Incident Action Checklist – Wildfire

The actions in this checklist are divided up into three "rip & run" sections and are examples of activities that water and wastewater utilities can take to: prepare for, respond to and recover from wildfires. For on-the-go convenience, you can also populate the "My Contacts" section with critical information that your utility may need during an incident. This checklist is also available in abbreviated form in the Response On-The-Go App for your mobile phone or tablet. Access the app via the Apple App Store or Google Play Store on your mobile device and search "EPA Response On-The-Go".

Wildfire Impacts on Water and Wastewater Utilities

A wildfire is any instance of uncontrolled burning in grasslands, brush or woodlands. Wildfires can be caused by lightning, human carelessness, technological accidents, or arson. Wildfires present a direct risk to property and water and wastewater infrastructure assets, in addition to potential degradation of the water supply. In some cases, source water quality issues can persist for 5-10 years following a wildfire. Areas that have experienced a wildfire are also at an increased risk when there is flash flooding and resulting mudslides because the ground where vegetation has burned away cannot effectively absorb rainwater. In addition to watershed impacts, fire can have detrimental effects on the operation of drinking water and wastewater treatment, storage, collection and distribution systems. Often, post-fire impacts (including those impacts resulting from flash floods) are more detrimental to drinking water and wastewater systems than the fire itself. Impacts to drinking water and wastewater utilities may include, but are not limited to:

- Infrastructure damage to the facility or distribution system due to proximity to the fire or firefighting activities
- Loss of water quantity due to increased withdrawals for firefighting activities
- Source water quality changes due to increased nutrients and other pollutants, which can result in higher turbidity, algal blooms, potential odor and taste issues, and subsequent higher treatment costs
- Increased sediment in reservoirs as a result of runoff and flash floods from burned areas, which can affect water quality, and reduced reservoir capacity and effective service lifespan
- Increased sediment and debris in stormwater runoff following flash floods, impacting water quality and treatment processes
- Decreased water supply downstream, as loss of forest canopy can lead to increased evaporation and reduction in the amount of water stored in snowpack
- Compromised distribution systems caused by damage to pipes (i.e., melting) and potential release of contaminants into the water supply

The following sections outline actions water and wastewater utilities can take to prepare for, respond to and recover from wildfires.

Notes:

Examples of Water Sector Impacts and Response to a Wildfire

Carr Fire Impacts to California Water Systems

In July and August 2018, the 230,000-acre Carr Fire impacted the Whiskeytown National Recreation Area in Shasta County, California. The destructive fire led to the evacuation of over 36,000 people and destroyed over 1,000 structures. The fire also severely impacted the Clear Creek Community Services District (CSD), Shasta CSD, Keswick, French Gulch and Redding water systems in the following ways:

- Fire destroyed a system's main office and two pump stations.
- Power outages combined with undersized generators led to treatment process disruptions for some systems. One community had to issue a boil water notice for 17 days.
- Some communities lost up to 95 percent of the homes in their service areas and dealt with extreme demand due to fire response and high leakage.
- Communication was extremely challenging, especially sharing public notifications with customers whose power was out or had evacuated.

Lessons learned by the impacted water systems included:

- Load test generators under peak demand conditions that mimic what may occur during a wildfire. A generator may perform well under normal operating conditions or during a single structure fire response but may not be adequate for extreme demand conditions.
- Identify options for sourcing additional generators if your generators are only designed to operate portions of your infrastructure during an emergency.
- Identify ways to share public notifications when normal communications have been disrupted.
- Build a relationship with local response partners, especially heavy water users (i.e., fire).
- Work with emergency responders during an emergency (i.e., local Emergency Operations Center).

Following the Carr Fire, the following mitigation actions were taken:

- The California Division of Drinking Water established bi-weekly meetings to discuss impacted source water sampling and to identify potential treatment options.
- Shasta CSD brought online two new pump stations made from cinder block with metals roofs, making them more fire resistant than the previous wood frame/siding construction.
- Shasta CSD and Keswick established an interconnection for redundancy.
- Redding has both groundwater and surface water sources. A pump station was built to provide treated groundwater through interconnections with Clear Creek CSD, Shasta CSD and Keswick.

