Hi! I'm Jeff Rubin, Emergency Manager for Tualatin Valley Fire & Rescue. I'm also a recovering geologist, and I'm here to talk about preparing for lahars and other hazards. I've never had the chance to say this before on Reddit: ask me anything!

AmGeophysicalU-AMA [1] and r/Science AMAs[1]

[1]Affiliation not available

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the WINNOWER

REDDIT

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AMGEOPHYSICALU-AMA R/SCIENCE

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Hi Jeff. How has the spread of smart phones and other smart devices influenced your work over the last 15 years? From both the monitoring of hazards and informing people of active hazards?

IceBean

There's a lot more to that than I can easily go into here. Smartphones have only been in common use in the US for < 10 yrs, and the capabilities have exploded since then. The (relatively) short answer is that they offer several means of information gathering and exchange that either didn't exist at all or had no practical way if implementing across populations. As a practitioner, I can use my phone to maintain better awareness of what's happening around me, receive emergency alerts (from my own agency and others), initiate alerts, find my way around in unfamiliar territory (like a rural incident in our service area at night with no landmarks), and that's just for starters (we'll leave off making flight or dinner reservations). As a member of the public, I also can maintain awareness, find useful preparedness tools, receive emergency alerts.

The biggest change is that the technology (not just phones) allows more direct two-way communication between agencies and the people we serve, before, during, and after a disaster as well as just every day. That includes using the public as a source of critical information as opposed to just the end-users of alerts. That's a game-changer, and it's one that we're still figuring out how best to use.

Hi Jeff, I live in Hillsboro, OR! Can you tell me more specifically about what hazards effect the Portland and SW Washington area? And what folks like me that live in the area would need to do to prepare? Also, glad about TVF&R 34-268 passing! I know a lot of businesses and farms will appreciate the change. Thanks for your service!

mmm_guacamole

In your area, the major hazards are earthquake, weather/flood, hazardous materials, and a few other

odds and ends. Where you specifically live matters in terms of floods and to an extent EQs, but we a major EQ in our region will affect everyone. I'll also steer you to TVF&R's preparedness site, http://www.tvfr.com/index.aspx?nid=182, and our EQ/Volcano subpage, http://www.tvfr.com/index.aspx?nid=182. We're part of the WashCo EMC but also connect with the other three counties that have parts of our service area. Cities of Hillsboro and Beaverton each have their own emergency managers, who are city employees.

In your expert opinion are natural disators, earthquakes, forest fires and the like happening more often or is it just we have the means to test for them now and publicize them when they do happen so it appears they are happening more often?

this_____that

I think some of it may be better detection/reporting, but a lot of it is that we simply have more people exposed to hazards. We tend to define disasters by their direct/indirect effects on people, and we have a combination of development in vulnerable areas, aging infrastructure, and a range of construction types and ages, built to various codes (consider the Pacific NW, where we didn't even see ourselves as being in a seismic hazard zone before the early 1970s). We also have the effects of climate change, which are likely to intensify: rising/warming seas, changes in storm, precip, and temperature regimes. Another aspect is that a presidential disaster declaration (i.e., Stafford Act) is based largely on economic impact, particularly to the public sector and some infrastructure, and a disruption costs a lot more than it used to. Disaster declarations (as opposed to disasters) are driven by multiple factors.

Are there areas in the Portland and Willamette Valley regions that sit above bedrock (instead of "fill") which would therefore be less prone to liquefaction during an earthquake? If an earthquake struck, how quickly would the Coast Guard or FEMA, via the cities of Redmond or Bothell, be able to bring aid to the region? Lastly, if the big-one hits (9.0 richter) what kind of damage would come to I-5, bridges, and rail?

roaming_dutchman

The southern part of the Willamette Valley (Eugene) will likely see less liquefaction impact than the Portland Metro area.

Ditto on the maps. Oregon's Department of Geology and Mineral Industries (DOGAMI) also has a great set of hazard maps, including their interactive HazVu, http://www.oregongeology.org/sub/hazvu/index.htm. Their hazard page is http://www.oregongeology.org/sub/earthquakes/earthquakehome.htm

The state and FEMA have identified staging areas, and we had international, federal, state/provincial, tribal, and local government, along with some private and non-profit participants in June's multi-day Cascadia Rising exercise. Long way to go, but we're making some progress. Our vulnerabilities in transportation and liquid fuel are considerable.

Not exactly Tualatin area, but....

Just how screwed is Tacoma if Rainier erupts?

And more in your area....who is screwed if Hood erupts?

