



FLOODS



Emergency Preparedness and Response to Climate Change: The Role of the Environmental Health Professional

The National Environmental Health Association (NEHA) aims to raise awareness of the impacts of climate change. These changes, including the effects of extreme weather events on infrastructure and human health, have increased the need for preparedness and response across every sector of public health, especially environmental health (EH). EH professionals play an integral role in mitigation, preparedness, response, and recovery. Clearly, NEHA's mission, to advance the environmental health professional for the purpose of providing a healthful environment for all.

Climate change is the greatest threat to global health.⁸ It affects human health through air quality, extreme heat, drought, wildfires, extreme storms, floods, vector borne illnesses, and changing local weather patterns.

Though global, the effects of climate change are inherently local. All people are susceptible to physical and mental health impacts; however, certain groups carry a heavier burden. These populations include children, people of color, older adults, people with disabilities, and people in impoverished communities.

! FAST FACTS !

NOAA predicts high tide flooding to increase **300–925%** over the next 50 years.*

SIX INCHES of moving water can knock a person down, and **2 FEET** of moving water can sweep a vehicle away.³

Over the last 110 years, precipitation has increased by **8.5%**.

In 2018, the U.S. had **80 FATALITIES** due to flash flooding events.⁴

On average, **17.8 MILLION** people worldwide are at risk of being displaced by floods every year.⁵

Diseases that are **SPREAD** by unsafe water include cholera, giardia, and typhoid.⁸

**National Oceanic and Atmospheric Administration*




CLIMATE CHANGE AND FLOODING

Climate change is modifying precipitation patterns and intensity of rainfall throughout the U.S. Flash flooding can occur when rivers experience a quick increase in precipitation during a short period of time. Frequent intense storms quickly saturate the soil, and in those urban areas with dense infrastructure and little open soil, these storms overwhelm storm sewer systems, causing even more severe flooding. Periods of drought can also exacerbate this problem as the sudden and intense downpours cannot be absorbed quickly. Flooding can affect many aspects of human health. For example:

- Sea level rise contributes to higher water levels, strong currents, and floating debris during flooding events. The increase in flooding puts people at risk of injuries, drowning, or death

- Warmer surface temperatures create a habitat that generates extreme storms. These characteristics increase the exposure to vector-borne diseases and the potential for dangerous extreme weather events
- During a flood, water can be contaminated through waterborne pathogens, chemicals from industrial areas and agriculture runoff, stormwater overflow, or human and livestock waste. Exposure to these contaminants can pose serious health threats
- Community destruction from flooding increases mental health effects from trauma and property loss, destroy roads, and limit access to supporting health services
- Flooding can also cause food supply destruction

Health effects related to floods can contribute to school and work absences as well as decreased workplace productivity.

			
Climate Impacts	Water Contamination	Sea level rise and mold exposure	Property loss and infrastructure disruption
Health Outcomes	Consuming contaminated water can cause gastrointestinal illnesses	Mold left behind from flooded homes increase risk of allergies and asthma exacerbations	Effects mental health; stress, trauma, depression

POPULATIONS VULNERABLE FLOODING



Farmers



Indigenous
Communities



Disabled
Populations



Coastal
Communities



First
Responders



Impoverished
Communities



Children



Elderly
Populations



ENVIRONMENTAL HEALTH WORKFORCE ROLE

EH professionals play an essential role in prevention, disaster recovery efforts, and reducing the public health risks of flooding. Severe flooding increases the need for preparedness and response from EH professionals. An EH professional has the appropriate education and training needed to support local impacts due to disasters and protect human health.

In order to address the health threats of floods, EH professionals must be able to:

- Investigate and assess hazardous pollution agents that can contaminate drinking and recreational water
- Provide recommendations, interventions, and policies to protect and control water contamination, mold exposure and soil hazards to health following a flood event
- Monitor weather systems and sea level patterns, as well as notify the public of severe flooding events
- Interpret flooding and health research utilizing science and understand the impact on health outcomes
- Respond to and mitigate mold-related issues post-flooding
- Monitor and respond to the potential for increased vector-borne disease related to increased habitats of mosquitoes due to standing water
- Assess damage to infrastructure caused by flooding, such as wells and septic systems and associated impacts on health
- Understand the impact that systems, social and structural inequities, institutional power and structural racism can have on climate change

EH professionals are uniquely qualified to respond to flooding impacts due to their in-depth knowledge of the relationship between floods, health, and the environment.



FLOODS



ASSESSMENT

EH professionals identify, assess, and help recommend solutions for flood vulnerabilities.

- Assess local weather and precipitation data and investigate current community health needs by identifying environmental hazards and the effect on human health. For example, monitoring daily precipitation and tracking water quality.
- Identify locations in communities at a high risk of flooding and develop prevention and action plans for the next event.

POLICY DEVELOPMENT

EH professionals must support community preparedness efforts to address flooding through policy.

- Weave climate and flood adaption into current organizational structures to adjust to current climate change conditions and mitigation policies to reduce standing water and severe flooding.
- The Pandemic and All-Hazards Preparedness Act of 2019 (PAHPA) was recently signed to sustain and strengthen the nation's preparedness for public health emergencies. The new revision is critical to drive flood preparedness policies.

ASSURANCE

EH professionals have an essential role in protecting the health of the public by maintaining and ensuring local flood preparedness, management plans, and recovery actions.

- In order to notify the public of contaminated drinking water, issuing alerts using multiple media outlets and different languages is critical to connecting with all populations.
- Design and develop healthy community design features to reduce negative effects on community health factors like municipal drainage systems, dams and levees.



RECOMMENDATIONS

- EH professionals should undergo the Environmental Health Training in Emergency Response (EHTER) training. The Awareness Level training focuses on EH responders' role to prepare for, respond to, and recover from air pollution emergencies, and the Operations Level involves hands-on operation practice and response to simulated events.
- NEHA recommends that communities utilize a systematic approach to flood preparedness such as CDC's Building Resilience Against Climate Effects (BRACE) Framework.
- NEHA supports the Pandemic and All-Hazards Preparedness Reauthorization Act (PAHPRA) and calls on its members to examine their roles in the implementation of this important bill.

- NEHA recognizes that it must continue to work to mitigate its own climate impact by reducing greenhouse gas emissions that impact warmer temperatures and sea-level rise.
- NEHA recommends action to preserve the built environment to minimize and mitigate the flooding impacts of climate change.
- NEHA recommends its members work together to share information and resources on flood adaptation and mitigation activities.

Resources

1 Sweet, W.V., Park, J., Marra, J.J., Zervas, C., Gill, S., 2014. Sea level rise and nuisance flood frequency changes around the United States. In: NOAA, Technical Report NOS COOPS 73, 53 pp.
2 USGCRP. (2017). Climate Science Special Report. Retrieved from <https://science2017.globalchange.gov/>.
3 FEMA. (2019, April 9). Graphic: 3 Fast Flood Facts. Retrieved from <https://www.fema.gov/media-library/assets/images/110068>

4 NWS NOAA. (n.d.). Hazard Flood Report - 2018. Hazard Flood Report - 2018. Retrieved from <https://www.nws.noaa.gov/om/hazstats/flood18.pdf>
5 Internal Displacement Monitoring Center. (n.d.). IDMC: Global Report on Internal Displacement 2019. Retrieved from <http://www.internal-displacement.org/global-report/grid2019/>.
6 Denchak, M. (2019, November 13). Water Pollution: Everything You Need to Know. Retrieved from <https://www.nrdc.org/stories/water-pollution-everything-you-need-know>.