



WPI

Natural Disaster Preparedness

Supplemental Materials

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Data Collection Methods



Consent Preamble

We are students from Worcester Polytechnic Institute, which is a University in the United States. We are working on a project To evaluate and suggest improvements in disaster preparedness on an individual scale. We would like to ask you a few questions about how you are assisting in others' preparedness as well as your own. Your information will be confidential, you do not need to give out any personal information or information you do not wish to share. Your participation is voluntary and you are free to stop or refuse any question



2

Raw Data



Survey data

The following link contains sheets and PDFs of the survey data from the WPI populations and the Icelandic population:

[IQP Survey Data](#)



Icelandic Meteorological Office interview notes

How do you inform Icelandic citizens about disasters

Regular meetings with Civil Protection, transport authorities, energy organizations

2 pm everyday

Imminent threats of weather, natural precursors

State media web page, social media

Rescue teams association

For citizens and travelers

Send SMS to everyone in a certain radius

What information do you think is most important to tell the general public

Stages of the weather phenomena, tells specifics of disaster and its effects in real time

Color coding warning system

Talk about what they know, what they believe are the possible scenarios

Ex: Wind, wind speed and gust

Yellow, orange, red

1-2 red warnings per year

Warnings up to five days ahead, more accurate closer to event

How do you alert them about impending disasters

How do people respond

What is the typical procedure for the IMO when a disaster occurs to aid Icelanders

How often does the Icelandic meteorological office issue alerts

What severity justifies an alert

What is your biggest challenge you face when trying to inform or alert the public (color coding system)

The 11 areas in Iceland are large

One part of the area could have red while the rest is fine, whole area is still red, could create a distrust

Do you think that there is any policy or change in policy that could reduce the threat that natural disaster could cause citizens

Do you as an individual have any preparations in case of a natural disaster either in home or in office?

She does not

Depends on where people are living in Iceland, people who are closer to volcanoes often have ready bags, supplies





Department of Civil Protection Interview Notes

Agust Gunnar Gylfason, works in risk analysis for 17 years for civil protection, works in analytical capacity for both disasters and climate, runs training for crew of National Crisis Coordination Center, career focused on human interaction through geography

David Lynch, head project manager at protection, been working on covid, military to 30 years in red cross, recently returned to Iceland, organizes both internal projects and external disasters

Civil protection and security council: policy

Minister of justice: policy

National commissioner of police (municipal authorities, civil protection committees, first responders, gov't agencies, I-SAR does search and rescue, Red Cross gives medical help and services for after a disaster): monitoring

National crisis coordination center: operations

Local crisis coordination center: operations

Temporary service center: rebuilding, works closely with red cross as it helps with not rescue but with aftermath of disaster, local government/insurance/shelter/belongings, set up after a disaster has happened, not always necessary

Civil protection investigation committee: evaluation, elected by parliament, very little has been done so far despite legislation being passed in 2008, committee has no funding

Recent eruption did not need a service center, most risk from ongoing eruption is due to rule breakers and ignorance/stupidity

Community town halls very important to talk face to face with people, large amount of misinformation over doomsday fears based on twitter volcano claims

2010 eruption population assumed to be generally homogenous in terms of response as it was largely the farming communities, but there is a meat processing plant in the area with a large polish community, unaware how diverse Iceland had become, held town meetings for weeks for Icelanders, got calls from polish embassy because the polish were scared, brought along experts but beginning of meeting went poorly, many did not trust the experts, but having an interpreter was extremely helpful, amount of interpreters has since been expanded and civil protection has become more aware that Iceland has become diverse

Town hall meetings supplemental, hope that people will support each other and make everyone understand what is expected for their own safety, reach out using SMS for affected areas, Facebook also a useful tool

Civil protection tasks: hazard and risk assessments (work with MET office and many other organizations), mitigation about educating people and making contingency plans to train the response sector, work a lot with international organizations that are humanitarian, affiliated with UN OFSCA, not a member of the EU but part of the EU Civil protection committee who train first responders and do satellite imaging/mapping, NATO has a civil protection cooperation, Nordic Civil protection cooperation, council of Baltic sea states because it was supposed to help Baltic states with environmental protection broadened into civil protection, arctic council search and rescue made up of Nordic countries plus Russia us and Canada mostly focused on ocean rescue, a lot of scientific cooperation, EU has large scientific funding most efficient to get a coalition of companies and universities and other organizations and need an end user to get funding which ropes in the civil protection agency frequently

Hazard assessment is largely doing probability calculations and estimating magnitudes extent and duration

Mitigation building resilience, teaching people what to expect and to think for themselves about how they intend to respond, civil protection has evacuation plans in place if people do not listen but they encourage people to plan, infrastructure also important to think about power lines/utilities and institutions like schools, bring in representatives of all major sectors of economy in case of loss of electricity