Source: PACE Engineering, Shasta CSD Upper Brunswick Pump Station alongside remains of the old wood frame pump station after the fire.

Actions to Prepare for a Wildfire

Pre-Planning

- [ ] Identify critical infrastructure and develop contingency plans for loss of access and operations.

- [ ] Review and update your utility's emergency response plan (ERP) to include (but not limited to):
  - Updated emergency contacts.
  - Current GIS map(s) of all system components, facilities, and distribution lines, including coordinates for each facility.
  - Steps for shut down and start-up of system.
  - Steps for manual operation of all facilities.
  - Treatment adjustments to make based on raw water quality changes during and after fire, if necessary.
  - A fire-specific sampling plan that can be adjusted during the incident based on the location and extent of the fire relative to your system (includes groundwater wells as new MCL violations for nitrates and arsenic have been observed at groundwater systems following wildfires).

- [ ] Develop an emergency drinking water supply plan and establish response partner contacts (potentially through your local emergency management agency [EMA] or mutual aid network) to discuss roles and responsibilities and procedures, which may include bottled water, bulk water hauling, mobile treatment units or temporary supply lines, as well as storage and distribution.

- [ ] Develop a list of priority water customers (e.g., medical facilities, nursing homes, schools).

- [ ] Create a communications plan to ensure critical information is provided to your customers, including sample results and data, during and after an incident with the understanding that normal communications may be disrupted for an extended period of time.

- [ ] Complete pre-disaster activities to help apply for disaster funding (e.g., contact state/ local officials with connections to funding, set up a system to document damage and costs, take photographs of the facility for comparison to post-damage photographs). Publicly-owned or private non-profit utilities may be eligible for federal reimbursement if a federal declaration is made.
  - Private for-profit utilities are not eligible for federal disaster funding and will need to rely on existing reserves, insurance, and loans.

- [ ] Ensure adequate personal protective equipment (PPE) is available for field employees.

- [ ] Conduct briefings, trainings and exercises to ensure utility staff is aware of all preparedness, response and recovery procedures.

- [ ] Develop emergency evacuation and shelter in place procedures as pertinent to wildfires.

Coordination

- [ ] Coordinate with your local emergency responders and EMA to:
  - Understand how the local emergency operations center (EOC) and utility EOC will be activated and what your utility may be called on to do (e.g., keeping hydrants pressurized for firefighting), as well as how local emergency responders and the local EOC can support your utility during a fire response (e.g. assisting with defending a critical asset). If your utility has assets outside of the local EMA's jurisdiction, consider coordination efforts that should be done in those areas as well.
    - Provide locations of critical facilities with local emergency responders.
  - Identify an appropriate contact such as a Liaison Officer (LO) or Public Information Officer (PIO) or other position determined by the EMA that can provide your utility with situational awareness during an incident.

Actions to Prepare for a Wildfire *(continued)*

- Establish a prioritization matrix to balance system restoration versus establishment of alternative sources of water.
- Work with your EMA to establish potential points of distribution for the delivery of emergency water supply (e.g., bottled water) to the public, as well as who is responsible for distributing the water.

☐ Meet with the fire agency that has authority in your utility's area. This could include a local fire department, state conservation and forestry offices, and/or the US Forest Service.

- Review plans (hydrant and reservoir locations, flow rates, allowable drawdowns).
- Discuss response activities, (e.g., fire suppression chemical use within watersheds or near well fields, how to defend and maintain accessibility to critical infrastructure).
- Identify hazards (e.g., oxidizers) and vulnerabilities at your utility.
- Ensure the fire agency's fire management plans are updated accordingly with your water system's critical infrastructure and contingency plans.

☐ Join your state's Water/Wastewater Agency Response Network (WARN) or other local mutual aid network. This is especially important for utilities that lack adequate resources.

