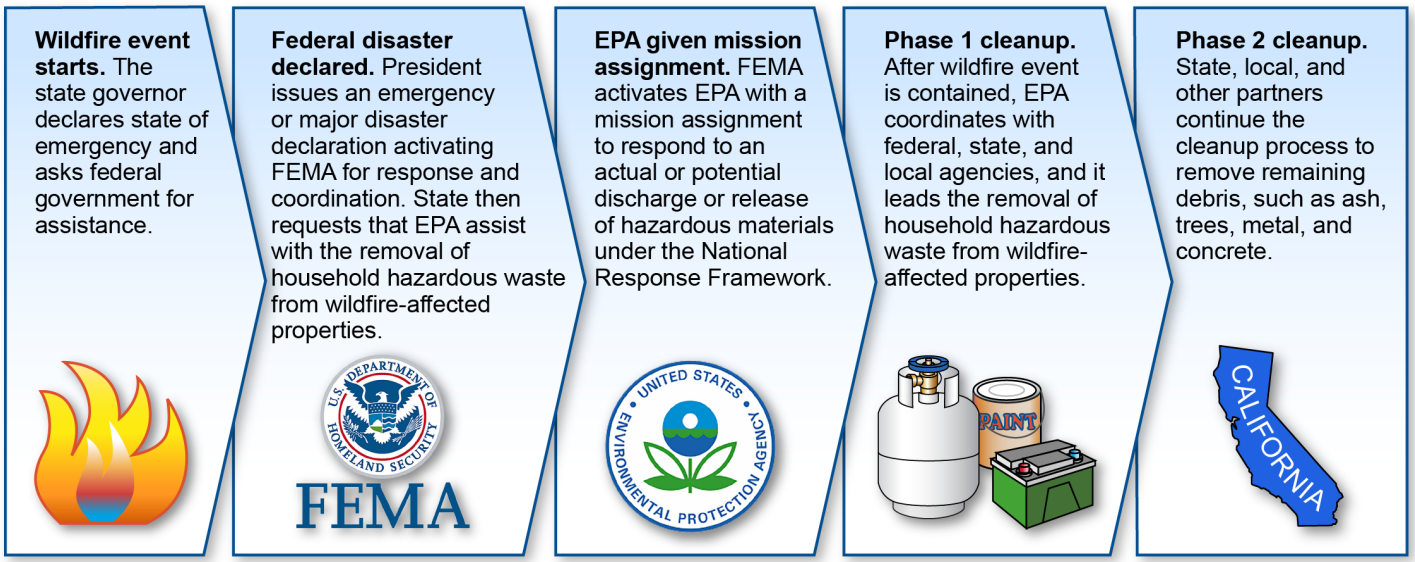
Sources: Environmental Protection Agency; Map Resources (map). | GAO-22-104276

Note: The CZU Lightning, North Complex, and SCU Lightning fires were complex fires. According to the Department of Agriculture's Forest Service, fires are defined as "complex" when two or more individual incidents are located in the same general area and are assigned to a single incident commander or unified command.

Overview of Federal, State, and Local Disaster Response

Federal agencies can become involved in responding to a disaster when effective response and recovery are beyond the capabilities of the state and affected local governments. See figure 2 for a depiction of the wildfire response and cleanup process for household hazardous waste at the federal, state, and local levels.

Figure 2: Wildfire Response and Cleanup Process for Household Hazardous Waste at the Federal, State, and Local Levels



Sources: GAO analysis of Environmental Protection Agency (EPA), Federal Emergency Management Agency (FEMA), and other agency documents; Map Resources (California map). | GAO-22-104276

Under section 401 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), the President can declare a major disaster in response to a request by the governor of a state or by the chief executive of a tribal government.[12] A presidential declaration can trigger a variety of federal assistance programs through which the federal government provides disaster assistance.[13]

The National Response Framework guides the federal government, states, localities, and other public and private sector institutions in their response to disasters and emergencies. Under the framework, the Department of Homeland Security has primary responsibility for

[12]42 U.S.C. § 5170.

[13]*Presidential Policy Directive-8 National Preparedness* is aimed at strengthening the security and resilience of the United States through systematic preparation for the threats that pose the greatest risk to the security of the nation. The directive calls for the establishment of a national preparedness system, which is to be an integrated set of guidance, programs, and processes. This system breaks preparedness activities into five different lines of effort—prevention, protection, mitigation, response, and recovery—each of which requires a separate planning framework.

coordinating federal disaster response and, within the department, FEMA is the principal adviser regarding emergency management.

The National Response Framework identifies 15 emergency support functions that serve as the federal government's primary coordinating structure for building, sustaining, and delivering disaster response efforts across more than 30 federal agencies. Each emergency support function consists of a federal department or agency designated as the coordinating agency along with a number of primary and support agencies. The federal agencies or departments have various responsibilities, depending on their authority and role under a given emergency support function; such responsibilities can include overseeing preparedness activities, managing mission assignments, and monitoring progress.