Biggest problem that you cannot always say where an eruption event might be, as most of Iceland is volcanic and lava could seep from any of the fissures that run off of the main crater/caldera, warnings are all probability based, like in a storm could have high chance of avalanche but it is hard to predict how dangerous they would be, could be deadly or could cause minor property damage or only hit the levies, recent weather was an unusual event so early in the season and people had not started their contracts with the government to be snow plowers, studded tires only allowed beginning OCT 15, increasingly early rate of storms is concerning

Recent eruption had SO₂ concerns but was basically in the middle of nowhere so there was less concern about other issues, most mitigation was based on people going to see the eruption including media

Contingency planning based on who is doing the rescuing, where service centers will be set up, training done through tabletop, command post (run local coordinators through fake scenarios), and live exercises

Activate the system for various incidents, both natural disasters and infrastructure failures like aircraft failure

National crisis center Department has 15 employees, 100 trained staff who are on call year round, and a duty officer who decides if the system will be activated

Operational staff come from large amount of various organizations such as I-SAR and red cross

Specific response plans for different departments in the country, about 70-90 case specific response plans for various scenarios such as pandemic, mass casualty (psychological first aid and extended psychological aid taken care of by red cross), volcano, storm, aircraft failure, maritime,

Look for response plans on Civil Protection website

One document in English but not official, rest in Icelandic so need to be careful with translation

National security department and Civil Protection agency have a lot of overlap, need a hard line between the two but the large problems of National security always have direct effect on the operations of Civil Protection (bank collapse, terrorism, pandemic, cybercrime, etc.)

Make tough choices about electrical allocation based on industrial use versus humanitarian

Crisis center has been operational for extremely long due to covid, 337 days last year and has been in operation since beginning of this year

Worcester Emergency Management division interview notes

Director of emergency management and communications

Makes sure that they are looking forward with disaster and emergency planning

Mitigation to prevent a hazard or lessen its effects

Preparedness to make a plan to know what to do when an event happens

Operations to save lives during a disaster

Recovery to focus on reopening businesses and returning people to their homes

After recovery you begin to look at mitigation again to build up bigger and stronger during recovery

Current role in low disaster times to focus on mitigation

Emergency operations center is opened during an emergency, open up the EOC to manage and meet with all of the disciplines and deal with requests, manage various branches that need coordination, working behind the scenes with police, fire, etc rather than being directly on the front lines and coordinating the available resources

Public education programs:

Emergency communications is the dispatch center

Smart911 allows individuals to enter their information into a database that will tie their phone/address to them for additional information for first responders

Other programs focus on individual preparedness

knowplanprepare boils down individual preparedness into knowing your hazards that you could face, make a plan with family/roommates in order to establish a plan for a hazard, prepare focuses on emergency supplies, 3 day kit with everything you need in case you cannot stay in your home, food, water (for everyone in your household+pets), medication/prescriptions, hand crank radio, cash, water filtration/lifestraw, change of shoes, blanket, flashlight, make sure to review everything in the kit regularly

Why 3 days? If you rely on local resources you may not be able to get through the first 3 days, but after 3 days almost always either MEMA or FEMA will be able to arrive and spread the resources through the area

Public school system is used as the shelter system

First choices are Worcester voc and North High in Worcester, voc has vet clinic on site, important because many people do not have places to evacuate with pets and they don't want to leave them behind, happened frequently in Hurricane Katrina, colocation of pets and human shelters are extremely valuable

Currently reviewing shelter plans, 2008 ice storm used a senior center as a shelter as it had good heating and a lot of space, schools were not used because they are invaluable to be opened in recovery, not using it as a shelter helps facilitate recovery

Shelters are not comfortable, people may feel inclined to stay at home for an event instead of going to a shelter

Covid means shelter is harder to group people together

Without staying in a shelter means the flow of information is also harmed, even if you do not stay at home and evacuate to a friends house

Make sure to communicate the severity of the event without becoming the boy who cried wolf

City of Worcester uses AlertWorcester, a voluntary system where they can send out alerts about potential issues

ILOTS forces text messages to any phone within a geographic area, basically an amber alert system, accessed through federal channels

Radio, television, newspaper, all have agreements to help disperse information about dangerous situations, social media also used

Use telemundo to get messages out to Spanish community

Highway sign boards also used, especially during covid for restrictions

Will be directed to shelters in case of an emergency as they are impromptu

Are people generally prepared in Worcester?