☐ Coordinate with WARN members and other neighboring utilities to:

- Outline response activities, roles and responsibilities, and mutual aid procedures (e.g., how to request and offer assistance such as equipment, personnel, or technical support).
- Establish interconnections between systems and agreements with the necessary approvals. Equipment, pumping rates and demand on the water sources need to be considered and addressed.
- Establish communication protocols and equipment to reduce misunderstandings during an incident.

☐ Coordinate with your local laboratories to ensure they have the capability and capacity to continue regular compliance sample analyses, as well as a potential surge of post-fire sample analyses (e.g., bacteriological, nitrate, nitrite, inorganic and volatile organic compounds).

☐ Coordinate with your identified priority water customers (e.g., hospitals, nursing homes) to obtain their contact information, map their locations, and develop a plan to restore those customers first or provide point-of-entry treatment options, in case of water service disruptions.

☐ Coordinate with local law enforcement to ensure utility credentials (or a local/state credential program) to allow access to utility assets in the incident area will be valid.

☐ Coordinate with your local emergency planning committee (LEPC), who may already have plans and procedures in place for a wildfire event in your community. Including the water sector in those plans is important.

☐ Sign up for mobile and/or email alerts from your local EMA, if available.

Communication with Customers

☐ Determine a spokesperson and back-ups for communications with the public and media.

☐ Develop public notice and other outreach materials in coordination with the state drinking water and wastewater regulatory agencies to provide your customers with information on the safety of their water supply (e.g., boil water or do not use advisories, guidance for residents on what to expect) or operational status of their wastewater system including potential special considerations for wastewater resulting from clean-up and recovery efforts (e.g., what not to put down the drain).

- The Oregon Health Authority created a

wildfire-specific do not drink public notice, but be sure to work with your regulatory agency to ensure you are following appropriate state requirements. Links to other notice templates developed by other fire-prone states are listed in the Resources section.

☐ Review emergency public information protocols with local EMA and public health/primacy agencies. These protocols should include delivering water advisory messages (e.g., boil water) to customers using appropriate mechanisms, such as reverse 911, in conditions where normal communications may not be available.

Facility and Service Area

☐ Inventory equipment and supplies and consider storing in an accessible and fire-hardened area. Make a list and order extra supplies, such as:

- Pumps
- Fuses
- Chemicals (ensure at least a two-week supply)
- Cellular phones or other wireless communications device with backup battery
- Fuel for generators
- Sampling bottles, reagents, and equipment
- PPE
- Emergency Supplies
  - Tarps/tape/rope
  - Wrench or pliers
  - Matches and lighter
  - Cots/blankets
  - First aid kits
  - Sanitizer
  - Foul weather gear
  - Plywood
  - Flashlights/flares
  - Sandbags (sand must often be ordered as well)
  - Bottled water
  - Batteries
  - Non-perishable food with manual can opener
  - Battery-powered or hand crank radio

☐ Ensure communication equipment (e.g., radios, satellite phones) works and is fully charged.

☐ Fire-harden critical facilities and areas:

- Practice mechanical thinning, weed control, selective harvesting, controlled burns and creation of fire breaks on utility managed property, and encourage these practices on property that may directly impact the utility, its water supply and/or water quality.
- Prioritize upgrades to wood structures and flammable materials: wooden water tanks, tank roofs made of wood, wooden building siding, asphalt shingles etc. Consider replacement with non-combustible material and/or retrofit existing buildings to meet current building code.
- Address and, if possible, remove vegetation from around facilities located in medium to high fire danger zones. Consider paving directly around water tanks and other critical buildings or infrastructure to discourage vegetation under building eaves and replacing flammable vegetation with fire-resistant landscaping.
- Create a zone of defensible space of approximately 100 feet or more to protect utility equipment and facilities (e.g., wellheads, structures, supports to wires and transformers). Consult with your local fire department for specific recommendations or requirements.
- Install manual or automatic irrigation systems to provide wetting of components and groundcover for vulnerable areas (e.g., chlorine storage, control equipment buildings).

