

Part I

The Effects of Disaster on Environmental Health

An Overview

The adverse environmental conditions that may accompany natural disasters vary according to disaster type. Table 1 presents probable concomitants to the most common disasters.

Table 2 presents the relative severity of the effects of some common disasters on the environment. These disasters cause considerable deterioration of environmental conditions. Partial or total disruption of environmental health services is to be expected, particularly of the lifeline services, such as water systems, food production and distribution, transportation, and power. Increased population density results from the effects of disaster listed in table 2. This, in turn, disrupts normal community life by causing health-related conditions to worsen and increasing the need for environmental health services.

Effects of Disasters on Conditions and Services

The sudden creation of areas of high population density, such as camps for displaced persons where there has been no planning for the sanitary accommodation of large numbers of people, is one of the most typical ways in which disasters affect environmental health conditions and services. Because of their generally inadequate facilities and services, establishing camps can result in secondary health emergencies; consequently, even more time and scarce resources will be needed than are required to address the original emergency situation.

Disruptions or overloading of water supply systems, excreta and liquid waste removal systems, and solid waste disposal systems also are likely consequences of natural disasters. When excreta and liquid waste disposal systems are disrupted, the probability of water-borne and food-borne diseases increases. Other water-related diseases and

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Table 1. Consequences by Type of Disaster

Disasters	Consequences
Storms (Hurricane, cyclone, tornado)	Destructive winds Flooding Heavy rains Landslides Power outages
Earthquakes	Destructive vibration Power outages Fires
Volcanic eruptions	Earthquake Tsunamis Fires Volcanic debris
Tsunamis (Sea surges)	Floods Power outages

general nuisances are also more likely to affect disaster-stricken populations. Whenever access to normal water sources is hampered or cut off, it is critical that authorities make sufficient quantities for human consumption available to the populations in need.

As sanitation decreases with the disruption of solid waste disposal systems, the contamination of food and water supplies and the proliferation of vectors increase the risk of disease. The bothersome conditions that accompany breakdowns in solid waste disposal may contribute to the mental stress that disaster victims undergo. The disruption of solid waste disposal systems also can create fire hazards in densely populated areas.

The growth of populations of vectors of diseases such as malaria, yellow fever, tularemia, and typhus is a further common consequence of natural disasters, particularly in areas where such diseases otherwise are incidental. As was experienced in the aftermath of disaster in Haiti, the interruption of established vector control activities can cause a resurgence of such diseases.¹

1. Mason, J., and Cavalié, P. "Malaria Epidemic in Haiti Following a Hurricane." *American Journal of Tropical Medicine and Hygiene* 14(4): 1-10 (1965).

Table 2. Matrix of Effects of Natural Disaster on Environmental Health Services

Service	Most Common Effects on Environmental Health	Earth-quake	Hurricane/Tornado	Flood	Tsunamis
Water supply and waste water disposal	Damage to civil engineering structures	●	●	●	○
	Broken mains	●	⊙	⊙	○
	Power outages	●	●	⊙	⊙
	Contamination (biological or chemical)	⊙	●	●	●
	Transportation failure	●	●	●	⊙
	Personnel shortages	●	⊙	⊙	○
	System overloading (due to shifts in population)	⊙	●	●	○
	Equipment, parts, & supply shortages	●	●	●	⊙
Solid waste handling	Damage to civil engineering structures	●	⊙	⊙	○
	Transportation failures	●	●	●	⊙
	Equipment shortages	●	●	●	⊙
	Personnel shortages	●	●	●	○
	Water, soil, and air pollution	●	●	●	○
Food handling	Damage to food preparation facilities	●	●	⊙	○
	Transportation failure	●	●	●	⊙
	Power outages	●	●	⊙	⊙
	Flooding of facilities	○	●	●	●
	Contamination/degradation of relief supplies	⊙	●	●	⊙
Vector control	Proliferation of vector breeding sites	●	●	●	●
	Increase in human-vector contacts	●	●	●	⊙
	Disruption of vector-borne disease control programs	●	●	●	●
Home sanitation	Destruction or damage to structures	●	●	●	●
	Contamination of water and food	⊙	⊙	●	⊙
	Disruption of power, heat fuel, water supply waste disposal services	●	●	●	⊙
	Overcrowding	○	○	○	○

- Severe possible effect
- ⊙ Less severe possible effect
- Least or no possible effect

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Finally, decreased standards of general housing sanitation and personal hygiene are among the most common effects of disaster upon environmental health conditions and services. When displaced persons move into areas in which physical structures have been damaged by the disaster, overcrowding often causes housing sanitation to decline. The lack of proper clothing, water, soap, detergent and basic cleaning and washing facilities makes it difficult to maintain usual standards of personal hygiene; as a result, there are increases in diarrheal disease, vector-borne diseases like typhus, and conditions like scabies in areas where they were already prevalent before the disaster.