Most vulnerable populations frequently also do not prepare for emergency

Poverty a main factor of vulnerability, simply do not have the time to deal with the future emergencies that could happen

Worcester poverty rates mean community resiliency has a lot of way to go

Non-english speaking groups are incredibly tight knit, if you get even one trusted voice they can cause the whole community to increase their preparedness, also they are frequently in a network of people who can help during an emergency

ICS integrated command system is what the US uses to manage disasters, created by FEMA, a lot of guidelines and information available

UN and rest of the world manage responses very differently

UNICEF is responsible for a lot when UN intervenes in a disaster, food is a large role

Red cross has a lot of information and in different languages



3



Deliverables

Southern Peninsula Preparedness Infographic

Southern Peninsula Disaster Information

Frequency of hazards



Earthquakes



Heavy snowfall



Recent Event

Earthquakes



Heavy snowfall



Volcanic activity



Landslide/Avalanche



Flooding



Hurricanes



Tornados



Wildfires



Recent Event

In March 2021 an eruption occurred in Fagradalsfjall this eruption caused over 17,00 seismic events before it erupted. The eruption displaced 300,000 cubic meters of lava into the Geldingadalir valley south of the eruption site. As of October 2021 earthquakes of increasing magnitude have been recorded indicating the creation of a new outlet for the volcano (Iceland Meteorological Office, 2021)

Get Informed

Information checklist

- You are aware of the natural disasters that occur in your area
- You researched how to prepare for disasters in your area
- You receive disaster and weather alerts from the IMO
- You are aware of Local relief protocols
- You are familiar with the locations of local disaster shelters

For the most up to date information on natural hazards and weather alerts see the Icelandic Meteorological Office's Website.



The Department of Civil Protection provides preparation resources to the public.



The Red Cross has multiple shelters and volunteers to help provide disaster relief



This infographic was created by the Natural Disaster Preparedness team for Worcester Polytechnic Institute's Interdisciplinary Qualifying Project. Contact us at: gr-earthquakesiqp@wpi.edu

Iceland Meteorological Office. (2021, August 20). Earthquakes in the last 48 hours. Icelandic Meteorological Office. <https://en.vedur.is/earthquakes-and-volcanism/earthquakes>

Southern Region Preparedness Infographic



Southern Region Disaster Information

Frequency of hazards



Earthquakes



Heavy snowfall





Earthquakes



Heavy snowfall



Volcanic activity



Landslide/Avalanche



Flooding



Hurricanes



Tornados



Wildfires



Recent Event

A glacial out burst flood began on september 1st 2021 on the Skaftá river. As of October 9th the river has begun to stablise, however the IMO still warns that roads maybe closed do to the heavy flow and the aditional heavy rains due to hit the Souther Region of Iceland on sunday 10.10 (Iceland Meteorological Office, 2021).

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Eastern Region Preparedness Infographic

Eastern Region Disaster Information

Frequency of hazards



Earthquakes



Heavy snowfall



Volcanic activity



Recent Event



Earthquakes



Heavy snowfall



Volcanic activity



Landslide/ Avalanche



Flooding



Hurricanes



Tornados



Wildfires



Recent Event

On march 11th 2021 many roads were shut down throughout Northe western Iceland due to an Instense blizzard that made visibility very poor. A warning against driving was issued and extended by the Icelandic meterlogic Office (Weather Warnings, 2021)

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Movement Detected in Mountain by Seyðisfjörður. (2021, October 6). Iceland Monitor. https://icelandmonitor.mbl.is/news/nature_and_travel/2021/10/06/movement-detected-in-mountain-by-seydisfjordur/

Northeastern Region Preparedness Infographic



Northeastern Region Disaster Information

Frequency of hazards



Earthquakes



Heavy snowfall



Earthquakes



Heavy snowfall



Volcanic activity



Landslide/ Avalanche



Flooding



Hurricanes



Tornados



Wildfires



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Northwestern Region Preparedness Infographic