Forestman88

I'll try to avoid highly technical jargon like "screwed"... The links that sbonds posted are good ones: USGS Cascades Volcano Observatory (CVO) is a great source of info for this. It's worth keeping mind that the maps show what could happen, including worst-case, but not every event is worst-case. Rainier and Hood don't have histories of explosive volcanism like St. Helens, so the mapped hazards there focus on lahars, or volcanic mud/debris flows. The Hood maps show the potential hazard zones.

Is there a natural disaster that we can't prepare for?

WaffleEater123

I think you can improve your chances of survival, or minimize disruption (or just misery), but there's no guarantee. Luck and location matter. if you're in the wrong place at the wrong time, your time may be up. I don't give a lot of thought to truly global disasters like a major meteorite impact, global thermonuclear war, or the return of Disco, but I know that I can increase my chances of coming out on the right side of most things. I just try to maintain realistic expectations.

How much fracking can a specific area take, before the ground begins to settle? How big do you think the biggest fracking earthquake will end up being?

indipit

Every area has its own characteristics, and most areas are not conducive to fracking (there has to be something worth getting out of the ground), but either way that's outside of my wheelhouse. I can, however, steer you to the Geological Society of America Critical Issues pages, which include objective information on hydraulic fracturing in general as well as induced seismicity. These are meant to be resources, not position statements:
http://www.geosociety.org/GSA/Science_Policy/Critical_Issues/GSA/Policy/issues/home.aspx?hkey=456191c2-fd3d-43cf-ad8e-8afdefb46ee1

What path did you take to get to where you are now? Currently an EMT with paramedic aspirations, as well as studying fire science and natural resources. I'm looking to do something very similar to this

green_tortuga

I'd love to say I had it planned all along, but I didn't. My career path has included several 90-deg turns, most of them unanticipated but also voluntary. I'm a much better generalist than I am a specialist, although it took getting my PhD in Geosciences to start figuring that out. I had been a first aid instructor for several years (useful for field work), and decided that an EMT class was a good next step. That led to my joining a VFD outside of Austin while I was working as a geologist for the state. When I went back to school, after finishing my course work I decided that this might be my last chance to try something else before finishing in school, an I wanted to become a better medic, so I went through the hiring process and started working fulltime with City EMS. I'd bring a laptop and try to right portions of my dissertation between calls, hope to get a few hours of sleep, and do my lab work on my days off. When I finished, I decided to go back to EMS (a lot better without a dissertation hanging over my head). I ended up becoming our hospital liaison, working with them and city EM on exercises, got a staff position doing planning, and started taking EM classes. After a couple of years in EH&S I decided EM was a good fit, did some contracting for the city, independent consulting, mostly for higher ed and healthcare institutions, and starting looking for EM jobs in the Pacific NW, where we decided to end up. I can apply everything I've done up to this point: geology, fire, EMS, hazmat, health and safety, healthcare systems, to what I do now. It's the ultimate generalist position. It's also a young enough profession that there's no single path, and an EM degree is not mandatory. It's a great career path for

geoscientists who are looking for something less conventional and want to apply science to society. I make that pitch every year at GSA.

Do you think humans are arrogant to settle in areas that are vulnerable to natural disaster? Do you agree with the "we will rebuild" mentality following devastation or would you recommend keeping certain areas clear of permenant residential areas?

delmarshaef

I don't think there's a single answer for every incident. I do think that it's better to make considered, evidence-based decision rather than reflexive ones, and that the affected communities need to buy in; that's also easier said than done.

ELI5 : What is a recovering geologist?

gazeebo88

I think these answers are more entertaining than mine will be. I acquired three degrees in geology, used to work as geologist, and decided to move in a different direction (by choice, actually). I apply my background to my current work, but I'm not licensed or registered as a geologist and it is not part of my job description. I'm still active with a couple of geoscience organizations, however, mostly on the policy/society side.

How does one prepare for a lahar? If I recall correctly, they tend to move very quickly and violently. Is it possible to escape one or is this more about avoiding roads/building in areas threatened by pyroclastic mudflow?

shiruken

If we can stay out of the way in the first place. so much the better. If we can channel the flow, that's neither guaranteed nor cheap. Unfortunately, it mostly comes down to getting out of the way (i.e., surviving), and the initial reply to your post is correct. CVO has good info on each of the US volcanoes, and state surveys do as well. good idea to know your hazard zones, warning signals, and escape routes before going in.