Actions to Prepare for a Wildfire *(continued)*

- [ ] Assess the possibility of and procedures for using raw or reclaimed water for fire suppression (prepare public notice and talking points).
- [ ] Document pumping requirements and storage capabilities, as well as critical treatment components and parameters.
- [ ] Back up essential records and data, and store in a fireproof safe or offsite facility. Cloud-based storage could allow for accessibility anywhere.

Personnel

- [ ] Identify essential personnel and ensure they are credentialed with local authorities to allow access to facilities during an incident.
- [ ] Ensure all essential personnel are trained to perform critical duties in an emergency (and possibly without communication).
- [ ] Establish communication procedures with essential and non-essential personnel. Ensure all personnel are familiar with emergency evacuation and shelter in place procedures.
- [ ] Pre-identify emergency operations and clean-up crews. Establish alternative transportation strategies if roads are impassable.
- [ ] Consider how evacuations or limited staffing due to transportation issues (potentially all utility personnel) will impact your response procedures.
- [ ] Identify possible staging areas for mutual aid crews if needed in the response, and the availability of local facilities to house the crews.
- [ ] Encourage personnel, especially those that may be on duty for extended periods of time, to develop family emergency plans.
- [ ] Ensure field personnel have adequate PPE.

Power, Energy and Fuel

- [ ] Evaluate condition of electrical panels to accept generators; inspect connections and switches.
    - Identify options for sourcing generators if needed.
- [ ] Document power requirements of the facility. Your local technical assistance provider may be able to help.
- [ ] Confirm and document generator connection type, capacity load and fuel consumption. Test regularly, exercise under load and service backup generators.
    - Load test generators under peak demand conditions that mimic what may occur during a wildfire.
    - Identify options for sourcing additional generators if your generators are only designed to operate portions of your infrastructure during an emergency.
    - Ensure any generator location has proper ventilation and staff have training on generator safety.
    - The Public Safety Power Shutoff SOP Template, while developed for shutoffs, can help utilities plan for and recover from any power outage.
- [ ] For systems with generators, consider setting up all generators with automatic transfer switches so generators can start automatically if grid power is lost.
- [ ] Fill fuel tanks to full capacity and ensure that you have the ability to manually pump gas in the event of a power outage. Ensure this equipment and other hazardous materials are located in a safe zone.
- [ ] Contact fuel vendors and inform them of estimated fuel volumes needed if utility is impacted. Determine your ability to establish emergency contract provisions with vendors and your ability to transport fuel if re-fueling contractors are not available. Develop a backup fueling plan and a prioritization list of which generators to fuel in case of a fuel shortage.
- [ ] Collaborate with your local power provider and EOC to ensure that your water utility is on the critical facilities list for priority electrical power restoration, generators, and emergency fuel.

Actions to Respond to a Wildfire

Safety First

- [ ] Constantly assess the scene, know your surroundings, and move to safe spots.
- [ ] Pay attention to all emergency alerts, instructions, and evacuate immediately if told by authorities.
- [ ] Turn off air conditioning or air circulation systems.
- [ ] Detach any electrical garage doors.
- [ ] Watch for flames, falling debris, sinkholes, uneven ground, large objects, septic systems, explosive materials (propane tanks, etc.), items that puncture, downed power lines, loss of guardrails, safety signals, traffic lights and other typical safety features that are no longer in place, etc.
- [ ] Have an N-95 or other type of respirator available, if possible, to limit exposure to smoke and other toxic fumes.
- [ ] Wet debris to minimize the risk of inhaling dust particles.
- [ ] If returning from evacuation, remember that dangers could still exist for personnel such as hot spots, charred and fallen trees, downed power lines, smoldering and falling debris, sinkholes, mud and landslides, etc.
- [ ] Fatigue during extended periods of emergency work is common and quite dangerous. Be sure to get plenty of rest and stay alert, even outside of the disaster zone.
- [ ] Pay attention to driving conditions.
- [ ] Obey all traffic and construction signs.
- [ ] Carry a first aid kit and avoid unnecessary risk.