Northwestern Disaster Information

Frequency of hazards



Earthquakes



Heavy snowfall



Volcanic activity

Recent

Earthquakes



Heavy snowfall



Volcanic activity



Landslide/ Avalanche



Flooding



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Tornados



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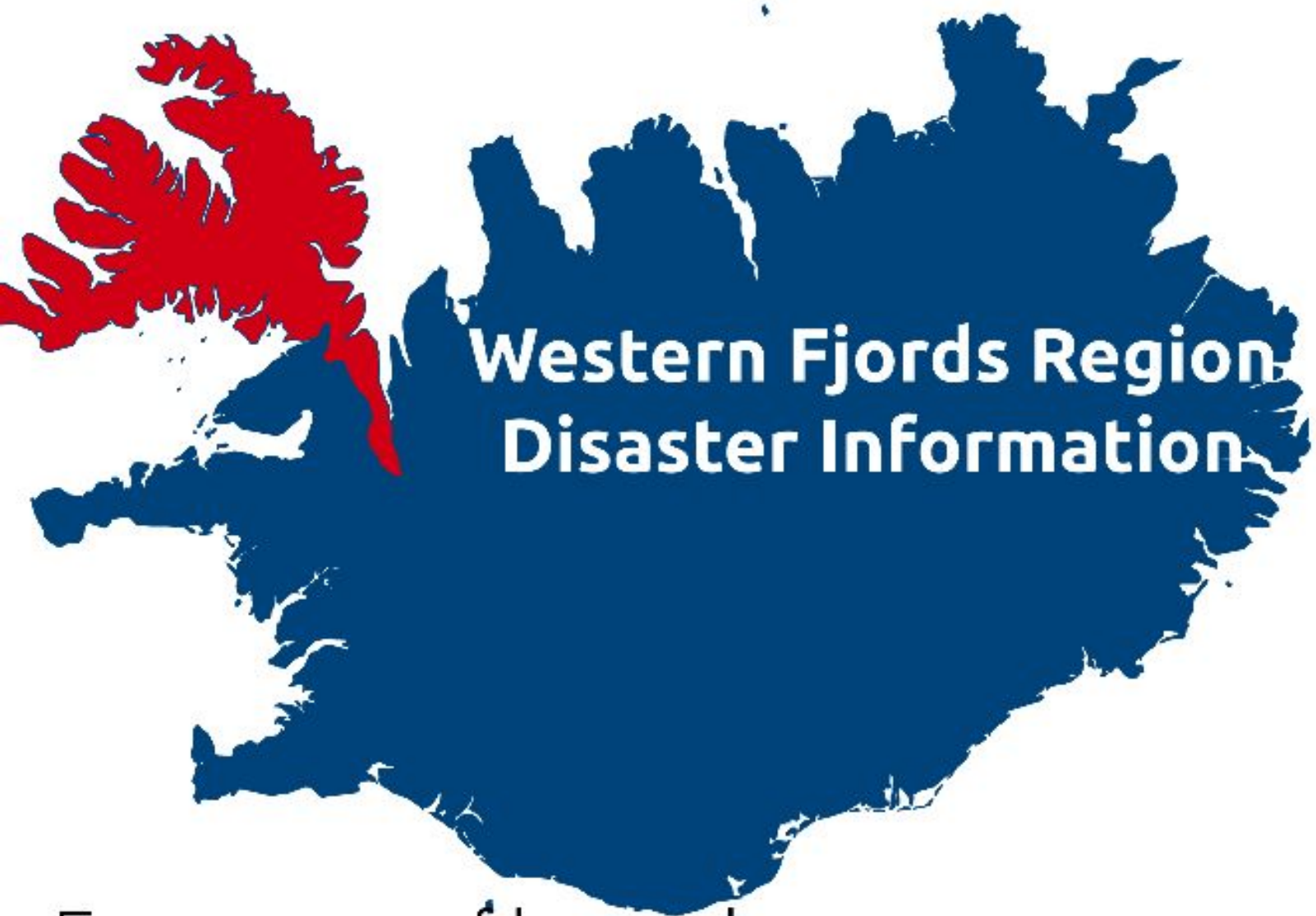
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Westfjords Region Preparedness Infographic



Western Fjords Region Disaster Information

Frequency of hazards



Earthquakes



Heavy snowfall





Earthquakes



Heavy snowfall



Volcanic activity



Landslide/Avalanche



Flooding



Hurricanes



Tornados



Wildfires



Recent Event

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Western Region Preparedness Infographic



Frequency of hazards



Earthquakes



Heavy snowfall





Earthquakes



Heavy snowfall



Volcanic activity



Landslide/ Avalanche



Flooding



Hurricanes



Tornados



Wildfires



Recent Event

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Massachusetts Preparedness Infographic

Massachusetts Disaster Information

Frequency of hazards

Earthquakes



Heavy snowfall





Earthquakes



Heavy snowfall



Volcanic activity



Landslide/ Avalanche



Flooding



Hurricanes



Tornados



Wildfires



Recent Event

During tropical storm Henri, more than 4000 Massachusetts citizens were without power. These outages were caused by extreme winds and falling trees (Tropical Storm Henri, 2021)

Get Informed

Information checklist

- You are aware of the natural disasters that occur in your area
- You researched how to prepare for disasters in your area
- You receive disaster and weather alerts on your phone
- You are aware of Local relief protocols
- You are familiar with the locations of local disaster shelters

For the most up to date information on natural hazards and weather alerts see the National Weather Service



The Federal Emergency Management Agency provides information and relief on disasters



The Massachusetts Emergency Management Agency has many local informational programs



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Tropical Storm Henri: Gusts up to 50 mph knock out power for more than 4,000 in Mass. (2021, August 22). Masslive. <https://www.masslive.com/weather/2021/08/tropical-storm-henri-more-than-4000-without-power-across-massachusetts-as-gusts-top-50-mpg.html>