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Safety Procedures for Volcanic Activity in the United States and Japan

When you think of the United States, volcanic activity probably does not cross your mind. What is surprising to most people, myself included, is that the threat of a volcanic eruption is of more concern than most people seem to realize. There are active volcanoes in the United States. It is important to understand what a volcano actually is, how they form, the kind of damage they can do, and so on. It is also important to understand the evacuation and safety procedures put into place in areas of the United States where volcanoes pose a potential danger. In addition to discussing the procedures set in place within the United States, discussing the evacuation and safety procedures of a country such as Japan could potentially help aid the United States in its efforts to not only protect people currently living near volcanoes, but protect future generations from the harm that can be caused as a result of an eruption.

When it comes to understanding volcano safety procedures it is essential to first understand what a volcano actually is, how it is formed, and the potential hazards that can result from these geological structures. Volcanoes are basically vents in Earth's crust that allow magma from Earth's mantle to come to the surface (National Geographic). When a person pictures "vents," they do not necessarily envision the mountain-like structures that are the aftermath of an eruption. "When thick magma and large amounts of gas build up under the surface, eruptions can be explosive, expelling lava, rocks and ash into the air" (National Geographic). These sometimes devastating eruptions can cause more damage than a person

might think. Also, contrary to popular belief, the United States is home to volcanoes, and they are not just in the Hawaiian Islands. Volcanoes also cover the northwestern portion of the United States.

It is understandable that a volcanic eruption can cause immense amounts of damage. “Volcanic eruptions are one of Earth’s most dramatic and violent agents of change” (United States Geological Survey). Luckily, volcanoes are not constantly erupting. There are issues surrounding the release of gases, which can eventually cause the magma to turn to foam and cause violent eruptions; lava flow, which can potentially destroy anything in its path; a risk of landslides, which can cause mass amounts of damage; lahars, which occur when debris mixes with water and flows down streams causing damage to the living things in and around the streams; and tephra, which includes volcanic ash can quickly become a health hazard when inhaled (United States Geological Survey.) The damage that a volcanic eruption can cause is more widespread than most people understand. Some other hazards include volcanic earthquakes, tsunamis, flooding, and famine and disease (Nelson). The potential for harm to be done to the land and environment, as well as living organisms, is high and can be catastrophic.

Areas in the Northwest, such as Washington state and Oregon, are at risk for damage that is caused by volcano eruption. There are procedures in place to minimize the danger that individuals have to come in contact with when such eruptions occur. It is important to not only review and understand the safety procedures put into place in the United States, but also review and understand the procedures established in countries such as Japan so that, if it is needed, revisions can be made to the procedures put into place by the United States.

As most people are aware, there are active volcanoes in Hawaii, but some people are unaware that there are also active volcanoes in the Northwestern part of the United States. There

are several volcanoes in Washington state that are inactive, but there are also active ones too.

“Washington is home to five major composite volcanoes or stratovolcanoes (from north to south): Mount Baker, Glacier Peak, Mount Rainier, Mount St. Helens, and Mount Adams. These volcanoes and Mount Hood to the south in Oregon are part of the Cascade Range, a volcanic arc that stretches from southwestern British Columbia to northern California” (Washington State Department of Natural Resources). According to the site all of these volcanoes have been active within the last two hundred fifty years, but they are not active on a set interval. This makes predicting the next eruption for each extremely difficult, if not impossible.

Since it is extremely difficult to predict a volcanic eruption, it is very important to have procedures in place to ensure that as many people as possible can get to safety as quickly as possible. No set of safety procedures is going to be completely identical, but they should all have similar main modes of keeping everyone safe. The danger is very real. “A Mount Rainier worst case lahar will demand what will likely be the largest and most complex response operations ever taken by Pierce County and Washington State” (Pierce County Department of Emergency Management). While this worst case scenario is just that, the worst case, it is still important to be prepared for that. Regardless of the event, the response is widespread and consists of multiple people. “Support agencies and incorporated cities and towns will perform tasks and expend resources under their own authorities, including implementation of mutual aid agreements, in addition to resources received under the authority of this plan” (Pierce County Department of Emergency Management, 49). It is important to understand both the significance and scale of the event’s potential occurrence and also the sheer number and size of the response process before diving into the process itself.

Now, the process of evacuation is one that requires more thought than some people would expect. Obviously, time is of the essence, but that can also lead to potential issues involving the safety of everyone trying to evacuate. “Transportation routes will be overwhelmed with evacuees. Vehicles will be abandoned, worsening the congestion” (Pierce County Department of Emergency Management, 52). This gridlock traffic issue could drastically hinder evacuation efforts. It is worth noting that in Washington State specifically, no public worker is expected to put himself or herself in harm’s way to continue rescuing city occupants.

When faced with a worst-case lahar, everyone in harms way needs to evacuate as quickly as possible. Everyone will be evacuating together, including public safety providers. Public safety providers may have time to assist others as they continue to evacuate themselves but no one can expect it. No fire fighter, police officer, or any other public safety provider will be expected to enter or remain in harms way to rescue others (Pierce County Department of Emergency Management, 51).

The ultimate goal with evacuation is safety for every person involved. A lot of this falls back on the people living in high risks areas. “In order to optimize the chances for survival of a worst-case scenario, people in the inundation zone are responsible to know the dangers associated with living, working, or visiting...” (Pierce County Department of Emergency Management, 51).

With the combination of evacuation procedures and the public’s knowledge of the hazards, these areas in Washington State have worked to create an effective evacuation plan that is as safe as possible.

When attempting to study the evacuation procedures in Japan, it was more difficult than expected to find helpful information. The need for education is similar to that of Washington State. “Counter measures against disasters in Japan fall into the following categories: 1.

Research into the scientific and technical aspects of disaster prevention 2. Reinforcement of the disaster prevention system (facilities and equipment) 3. Construction projects designed to enhance the country's ability to defend against disasters. 4. Emergency measures and recovery operations 5. Improvement of information and communication systems" (Erfurt-Cooper and Cooper 165). Just as in the United States, Japan takes a self-educational approach to safety. In order for everyone to be safe, everyone needs to be aware of the potential hazards and how to handle himself or herself if or when a disaster might strike.

Though the idea of educating the residents has been put into place there is a serious lack of plan to "be educated" on. "Out of the 130 municipal governments located near volcanic vents, 110 have not made any evacuation preparations for a potential eruption" (Shimbun). There have been devastating eruptions in the past in Japan, yet there is still a major lack of evacuation protocol. Fortunately for the United States, and possibly unfortunately for Japan, the United States Marines have an evacuation plan in place for their units stationed in Japan. According to the United States Marine Corps website, there are procedures and instruction on what to do prior to volcanic activity, during it, how to educate your children and keep them safe, what to do for animals, and what to do after the event occurs. The website even goes as far as to mention what to do in case of volcanic activity so that all involved are prepared on every level.

To conclude, volcanic eruptions are dramatic and devastating events that can cause mass amounts of hazards to people and the environment. Safety procedures are important because they are the best means of keeping everyone, and everything, safer in the event of a volcanic eruption. Though there was little information to be found on what Japan uses for safety procedures there was a significant amount of information found on the United States. Washington State specifically was the focus of this paper; however, there are volcanoes in other

parts of the United States with entirely different and separate safety and evacuation procedures.

There is no way to truly cover it all in one research paper. Safety is of the essence in general, but especially when it comes to volcanoes and the devastating effect they can have on this planet.

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