Plans and Procedures

- [ ] Execute your ERP, communications, and emergency drinking water supply plan, as needed.
- [ ] Work with your state regulatory agency to develop a fire incident-specific sampling plan that monitors raw water and finished water quality (both surface water and groundwater sources). The plan should identify target contaminants, a sample collection protocol, sampling locations (including raw water, point of entry, and distribution), and a data quality and management system.
    - Raw water sampling should include basic water quality parameters such as turbidity, total organic carbon (TOC), pH, alkalinity, iron, and manganese as noted in Oregon Health Authority's Post-Fire Monitoring Guidance for Drinking Water Systems, as well as bacteriological monitoring.
    - For any water systems with potentially impacted distribution systems, see EPA's Addressing Contamination of Drinking Water Distribution Systems from Volatile Organic Compounds (VOCs) After Wildfires for information on how distribution systems may get contaminated and further considerations with sampling, analysis, and actions.

Coordination

- [ ] As soon as possible, reach out to your local EMA to maintain awareness of the situation and, if possible, to lend or receive assistance.
- [ ] Notify your local EMA and state regulatory agency of your system's operational status and any needs and maintain communication with both.
    - Coordinate on issuance of water advisories, as appropriate.
- [ ] If needed, request or offer assistance (e.g., equipment, personnel) through mutual aid networks, such as WARN.

Actions to Respond to a Wildfire *(continued)*

- [ ] Assign a utilility representative to coordinate with the community's incident command post or EOC either virtually or in-person.
- [ ] Establish connection, if possible, with the fire cooperators meeting location for coordination with responding state and local fire agencies.

Communication with Customers

- [ ] Notify customers of any water restrictions or advisories (e.g., boil water, due not use, do not flush) and consider having your designated spokesperson collaborate with local media (television, radio, newspaper, etc.) and your local EMA (reverse 911, text alerts, etc.) to distribute the message.
    - If conditions are unknown, consider issuing a precautionary water advisory.
- [ ] If emergency water is being supplied, provide information on any distribution locations and logistics.

Facility and Service Area

Overall

- [ ] Conduct damage assessments of the utility to prioritize repairs and other actions if conditions are safe.
- [ ] Check that back-up equipment and facility components, such as controls and pumps, are in working order, and ensure that chemical containers and feeders are operational. Be aware that there may be damage that cannot be seen. If needed, hire professionals to assess facilities, equipment, and instrumentation.
- [ ] Work with the local EMA to identify passable access roads and to ensure that utility facilities in forest areas are clearly identified.
- [ ] Notify your state regulatory agency of any damage, changes to operations or required testing parameters, and/or impacts to water quality or quantity.
- [ ] Prepare and deploy equipment as needed to support firefighting operations, such as tanker trucks and related pumping equipment, as well as bulldozers for the construction of firebreaks.

Drinking Water Utilities

- [ ] If possible, refill storage tanks each day to ensure maximum storage for demand, including fire suppression.
- [ ] Keep intakes and access hatches clear of debris.
- [ ] Surface water systems should evaluate the amount of burn area in the watershed contributing to the surface water intakes. The potential increased sediments loadings and estimated travel time from the burn area to the intake should be considered in preparing for future weather events until slope stabilization methods are applied.
- [ ] Surface water systems should conduct on-site jar testing to respond to changes in turbidity, TOC, non-organic matter and other water quality parameters that could affect treatment efficacy.
    - Maximize removal of non-organic material pre-disinfection to help reduce disinfection byproduct formation.
- [ ] Determine if any points in the distribution system lost pressure.
- [ ] Turn off services to burned homes.
- [ ] Repair leaks, starting with the most severe ones. Shut off areas where leaking affects the ability to keep water in the system until repairs can be made.
- [ ] Execute your fire incident sampling plan to monitor raw water and finished water quality.
- [ ] Utilize pre-established emergency connections or set up temporary connections to nearby communities, as needed. Alternatively, implement plans to draw emergency water from pre-determined tanks or hydrants. Notify employees and emergency personnel of the activated sites.