What particular signs can regular people look out for in their home cities to be prepared for potential mass-movement events that might occur in the near future?

hapaxlegomenonically

Assuming you're in a potentially susceptible area, I'd actually point you toward your state geological survey, USGS, and state/local EM (or, if you have more resources or just know someone in the field, a geotechnical engineer). Using Oregon as an example, our state survey, DOGAMI, has interactive maps for a range of hazards, http://www.oregongeology.org/sub/hazvu/index.htm, and a specific tool for landslides, SLIDO: http://www.oregongeology.org/sub/slido/index.htm. USGS landslide home page is http://landslides.usgs.gov/.

Have I mentioned that these are linked from our website, http://www.tvfr.com/index.aspx?nid=182

How have you engaged the community to have better emergency preparedness among the laypeople? What's the overall state of your jurisdiction in this regard? Have you done any coordinating with volunteer Amateur Radio operators groups like ARES?

DrunkPanda

We have. We're a special services district, so we share jurisdiction with city and county EM in several areas. We also take advantage of the numerous surveys conducted elsewhere and nationally, as the level of preparedness is pretty consistent across the US. We work with ARES, but they provide a response function so not the same as greater community preparedness. I try to maintain realistic expectations: we're all human, and we tend to focus on what's in front of us rather than what could happen some day. I'm also less concerned with people putting together a kit than I am taking specific steps that require thought and action but not necessarily acquisition (e.g., how to connect with loved ones if separated during a disaster, who will look in on dependents, having sufficient prescription meds/home O2/backup power for life-support equipment - none of which you can get in a prefab kit, considering post-disaster individual sanitation). I think the key is, as I think you're saying, connecting with the people we serve. That means understanding what's important to them, what communities they define themselves to be in, and how the perceive risk so that we can better communicate it. Last but not least, understanding that simply providing information is only the start, not the solution. I think the organizations that do this really well are few and far between, but we're getting better at it.

Hi Jeff, I am a geology undergrad and a full-time AEMT. Can you shed some light as to how you made the transition to your Emergency Manager position? What did you do as a professional geologist? Do you have any advice for someone who aspires follow the path you took? What professional skills (geoscience and FF) does your position require?
Thanks!!!

planeman125

When I worked as a geologist for the state, I did some basic research (mostly igneous petrology), ran an analytical lab (electron microprobe and SEM), did a fair bit of work on economic and potentially economic mineral deposits, and provided public information.

I'll lean mostly on my reply to green_tortuga for the rest, but I think that being able to think analytically, evaluate different sources of information, and apply the scientific method as much as possible (it's way too useful to leave just to scientists) are useful skills in many jobs, including EMS, geology, and EM.

How do you get people to take the very real threats of natural disasters seriously without fearmongering or causing unnecessary panic?

amelie-poulain

There's not much evidence that people panic when presented with hazard info (there's actually a lot of evidence to the contrary). The bigger challenge is understanding how people perceive and personalize risk so we can better communicate it, and demonstrate that they can take action that will have positive impact. You can't scare people into preparing, but you can't win by withholding or dumbing down, either.

Thanks for taking time to talk with the community. As someone interested in emergency management, but also nursing; do you see a crossover with the two disciplines? Do you work with healthcare professionals in your day to day; or is there more of a separation?

HoovesZimmer

I found my clinical (EMS) background useful, and I've spent > 20 yrs in one way or another in healthcare preparedness. I think a major problem with HC EM is that it's typically assigned as "other duties" to someone who has little or no training or experience, no opportunity to get it, no additional compensation, and is faced with a mound of compliance responsibilities. I think the best hospital EMs understand how hospitals work, regardless of whether they have a clinical background.

Which city is safer to live in in terms of natural disasters? Seattle, WA or Portland, OR?

viperwalrus

Portland has better beer, Oregon has better wine and beaches. I'd have to give the edge to Seattle on chocolate. Are there other important factors?

Emergency Manager seems like an odd title for a FD. In paramilitary terms, what rank would that make you?

My department is split into operational roles and non ops, Executive manager is equivalent to deputy chief but with no Authority over operational matters.

TheLoosestCannonOG

I'm a civilian, non-civil-service employee, so not part of the ops chain of command. Different agencies do things differently, but the EM job description would probably recognizable across organizations. The bigger issue is having it viewed as a profession rather than "other duties as assigned," which is a particular challenge in public safety, small public agencies, and healthcare. Blessing and curse of a young profession.

Hey Jeff, hardball question here. What's your favorite rock?

Apathetic-Asshole

One with high-grade copper-gold ore in it.