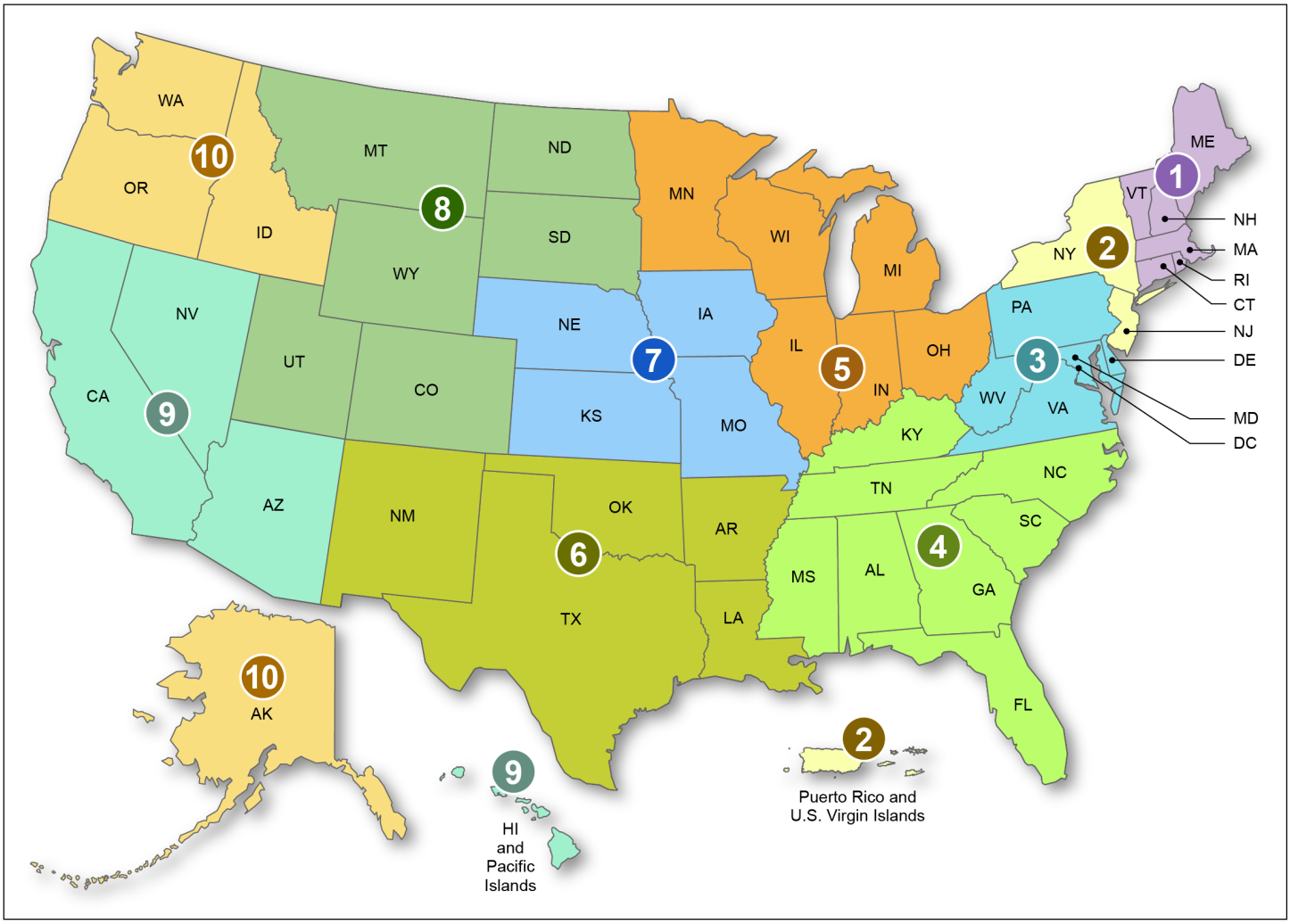
Through Emergency Support Function 10, EPA serves as both the coordinating agency and one of the primary agencies in response to an actual or potential discharge or release of oil or hazardous materials.[14] EPA's work can include analysis of options for removal and disposal of household hazardous waste and environmental decontamination and cleanup of buildings and structures. This work is led by on-scene coordinators, who are federal officials responsible for monitoring or directing responses to discharges or releases of oil or hazardous materials and coordinating federal efforts with local, state, and regional response communities.[15] The EPA region in which the wildfires are located manages EPA's response, in coordination with FEMA and according to mission assignments. EPA has 10 regional offices, and each

[14]Emergency Support Function 10 – Oil and Hazardous Materials Response provides federal support in response to an actual or potential discharge and/or release of oil or hazardous materials when activated. EPA serves as the coordinating agency for Emergency Support Function 10. In general, EPA also serves as the primary agency for Emergency Support Function 10 actions in the inland zone, whereas Department of Homeland Security/U.S. Coast Guard serves as the primary agency for such actions in the coastal zone.

[15]On-scene coordinators also provide support and information to local, state, and regional response communities. In general, an on-scene coordinator is responsible for assessing, monitoring, providing response assistance, and evaluating situations during and after a response. On-scene coordinators are agents of either EPA or the U.S. Coast Guard, depending on where the incident occurs. EPA's on-scene coordinators have primary responsibility for oil spills and hazardous material releases to inland areas and waters, whereas the U.S. Coast Guard's on-scene coordinators have responsibility for coastal waters and the Great Lakes.

one is responsible for executing EPA activities within several states and, in some regions, territories. Figure 3 illustrates EPA's 10 regions.

Figure 3: Environmental Protection Agency (EPA) Regions



Sources: GAO analysis of EPA documents; Map Resources (map). | GAO-22-104276

After the publication of the National Response Framework, EPA developed its National Approach to Response policy, in part to focus its preparedness and response planning on the possibility for multiple, simultaneous, nationally significant incidents that could occur across several regions. This policy, first created in 2003 and first formalized in

2008, aims to help EPA staff nationwide coordinate between its regional offices and headquarters. It also helps EPA staff respond to disasters consistently by defining key aspects of a response and roles for field operations. The policy states that each region will maintain an incident management team, which includes its disaster response staff who are trained and ready to respond. As a part of implementation of the policy, EPA also created the Response Support Corps, a nationally led initiative managed by both headquarters and regional offices, as appropriate, with membership open to all agency employees. The Response Support Corps was established after certain events, including September 11, 2001, made it evident to the agency that significant additional resources were needed to augment EPA's primary emergency response staff for EPA's emergency response program to be successful.[16]

Under the emergency support functions, FEMA coordinates disaster response efforts through mission assignments. The Stafford Act authorizes FEMA to issue work orders—that is, mission assignments—that direct another federal agency to utilize its authorities and the resources granted to it under federal law in support of direct assistance to state, local, tribal, and territorial governments during major disaster declarations.[17] After a wildfire event is contained, EPA may receive a mission assignment from FEMA to coordinate with federal, state, and county agencies to lead the removal of oil or hazardous substances, including household hazardous waste, on wildfire-affected properties.

EPA received such mission assignments to remove household hazardous waste after the 2018 and 2020 wildfires. In 2018 and 2020, FEMA provided mission assignments to EPA for over $101 million, and over $50 million, respectively, to remove household hazardous waste. Removing

[16]Response Support Corps members may be asked to support operations in the field as well as at the Headquarters Emergency Operations Center and the regional emergency operations centers. Such support may include general administrative duties or duties specific to emergency response and the Incident Command System. The policy states that during responses that exhaust the resources of a region, additional resources from the Response Support Corps will first be requested from designated backup region(s), as defined in existing backup region memorandums of agreement, before pursuing resources from other regions. Regions 8 and 10 are the designated backup regions for Region 9.

[17]42 U.S.C. § 5170a(a)(1). Specifically, the Stafford Act authorizes the President to direct any federal agency, with or without reimbursement, to utilize its authorities and the resources granted to it under federal law in support of state and local response or recovery efforts. This tasking authority, delegated to the FEMA Administrator, is carried out through a mission assignment.

household hazardous waste is phase 1 of two phases of the cleanup process.

During phase 2 of the cleanup process, state, county, and other partners continue the cleanup process. For example, CalRecycle generally works in coordination with county agencies to remove ash, metal, concrete, and other building materials.

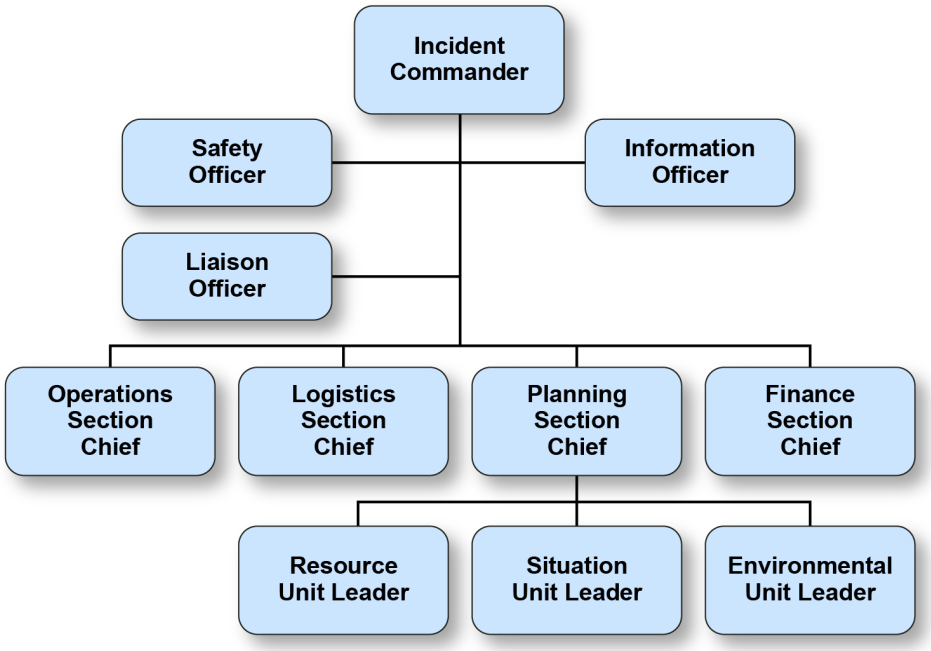
EPA Took Steps That Followed Its Response Policy, with Region 9 as the Lead, to Remove Household Hazardous Waste after the 2018 and 2020 California Wildfires

EPA followed its National Approach to Response policy to remove household hazardous waste after the 2018 and 2020 wildfires in California. In doing so, it took the following steps during phase 1 of the cleanup process:

1. **Activated incident management teams in Region 9.** In 2018 and 2020, EPA Region 9 activated its incident management teams to manage the removal of household hazardous waste from wildfire-affected properties. Incident management teams manage the tactical aspects of the response by developing and implementing objectives. According to EPA officials, each incident management team follows individualized incident action plans, which are updated frequently and outline mission objectives and work assignments needed to respond to a disaster, including wildfires. For example, work assignments could include information about wildfire-affected areas where asbestos removal activities are planned. Incident action plans also list work assignments on a 12-hour to multiple-day time frame and identify the emergency response staff necessary for EPA's response. Such staff could include, for example, an incident commander, safety officer, finance section chief, logistics section chief, data support coordinator, and public information officer.

   Each incident management team consisted of key leadership positions, such as an incident commander and a safety officer, among others (see fig. 4).

Figure 4: Structure of Environmental Protection Agency (EPA) Region 9's Incident Management Team for Disaster Response and Household Hazardous Waste Removal



Source: EPA. | GAO-22-104276

While activating its incident management teams for the 2018 and 2020 wildfire response, Region 9 determined that it needed additional EPA staff support because its primary emergency response staff were operating at full capacity. According to Region 9 officials, the region initially requested on-scene coordinators and Response Support Corps members from its backup Regions 8 and 10 and then requested staff from all EPA regions to ensure that it met its staffing needs. Staff from other regions filled some of the key leadership positions on the incident management team, such as safety officer, logistics section chief, and planning section chief.

In 2018, EPA staff deployed from all other regions to assist Region 9 with the wildfire response. According to Region 9 officials, 204 EPA staff responded to the wildfires, and 132 of those staff came from other regions. Officials added that six personnel from the U.S. Coast Guard and 392 contractor

personnel also deployed to support the region's wildfire response. Deployments to the wildfire-affected areas were typically 2 weeks long.

In 2020, the involvement by other regions to assist Region 9 was somewhat different, due to the pandemic and other regions responding to wildfires elsewhere. For example, staff from other regions typically operated in a virtual capacity, and deployments were for 3 weeks, instead of the usual 2 weeks, to reduce staff turnover because of the COVID-19 pandemic, according to Region 9 officials. In addition, Region 10 was involved in responding to wildfires in Oregon and was tapping into nationwide support. Region 9 ultimately received staffing support from all regions. According to Region 9 officials, in 2020, 186 EPA staff responded to the wildfires, and 114 of those staff came from other regions. Officials said that 17 U.S. Coast Guard personnel and 306 contractor personnel were deployed to support the region's wildfire response.

2. **Conducted assessments**. EPA teams led task forces to conduct assessments, and each task force included an EPA leader and about seven to nine contractor personnel, according to Region 9 officials. The assessment process started with obtaining a list of wildfire-affected properties from county officials and assigning these properties to task forces for assessment. Next, the designated task force visited each assigned property to identify whether there was any household hazardous waste present. Task force members recorded property information, features, and hazards into a field logbook and electronic application. See figure 5 for examples of EPA task forces assessing waste for removal.

Figure 5: Example of EPA Region 9 Task Force Member Assessing Household Hazardous Waste at Wildfire-Affected Properties in California

A task force member assessing household hazardous waste on a wildfire-affected property.

Source: Environmental Protection Agency (EPA). | GAO-22-104276

3. **Removed waste**. During the removal process, the designated task force separated waste into different piles. Some household hazardous waste cannot be mixed together because incompatible waste might react, ignite, or explode. The task force then secured the waste in appropriate containers for transfer to a designated staging area. In response to the 2018 wildfires, Region 9 established two staging areas: One was located in Chico near the Camp Fire, and the other was in Los Angeles County for the Hill and Woolsey Fires. In response to the 2020 wildfires, Region 9 set up three staging areas in Auberry, Felton, and Oroville, California. EPA used specific procedures for handling certain types of waste. For example, in removing waste that contained asbestos, EPA deployed task teams with specialists to wet the materials and secure them in special bags for disposal. See figure 6 for examples of EPA task forces removing waste from wildfire-affected properties.

Figure 6: Examples of EPA Region 9 Task Forces Removing Household Hazardous Waste from Wildfire-Affected Properties in California

Task force members removing household hazardous waste from wildfire-affected property.

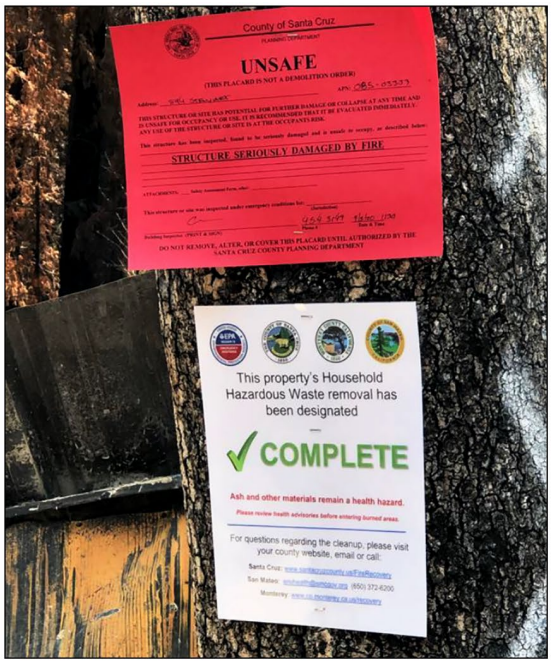
Task force members removing material that is suspected to contain asbestos at a wildfire-affected property.

Source: Environmental Protection Agency (EPA). | GAO-22-104276

4. **Transported and disposed of waste**. EPA task forces used specially marked trucks to transport household hazardous waste to a staging area. According to EPA officials, these trucks had special permits to transport household hazardous waste from the Department of Transportation's Pipeline and Hazardous Materials Safety Administration. Next, the waste was consolidated at staging facilities. According to Region 9 officials, task force teams then transported the household hazardous waste to a designated Resource Conservation and Recovery Act (RCRA)-certified disposal facility. For example, Region 9 officials said that radiological-based materials were disposed at a RCRA facility in Utah, and asbestos materials were disposed at a RCRA landfill in Davis, California. Once the EPA task forces removed household hazardous waste from wildfire-affected properties, task force members placed signs to indicate the completion of phase 1 cleanup, as shown in figure 7.

Figure 7: Examples of an EPA Region 9 Task Force Transporting Household Hazardous Waste from Wildfire-Affected Properties in California and Signs Communicating the Completion of Waste Removal

Task force members use equipment to load trucks transporting household hazardous waste to a staging facility in northern California.



After completing disposal of household hazardous waste on a wildfire-affected property, EPA Region 9 task force teams placed signs indicating the completion of phase 1 removal.

Source: Environmental Protection Agency (EPA). | GAO-22-104276

5. **Announced that EPA activities for waste removal were concluded.** EPA announced in early February 2019 that over 99 percent of the waste had been removed and that it had concluded its work.[18] According to EPA, during its 2018 response, EPA task teams removed waste from over 14,950 wildfire-affected properties in three counties. In response to the 2020 wildfires, EPA announced on December 17, 2020 that waste had been removed from 2,645 wildfire-affected properties in seven counties.[19]

Throughout phase 1 of the cleanup process after the 2018 and 2020 wildfires, EPA coordinated with FEMA and state and county agencies. For example, Region 9 officials said that during the response to the 2018

[18]EPA began household hazardous waste removal activities in response to the 2018 wildfires on December 3, 2018. After EPA concluded its work, California's DTSC cleared the remaining household hazardous waste.

[19]EPA began its household hazardous waste removal activities in response to the 2020 wildfires in late September 2020.

wildfires, EPA officials spoke with officials from FEMA and California's Office of Emergency Services at daily meetings to provide updates about completed work. Region 9 officials added that FEMA officials requested information about the number of wildfire-affected properties that were cleared of household hazardous waste. According to Butte and Santa Cruz County officials, they facilitated community meetings between EPA officials and their communities.

EPA Conducted Lessons Learned Activities Following Its Wildfire Responses, but It Does Not Have a Formal Lessons Learned Process for Disaster Responses

EPA conducted lessons learned activities following its responses to the 2018 and 2020 wildfires in California; however, we identified additional lessons learned activities that may have been useful for EPA to implement. In addition, EPA conducts lessons learned activities on a case-by-case basis and does not have a formal lessons learned process in place for wildfire or other disaster responses that specifies when and what lessons learned activities should be conducted. The use of lessons learned is a principal component of an organizational culture committed to continuous improvement, which serves to communicate acquired knowledge more effectively and to ensure that beneficial information is factored into planning, work processes, and activities.

EPA Conducted Lessons Learned Activities Following Its Responses to the 2018 and 2020 Wildfires in California but May Have Found Additional Lessons Learned Activities Useful

Following its wildfire responses in 2018 and 2020, EPA Region 9 conducted the following lessons learned activities:

- **Collected information through an after-action review and survey.** After its 2018 wildfire response, the region collected information by holding an after-action review and conducting a survey.[20] For the after-action review, Region 9 invited all Region 9 staff who were deployed in the response as well as the backup regions and other regional responders, according to officials. For the survey, Region 9 asked all staff who were deployed in the response to list three positive aspects of the response and three areas for improvement. The region received 41 responses to the survey, of which 25 were from Region 9 officials and 16 were from officials from other regions. Following its 2020 wildfire response, Region 9 held an after-action review that included officials from key leadership positions on June 3, 2021. Region 9 did not conduct a survey following the 2020 wildfire response.

[20]The Center for Army Lessons Learned describes the after-action review as a verbal discussion, held at the completion of an operation or event, with key participants to determine what happened, what worked, what did not work, and how to improve for the next event. EPA refers to after-action reviews as "hot washes."

- **Produced an after-action report for the 2020 response.** Following its 2020 response, Region 9 produced an after-action report that summarized the review meeting. An after-action report is part of the information collection process, generally documents an organization's actions for historical purposes, and provides key observations and lessons. After-action reports can also be used to share lessons learned. Region 9's report included a brief background section describing the damage from the wildfires and the region's mission assignments from FEMA. The report listed what went well and areas for improvement for various aspects of the response, such as data, planning, logistics, and safety. Region 9 did not produce an after-action report to summarize the 2018 review meeting.
- **Developed a list of best practices and corrective actions.** Using the after-action review and survey following its 2018 response, Region 9 developed a bulleted list of activities that it considered to be best practices and corrective actions. The list was shared with all EPA regions and EPA headquarters, according to Region 9 officials. The list included corrective actions related to event preparedness and incident management. According to Region 9 officials, the region addressed most of these corrective actions by aligning them with existing program areas and addressing them through those programs. For example, the list identified corrective actions to increase the number of staff available for each key leadership position. The region addressed this by recruiting more Response Support Corps members and supporting their enrollment in training on the incident command system, according to Region 9 officials. In addition, officials said that EPA Region 9 advocated for a key leadership position training, which was held in Philadelphia the year after the 2018 wildfires.

  According to Region 9 officials, the region does not formally track whether corrective actions have been implemented. However, steps taken to implement corrective actions were discussed through periodic reporting out in Emergency Response Branch operational calls and management meetings. The region also developed a list of corrective actions following its 2020 response.

- **Shared best practices and lessons through meetings**. According to Region 9 officials, the region shared best practices and lessons from its 2018 response through monthly and quarterly meetings and annual trainings with on-scene coordinators from across the country. In addition, the region shared lessons learned directly with Emergency Response Program leadership from all 10 regions, the Office of Emergency Management, and officials from other federal agencies at an annual meeting in 2019 for federal departments and agencies

responsible for coordinating emergency preparedness and response to oil and hazardous substance pollution incidents, according to Region 9 officials. Region 9 officials said that they plan to share information from its after-action report for its 2020 response in the same way.

We identified additional lessons learned activities that may have been useful for EPA to conduct, such as discussing lessons with state and local entities, producing an after-action report following its 2018 response, and tracking corrective actions in a formal, centralized location. For example, when conducting activities to collect information about lessons, the region did not include officials from state and local entities with which the region had coordinated during the response, potentially missing some lessons from a nonfederal perspective.

Officials from the four counties we met with and California's DTSC said it would have been helpful to discuss lessons with EPA. According to EPA officials, EPA worked closely with county and state officials on a daily basis and had incident closure meetings at which unresolved concerns were discussed. Los Angeles County officials told us that they met with EPA to discuss the transition from phase 1 to phase 2 during an informal close-out meeting. However, they said the topic of lessons learned from the response was not part of the transition meeting and that there were no further meetings scheduled to discuss lessons learned. Officials from the counties with whom we met and California's DTSC noted that they generally had good communication with EPA. However, officials from two counties and California's DTSC also provided examples of lessons that they thought would be helpful to discuss with EPA. For example, an official from Santa Cruz County told us that in 2020, the signs that EPA had posted to communicate the completion of phase 1 cleanup on the property could give the impression that all cleanup is complete. The official said that the signs were not explicit enough that phase 2 cleanup still needed to be completed, resulting in some residents accessing their properties before all wildfire debris was removed.

In addition, Region 9 did not produce an after-action report for its 2018 wildfire response. In not doing so, EPA missed the opportunity to document key observations and lessons or to use the report to share lessons learned. EPA did produce a three-page list of best practices and corrective actions following the 2018 wildfire response, but that list does not provide the context that could be included in an after-action report. For example, it does not include a description of the wildfire event or

EPA's mission assignments. It also does not generally explain why the best practices or corrective actions identified might be helpful.

The region also does not track corrective actions in a formal, centralized way, according to Region 9 officials, and not all of the corrective actions have been addressed. The list of best practices and corrective actions that the region developed following its 2018 response included 44 items. According to officials, 24 of those items have been addressed. Sixteen of the remaining listed items are in process through regional or national initiatives, and six have yet to be addressed substantively. For example, the corrective actions for the 2018 response included a task to develop a proposal for the 2022 budget to increase the number of on-scene coordinators in the Western Regions (i.e., EPA Regions 8, 9, and 10). According to Region 9 officials, EPA formed a working group in July 2019 to analyze this issue; however, the officials said that this working group was dissolved in November 2020, and no proposal has been made to increase the number of on-scene coordinators.

EPA Does Not Have a Formal Lessons Learned Process with Written Guidelines for Wildfire or Other Disaster Responses

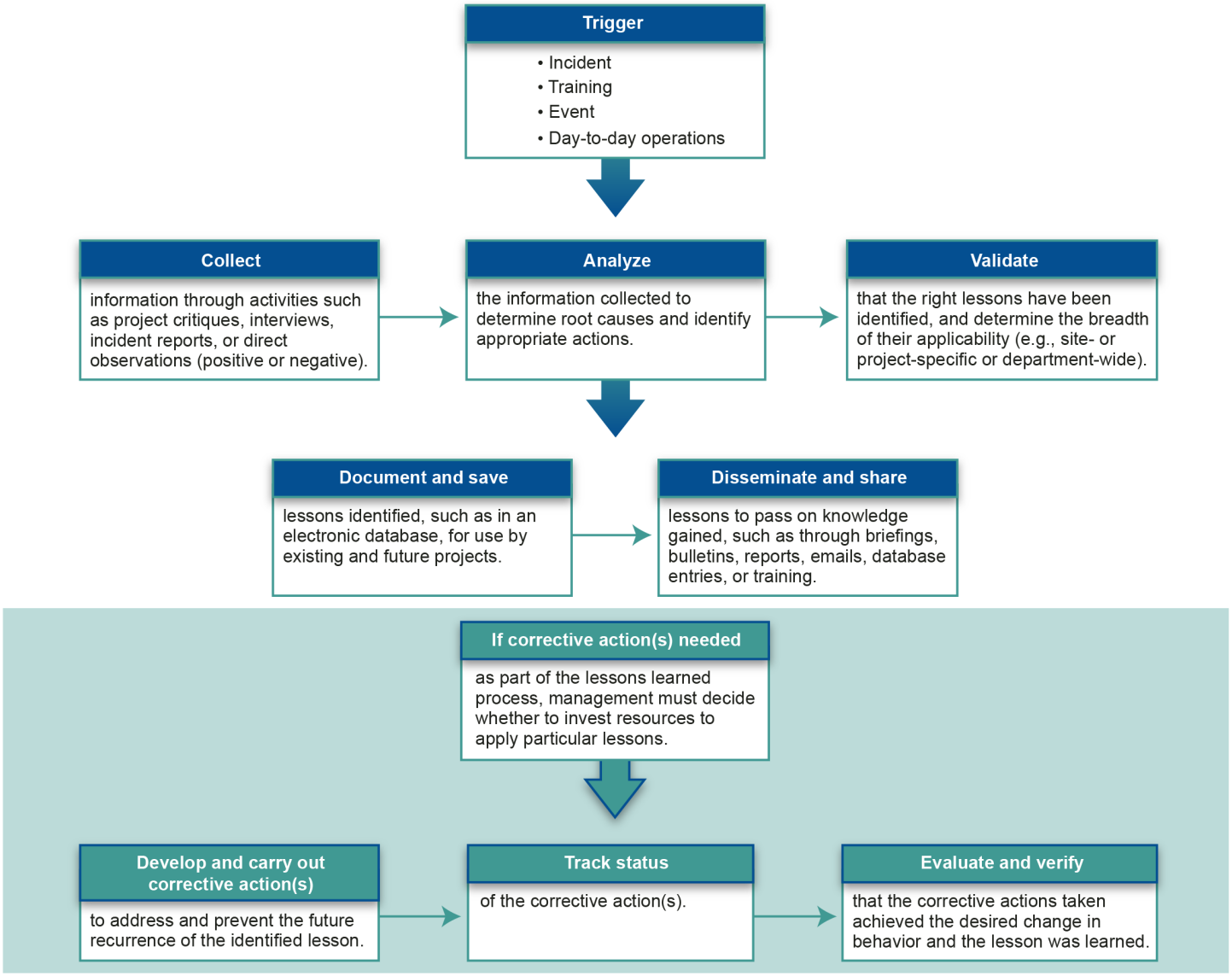
According to Office of Emergency Management officials, EPA conducts lessons learned activities on a case-by-case basis and does not have a formal lessons learned process with written guidelines for wildfire or other disaster responses that specifies when and what lessons learned activities should be conducted. In contrast, EPA does have a formal lessons learned process for emergency response exercises.[21]

Key practices of a lessons learned process include collecting and sharing information and knowledge gained on positive and negative experiences and developing and tracking corrective actions to address lessons (see fig. 8).[22] Information collection can include developing an after-action report. The Center for Army Lessons Learned handbook on Establishing a Lessons Program—which is intended to assist any government or civilian organization that wants to develop a lessons learned capability—notes that after-action reviews and reports produce some of the best and most timely lessons.

[21]An exercise helps develop, assess, or validate capabilities to achieve planned objectives. Exercises provide opportunities to test plans and improve proficiency in a risk-free environment.

[22]See GAO-19-25, GAO-14-63, and GAO-02-195; Center for Army Lessons Learned, *Establishing a Lessons Learned Program: Observations, Insights, and Lessons*.

Figure 8: Key Practices of a Lessons Learned Process Following a Triggering Event



Sources: GAO and Center For Army Lessons Learned handbook. | GAO-22-104276

EPA's Office of Emergency Management officials said that it is generally understood throughout the agency that it is a good practice to do lessons learned activities. However, such activities are done on a case-by-case basis, and there is no formal written guidance specifying what type of

incident, such as disasters, should be followed by a lessons learned process nor what activities should be included in such a process.

Region 9 officials said that the region is still developing how it conducts lessons learned activities, in the absence of a formal process. The officials told us that they plan to study lessons learned activities from other regions, such as EPA Regions 6 and 7, to learn what they are doing. Officials said it has been difficult to develop a lessons learned process while responding to multiple disasters—including multiple wildfires and a typhoon in 2018—and responding to disasters during a pandemic.

Three of the other four EPA regions with whom we met had some limited written guidelines related to lessons learned activities following incidents, such as responses to wildfires. For example, two of the regions we met with have some written guidelines for lessons learned activities in their Incident Management Team Implementation Plans, which outline the region's resources available to augment emergency responses, exercises, and other preparedness activities. The plans state that effective implementation requires formal assessment of exercises and incidents. According to the plans, organizational and procedural improvements, as well as best practices, should be documented and shared via three review processes: postevent after-action reviews, an After-Action Report/Improvement Plan, and lessons learned documentation and reporting. However, the plans do not address all of the key practices of a lessons learned process, such as tracking the status of corrective actions. Furthermore, they state that exercises must be followed by after-action reports but do not specify whether incidents should also be followed by after-action reports.

For emergency response exercises, EPA has a formal lessons learned process, with written guidelines for conducting lessons learned activities. Specifically, EPA uses its Evaluation, After-Action Summary, and Continuous Improvement Program to evaluate exercises. The program is intended to ensure that evaluation data collected from exercises are shared among regions and inform an iterative cycle of improvement on a national scale.

The guidelines state that the program will (1) compile best practices, after-action summaries, after-action reports, and solutions to previous corrective actions; (2) ensure that concrete, actionable steps are taken by the relevant person or group to resolve capability gaps and shortcomings identified in exercises and responses; and (3) encourage lessons

learned/corrective actions to be validated in future exercises or, to the extent practicable, real-world incidents, ultimately resulting in improved operational performance. The guidelines also describe how to carry out these activities and include guidance on tracking the status of corrective actions. Furthermore, the guidelines state that codifying the evaluation and continuous improvement program with the guideline document will ensure that EPA consistently implements evaluation and continuous improvement nationwide, while adjusting, as necessary.

Lessons learned provide a powerful method of sharing good ideas for improving work processes, quality, and cost-effectiveness.[23] The National Response Framework states that the planning process for disaster response includes a feedback loop for continual refinement of plans to more effectively address incident priorities and objectives, including through after-action and lessons learned processes. According to the Department of Homeland Security's Response Federal Interagency Operational Plan, which builds on the National Response Framework and describes how the federal government delivers core capabilities for the response mission area, reviews of the effectiveness of responses and suggestions for future improvements are to be derived from after-action reviews and formal assessments of actions taken during the response. The plan also states that an after-action report is to be generated that provides assessments needed to improve plans and information for improvement of training. Furthermore, according to the Center for Army Lessons Learned, it is a good idea to formalize a lessons learned program by developing a set of written guidelines—established procedures approved by executive leadership.

By developing a formal lessons learned process with written guidelines for disaster responses that incorporates the key practices of a lessons learned process, EPA may be better prepared to respond to future disasters that require household hazardous waste removal assistance. Doing so will help EPA identify what went well, lessons, and corrective actions to improve overall wildfire response operations. Furthermore, tracking the status of corrective actions and verifying that they resulted in the desired change in behavior, both key parts of a lessons learned process, would provide EPA assurance that corrective actions are working as intended.

[23]See GAO-19-25; and Center for Army Lessons Learned, *Establishing a Lessons Learned Program: Observations, Insights, and Lessons*.

Conclusions

In 2018 and 2020, California experienced record-setting fire seasons. According to EPA, wildfires are expected to become more frequent and intense, particularly in some regions of the country. EPA plays a significant role in responding to wildfires under the National Response Framework as a primary agency for helping to provide a coordinated federal response, including removing household hazardous waste, to incidents involving hazardous materials. Developing a formal lessons learned process for disaster responses—similar to EPA's lessons learned process following exercises—that incorporates the key practices of a lessons learned process may enable EPA to be better prepared to respond to wildfires. Specifically, a formal lessons learned process for disaster responses would provide EPA with a consistent process to identify lessons learned and implement needed corrective actions following actual events.

Recommendation for Executive Action

We are making one recommendation to EPA.

The Director of the Office of Emergency Management at EPA should develop a formal lessons learned process with written guidelines for disaster responses, including responses to Stafford Act disasters, that incorporates the key practices of a lessons learned process.

Agency Comments

We provided a draft of this report to EPA and the Department of Homeland Security for review and comment. The Department of Homeland Security had no comments on the draft report. In its comments, reproduced in appendix I, EPA generally agreed with our findings about the steps it took to remove household hazardous waste after the 2018 and 2020 California wildfires. EPA also agreed with our recommendation and described actions that it intends to take in response to our recommendation.

EPA noted that it is concerned that the report draws broad national conclusions from a limited set of regional findings. However, while our review focused on EPA Region 9's responses to the California wildfires in 2018 and 2020, we interviewed and collected documentation from EPA officials in five regions as well as EPA headquarters. During our interviews with officials from EPA Regions 6, 7, 8, 9, and 10, we inquired about those regions' involvement in the 2018 and 2020 wildfire responses and lessons learned activities as well as the individual regions' lessons learned processes. At the headquarters level, we interviewed officials from EPA's Office of Emergency Management, the office that develops the agency's emergency response policy, to understand agency-wide practices regarding lessons learned. Additionally, we reviewed the Office

of Emergency Management's 2017 Hurricane and Wildfire Response After-Action Report, which identified strengths and areas for improvement related to the agency's disaster response activities.

Through this work, we believe that our findings are applicable agency-wide. We determined that EPA conducts lessons learned activities on a case-by-case basis. EPA also does not have a formal lessons learned process with written guidelines for wildfire or other disaster responses that specifies when and what lessons learned activities should be conducted.

EPA also noted concerns about perceived omissions in Region 9's state and local communications and after action review process. EPA stated that our findings indicate insufficient coordination between EPA and state and local governments, and our findings do not mention the agency's continuous improvement process that is part of its Incident Command Structure. However, the report notes that EPA worked closely with state and local officials throughout the response process, and we found that officials from the county and state agencies with whom we met said that they generally had good communication with Region 9. As our report notes, though, these officials were not included in activities to collect information about lessons, and consequently EPA potentially missed some lessons by not seeking such nonfederal perspectives.

EPA also provided technical comments, which we incorporated into our report as appropriate.

We are sending copies of this report to the appropriate congressional committees, the Administrator of the Environmental Protection Agency, and the Secretary of the Department of Homeland Security. In addition, the report will be available at no charge on the GAO website at http://www.gao.gov.

If you or your staff have any questions about this report, please contact me at (202) 512-3841 or gomezj@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 III.

J. Alfredo Gómez
Director, Natural Resources and Environment

List of Committees

The Honorable Jeff Merkley
Chair
The Honorable Lisa Murkowski
Ranking Member
Subcommittee on Interior, Environment, and Related Agencies
Committee on Appropriations
United States Senate

The Honorable Chellie Pingree
Chair
The Honorable David Joyce
Ranking Member
Subcommittee on Interior, Environment, and Related Agencies
Committee on Appropriations
House of Representatives

Appendix I: Comments from the U.S Environmental Protection Agency

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

OFFICE OF THE
REGIONAL ADMINISTRATOR

Mr. Alfredo Gomez
Director
Natural Resources and Environment
U.S. Government Accountability Office
Washington, DC 20548

Dear Mr. Gomez:

On behalf of the U.S. Environmental Protection Agency (EPA), thank you for the opportunity to review and comment on the U.S. Government Accountability Office's (GAO) draft report, *HOUSEHOLD HAZARDOUS WASTE REMOVAL: EPA Should Develop a Formal Lessons Learned Process for Its Disaster Response* (GAO-22-104276). We also appreciate the prior engagement we have had with your staff, most recently the December 15, 2021, meeting. It was helpful to have an in-depth discussion of the proposed findings and conclusions in the draft Statement of Facts.

The purpose of this letter is to provide EPA's formal response to the draft report's findings, conclusions, and recommendation. We have also included technical comments for your consideration in the enclosure. This response has been coordinated with and agreed upon by the Office of Land and Emergency Management.

In general, EPA agrees with the GAO's findings regarding the steps EPA took to remove household hazardous waste after the 2018 and 2020wildfires in California. We appreciate the effort GAO staff undertook to understand and document the important and successful emergency response work that EPA Region 9 has completed to address unprecedented community impact in these disasters. With respect to the GAO's conclusions and recommendations, however, we are concerned that the report draws broad national conclusions from a limited set of regional findings. We are also concerned about the report's narrative regarding perceived omissions in EPA Region 9's state and local communications and after-action review processes. In particular, the report cites local and state government coordination as lacking in that regard but does not sufficiently acknowledge the continuous process improvement built into the actual response by Incident Command Structure doctrine. During disaster responses, EPA appoints multiple Liaison Officers at the Command level to ensure that state and local government response priorities and input receive immediate attention. Integration of state and local partner input is also a hallmark of in-response leadership and operations collaborations. We are proud of our partnerships and confident that our lessons learned and continuous improvement process honors the input of our partners. That being said, and despite our previously communicated concerns about the foundation for some of the report conclusions, EPA agrees with GAO's recommendation that EPA develop a formal lessons learned process with written guidelines for disaster responses.

GAO Recommendation

The Director of the Office of Emergency Management at EPA should develop a formal lessons learned process with written guidelines for disaster responses, including responses to Stafford Act disasters, that incorporates the key practices of a lessons learned process.

EPA Response

EPA agrees with the recommendation to develop a formal lessons learned process with written guidelines for disaster responses, including responses to Stafford Act disasters, that incorporates the key practices of a lessons learned process. To that end and in consultation with EPA's Office of Emergency Management, EPA will target a completion date of December 31, 2022, for this recommendation.

Again, thank you for the opportunity to review and respond to the GAO's draft report. For further details, questions, or additional information regarding the report findings or conclusions, please contact Mendy Guan (EPA Region 9; 415-972-3749 or Guan.Mendy@epa.gov). For further details, questions, or additional information regarding the report recommendation, please contact Kecia Thornton (OLEM; 202-566-1913 or Thornton.Kecia@epa.gov.)

Sincerely,

Martha Guzman Aceves
Digitally signed by Martha Guzman Aceves
Date: 2022.02.28 12:58:23 -08'00'

Martha Guzman
Regional Administrator

Enclosure: Technical Comments

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Appendix II: GAO Contact and Staff Acknowledgments

GAO Contact

J. Alfredo Gómez, (202) 512-3841 or gomezj@gao.gov

Staff Acknowledgments

In addition to the contact named above, Barbara Patterson (Assistant Director), Kelsey Sagawa (Analyst-in-Charge), Anthony Fernandez, Cindy Gilbert, Marya Link, Patricia Moye, Dan C. Royer, Janay Sam, and Caitlin Scoville made key contributions to this report.

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