Actions to Respond to a Wildfire *(continued)*

Drinking Water Utilities with Contaminated Distribution Systems

☐ Work with your state regulatory agency to:

- Assess your system for possible contaminants.
- Create a sampling plan that identified target contaminants, sample collection protocols, sampling locations, and data quality and management.
- Issue appropriate drinking water advisories (boil water, do not drink, do not drink - do not boil, do not use), and update advisories as needed.
- Unidirectionally flush as soon as possible to expel any foreign material/substances and back-siphoned water, and minimize permeation of any VOCs into infrastructure.
    - Flushing should begin at the water source and proceed downstream through the distribution system.
    - Multiple flush cycles may be necessary.
    - Obtain any necessary permits for proper disposal of contaminated waters.
    - Once the system mains are flushed, customers should be instructed to flush their building plumbing from the tap closest to the service connection to the furthest tap.
- Consider isolating areas of distribution to potentially prevent contamination from flowing into unimpacted areas, but also evaluate negative impacts.
- Consider alternative water options immediately as returning to normal operations may take time.
- Continue to flush and sample until service connections can be cleared.
- Determine next steps, such as pipe or valve replacement, if flushing does not resolve the contamination.
- Provide customers with water sampling information and recommended actions as soon as possible.
- Determine if a long-term monitoring program for VOCs is appropriate and develop if needed.

☐ For more information on the sampling plan and actions to take if a system experiences distribution system impacts, please refer to EPA's Addressing Contamination of Drinking Water Distribution Systems from Volatile Organic Compounds (VOCs) After Wildfires factsheet.

Wastewater Utilities

☐ Inspect the utility and service area, including lift stations, for damage and power availability.

☐ Inspect the sewer system for debris and assess the operational status of the mechanical bar screen. If necessary, run system in manual operation.

Notes:

Actions to Respond to a Wildfire *(continued)*

Documentation and Reporting

- [ ] Proper documentation is critical for public and private non-profit utilities in requesting reimbursement. Document all damage assessments, mutual aid requests, emergency repair work, equipment used, purchases made, staff hours worked, and contractors used during the response to assist in requesting reimbursement and applying for federal disaster funds. When possible, take photographs (with time and date stamp).
- [ ] Work with your local EMA on the required paperwork for public assistance requests.
- [ ] Privately-owned systems should prepare similar documentation for actions from any regulating agencies (i.e., Public Utilities Commission).
- [ ] Insurance companies may request specific documentation. Work with the provider to determine appropriate documenting and reporting.

Personnel

- [ ] Remind personnel that their personal safety is paramount.
- [ ] Account for all personnel and provide emergency care, if needed.
- [ ] If personnel are in the field, communicate with the National Weather Service (NWS) on local wind conditions in the fire area so staff are aware of how quickly winds are shifting and if evacuation from facilities is required.
- [ ] Deploy emergency operations and clean-up crews.
    - Identify key access points and roads for employees to enter the utility and critical infrastructure
    - Coordinate the need for debris clearing with local emergency management or prioritize it for employee operations.

Power, Energy and Fuel

- [ ] Use backup generators, as needed, to supply power to system components. Prioritize critical facilities first.
    - Backup generators are designed for normal service. Consider requesting additional generators through WARN, technical assistance providers or emergency management.
- [ ] Monitor fuel needs and coordinate fuel deliveries to generators.
- [ ] Maintain contact with the local electric provider for power outage duration estimates.
- [ ] Coordinate priority power restoration for critical water production facilities.

Notes:

Actions to Recover from a Wildfire

Coordination

- [ ] Coordinate through your local EMA with debris management teams. Availability of water may be scarce post-wildfire.
    - Water will be necessary for clean-up and dust suppression.
    - Water may also be needed for water system flushing.
    - Wastewater may be created from clean-up activities that will require proper disposal.
- [ ] Coordinate with local, state, or federal remediation teams (depending on the size and location of the fire) that will work to implement any necessary emergency stabilization of the landscape (e.g., soil and vegetation) post-fire. This stabilization is critical for surface water systems whose source water quality can be impacted by increased sediment load and debris flows.
- [ ] Continue work with response partners to obtain funding, equipment, etc.
    - If a Presidential Disaster Declaration is declared for the incident, funding may be available from the Federal Emergency Management Agency for public and private non-profit water and wastewater systems for repairs and sample and analysis.
    - Your state WARN program does not require a Presidential Declaration and WARN members could be available to provide assistance such as cutting burned service connections, sampling, etc.
- [ ] Coordinate with landowners and other partners to restore and treat burned areas.
- [ ] Coordinate with your back-up water sources to ensure water remains available if needed.

Communication with Customers

- [ ] Have your designated utility spokesperson continue to communicate with customers concerning actions being taken by the utility, a timeline for recovery, and other pertinent information.
    - Plan for multiple types of communication with customers (e.g. website, local news, social media, direct).
- [ ] Continue communication and updates on any water use advisories issued as well as information on flushing for residents who stayed or are returning.
- [ ] Make wildfire-related water system sample results available to the public via a website, if possible. This is critical if VOCs were detected in the distribution system.
    - Ask the city or county to assist with posting the data on their website if a water utility website is unavailable.
    - Continue posting sample data until the utility returns to normal operations.

Documentation and Reporting

- [ ] Compile damage assessment forms and cost documentation into a single report to facilitate the sharing of information and the completion of state and federal funding applications. Visit EPA's web-based tool, Federal Funding for Utilities—Water/Wastewater—in National Disasters (Fed FUNDS), for tailored information and application forms for various federal disaster funding programs: https://www.epa.gov/fedfunds. In addition, EPA's fact sheet on Addressing Contamination of Drinking Water Distribution Systems from Volatile Organic Compounds (VOCs) After Wildfires has information on various funding options after the fire.
- [ ] Develop a lessons learned document and/or an after action report (AAR) to keep a record of your response activities. Update your risk and resilience assessment and ERP. Work with local

fire officials to update their fire models and fire management plans with any water or wastewater system-specific lessons learned.

- [ ] Revise budget and asset management plans to address increased costs from response-related activities.

Facility and Service Area

- [ ] Complete damage assessments and additional documentation for potential reimbursement.

- [ ] If contamination is present in distribution lines, continue to repeatedly flush and sample in accordance with your post-fire and/or VOC-specific sampling plan and re-assess after each flush and sample cycle. Note: The absence of visual fire damage does not mean damage to piping or appurtenances has not occurred.

- [ ] Conduct sediment removal activities such as installing permanent or temporary debris basins.

- [ ] Consider specialized assessments and material testing. For example, consider taking destructive (representative) samples of sections of water main or consider rebuilding fire hydrants to determine the extent to which heat may have damaged components.

- [ ] Complete permanent repairs, replace depleted supplies, and return to service.

- [ ] Establish fill stations for clean-up and construction crews.

Watershed/Source

- [ ] Identify mitigation and long-term adaptation measures that can prevent damage and increase utility resilience. Consider impacts related to future climate conditions and the increased frequency of wildfires (e.g., installing buffer strips, removing hazardous fuels, laying steel or ductile iron raw water lines, building concrete buildings for pumping stations).

- [ ] Consider implementing the following mitigation measures to prepare for possible flash flooding or mudslide events following a wildfire:

  - Monitor the watershed, as conditions may be different post-fire. Identify potential failure points within your service area: ensure culverts can handle increased flow and determine runoff points and areas where water will now collect.
  - Install a rain gauge upstream of raw water intakes for early warning of heavy precipitation that could lead to high turbidity water and sensors to monitor the amount of debris and sediment coming downstream.
  - Consider instituting erosion control measures to protect against runoff and sediment concerns that occur during suppression and precipitation.

Treatment and Distribution

- [ ] Consider incorporating resilience and mitigation when designing and reconstructing infrastructure. Consider impacts related to future climate conditions and the increased frequency of wildfires. Some mitigation measures include:

  - Removing any above-ground and shallow-buried plastic components and replace with more fire-resistant materials, like metals.
  - Installing concrete meter boxes.
  - Installing metal meters.
  - Constructing steel tanks.
  - Burying service lines deeper.
  - Building concrete structures, rather than wood frame, especially for critical facilities.
  - Purchasing additional generators that can be used to handle the extreme load caused by wildfires.

My Contacts and Resources

CONTACT NAME	UTILITY/ORGANIZATION NAME	PHONE NUMBER
	Local EMA	
	State EMA	
	State Primacy Agency	
	WARN Chair	
	Power Utility	

Fire Mapping and Outlooks

- Active Fire Mapping Program (U.S. Forest Service [USFS])
- National Significant Wildland Fire Potential Outlooks (National Interagency Coordination Center NICC)
- National Weather Service – Fire Weather (National Oceanic and Atmospheric Administration [NOAA])
- Fire Weather Outlooks and Forecasting Tools (National Weather Service [NWS])
- Incident Information System (InciWeb)
- National Fire Situational Awareness Map (National Wildfire Coordinating Group [NWCG])
- Wildfire Assessment System (USFS)
- National Interagency Fire Center (NIFC)
- Firewise Communities (National Fire Protection Association [NFPA])
- U.S. Drought Portal (National Integrated Drought Information System [NIDIS])

Training and Preparedness

- All-Hazard Consequence Management Planning for the Water Sector (Preparedness, Emergency Response, and Recovery Critical Infrastructure Partnership Advisory Council (CIPAC) Workgroup)
- Ready.gov Wildfire Preparedness (Federal Emergency Management Agency [FEMA])
- Creating Resilient Water Utilities (EPA)
- Tabletop Exercise Tool for Water and Wastewater Utilities (EPA)

Coordination

- Water/Wastewater Agency Response Network (EPA)
- Community Based Water Resiliency (EPA)

Communication with Customers

- Oregon Health Authority public notice resources and templates
- California Water Boards templates for public notification
- Washington State Department of Health water advisory template
- EPA public notification templates

Facility and Service Area

- Post Fire Recovery (NIFC)
- Water Quality After Wildfire (USGS)
- Defensible Space Guidance (CAL FIRE)
- Private Wells after the Fire: A private well owner's guide to protecting your drinking water source (Arizona Department of Environmental Quality [ADEQ])
- Water Quality Concerns Fact Sheet (ADEQ)
- Evaluating the Effectiveness of Post Fire Rehabilitation Treatments (USDA)
- Water Supply Systems for Fire Protection (USFA)
- Wildfire Impacts on Water Quality (Southwest Treatment Catalog (USFS)
- Post Fire Rehabilitation Techniques (Colorado State University)

- Post-Wildfire Monitoring Guidance for Drinking Water Systems (Oregon Health Authority [OHA])
- Addressing Contamination of Drinking Water Distribution Systems from Volatile Organic Compounds (VOCs) After Wildfires (EPA)
- Post-Wildfire VOC Sampling Guidance for Public Water Systems (OHA)

Power, Energy and Fuel

- Power Resilience Guide (EPA)
- Power Outage Incident Action Checklist (EPA)
- EPA Region 1 Water/Wastewater System Generator Preparedness Brochure (EPA)
- Public Safety Power Shutoff Standard Operating Procedure Template (EPA)

Documentation and Reporting

- Federal Funding for Utilities in National Disasters (EPA)

Mitigation

- Burned Area Emergency Response (BAER) Treatment Catalog (USFS)
- Plants for Wildfire Protection and Restoration (USDA)
- Climate Resilience Evaluation and Awareness Tool (EPA)
- Resilient Strategies Guide (EPA)
- Hazard Mitigation for Natural Disasters (EPA)
- Effects of Wildfire on Drinking Water Utilities and Best Practices for Wildfire Risk Reduction and Mitigation (EPA and Water Research Foundation)
- Wildfire Hazard Mitigation Handbook for Public Utilities (FEMA)

Notes: