



PENINSULA EMERGENCY PREPAREDNESS 2020 GUIDE

BUILDING COMMUNITY RESILIENCE

This publication aims to properly educate and prepare people of Clallam and Jefferson counties for emergencies resulting from disasters that interrupt supplies and services by providing a comprehensive insight into community preparedness planning.





Content for this publication has been provided by Clallam County Fire District 3

PENINSULA EMERGENCY PREPAREDNESS GUIDE

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For a copy of the guides from 2018 and 2019, go to bit.ly/2018PEPG and bit.ly/2019PEPG.

BY JIM BUCK, FORMER STATE REPRESENTATIVE,
& BLAINE ZECHENELLY, CLALLAM COUNTY
FIRE DISTRICT 3 DISASTER PLANNER

Welcome to the third North Olympic Peninsula Emergency Preparedness Guide, in which we discuss how the local community can plan for emergency situations and potential disasters.

Last year, the Peninsula Daily News conducted a survey that indicated there may be some basic misunderstandings about our emergency preparedness messages — about 40 percent of respondents said they cannot afford, don't have the time or don't know how to prepare for a disaster. This shows we have a couple messaging problems.

First, our efforts over the last few years focused on preparing for a major earthquake. Our reasoning is, if you are prepared for this big event, you will have everything you need for anything smaller. That means you don't have to be worried about blizzards, wind storms, power outages or inconveniences that might last a couple days.

Second, many people believe we expect them to go spend a lot of money on emergency equipment. However, the truth is that you probably already have most of what you need and just don't realize it. For instance, you don't have to go buy sleeping bags. The sheets, blankets and quilts you sleep on every night will do just fine. You don't have to go buy an

emergency cook kit or paper plates. The pots, pans, utensils, plates, cups and saucers in your kitchen will work the same after an emergency as the do before. Same goes for your wardrobe; there is no need for you to buy "survival clothes." Trust me, your sweatshirt won't know if you are in a survival situation.

What we should have said was, "Here is a list of emergencies we face in Clallam County. Let's talk about how to prepare for them."

... so let's talk!

Jim Buck is a 1971 West Point graduate, Army veteran and former Washington State representative. He has been an active volunteer for Clallam County Emergency Management (CCEM) since 2015. He received the 2018 Governor's Volunteer Service Award in the "disaster preparedness and response" category for his efforts in the Joyce Emergency Planning and Preparation (JEPP) community organization, which received the Individual and Community Preparedness (ICP) Award honorable mention by FEMA in 2017.

Blaine Zechenelly is a former IBM executive with an MBA in finance. He is a volunteer at Clallam County Fire District 3 with over 20 years of experience in emergency services and holds FEMA's Emergency Management Institute Advanced Professional Series certification for managing emergency operations. He and his wife, Cindy Zechenelly, received the 2020 Governor's Volunteer Service Award in the "volunteer family" category.



Emergency Preparedness at Olympic Medical Center

Olympic Medical Center works with a multitude of community, state and federal agencies to ensure our hospital and clinics are prepared to provide a timely and coordinated response in the event of a disaster or local emergency.

Our leadership, providers and staff participate in disaster planning and training so that we're as ready as we can be. We encourage you and your family to do the same.



REGARDING EARTHQUAKES

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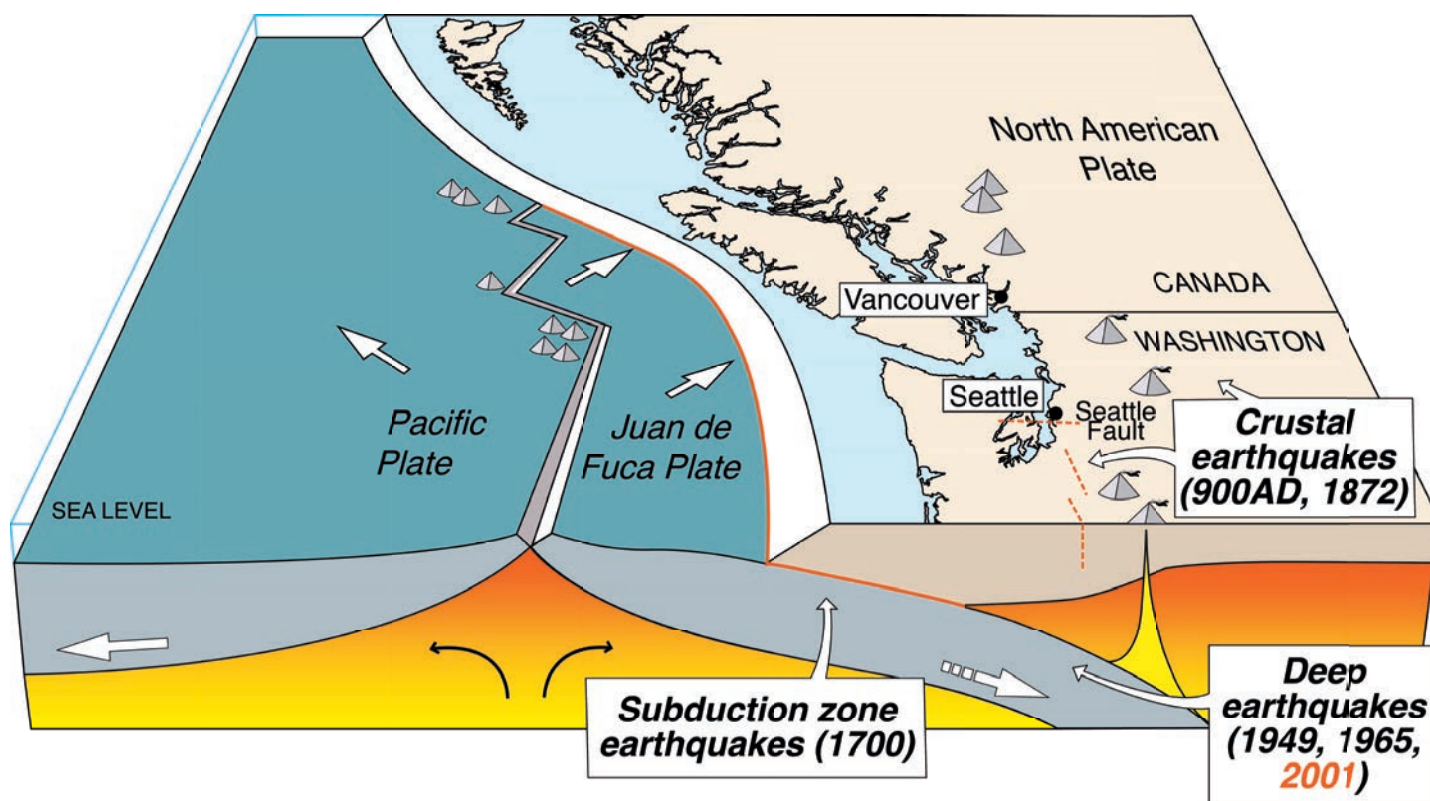


Plate tectonics in the Cascadia Subduction Zone (CSZ): According to the Pacific Northwest Seismic Network (PNSN), this diagram shows the relative positions of the Juan de Fuca and North American plates. Note how much deeper the 1965, 1949 and 2001 earthquakes appear in cross-section, far below the reach of crustal earthquakes (seen above as a dashed red line reaching into the brown surface crust).

Image from the Regional Resiliency Assessment Program report, by Wells et al.

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Let's review the basics.

An earthquake is a sudden and violent shaking of the ground, sometimes causing great destruction. An earthquake often triggers secondary hazard events, as well, including ground shaking, landslides, liquefaction (the strength and stiffness of the soil is reduced, causing it to behave like a liquid) and tsunamis. The level of destruction is relative to the size of an earthquake, measured using magnitude (M).

Western Washington has one of the highest earthquake hazard ratings in the nation.

On the Olympic Peninsula (the Peninsula), the potential for severe damage from a major earthquake is likely due to the region's proximity to the Cascadia Subduction Zone (CSZ).

Earthquakes near the Peninsula are a result of movements within the earth's crust, usually along fault lines (cracks in the crust). Deeper cracks tend to cause bigger quakes. As a result, fault lines are the best indicator of where earthquakes can be expected to occur.

Shock waves tend to move perpendicular to the fault line, so tremors from a fault running east to west will be felt farthest away to the north and south of the epicenter. This is part of why Peninsula residents will likely not feel quakes that occur on the Olympia Fault; it's too far away and pointed the wrong direction. Conversely, an earthquake on the South Whidbey Island Fault will be felt at almost full strength on the Peninsula.

Although destruction from the potential CSZ event garners a lot of attention, smaller earthquakes occur regularly and can still destroy buildings, roads and other

infrastructure. Any earthquake over M7.0 is considered destructive.

A large portion of the Peninsula infrastructure will suffer in the event of such an earthquake, including airports, facilities housing hazardous waste, propane sources and schools. At least half of all sewer, communication, medical, fire, government and law service facilities are expected to survive. Water and electricity sources may suffer very little damage, but many of the water facilities (if they don't rupture) require power to work. Water pipes will likely break, making delivery of water a problem. Wells may become unusable due to cracked casings, water table changes or loss of power.

Roads also will be severely impacted, which will interfere with emergency response times and interrupt supplies.

Immediate safety hazards during an earthquake are from falling objects and getting trapped in any collapsed structures. There also are several

secondary disaster risks, such as fires, tsunamis and landslides.

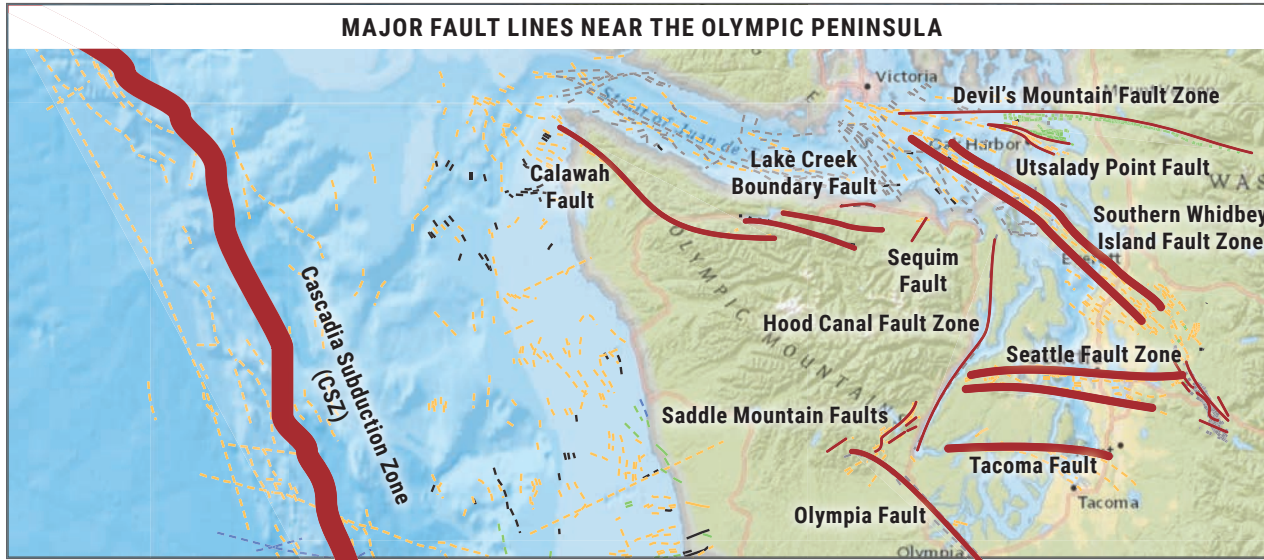
In the long-term, potential contamination and epidemic hazards resulting from broken sewage lines and a lack of clean water are possible.

When the CSZ earthquake happens, estimates for re-establishing basic supply lines range from 30 days to six months, and extensive damage will have occurred to most local infrastructure.

In community-wide disaster situations, aside from being personally prepared, relying on your neighbors and working with localized efforts is the best way to help yourself.

Despite these cautions, if you have a life-threatening emergency during a disaster, you should still call 9-1-1 (assuming communications are working). Even if services are overwhelmed, it's important to notify authorities so resources can be responsibly allocated.

SEISMIC HAZARDS FOR THE PENINSULA



Here's how our community will be impacted.

The following information is based on the Washington State Transportation Systems Regional Resiliency Assessment Program (RRAP) study, conducted by the U.S. Department of Homeland Security. More information about this report, its methodology and goals is available on page 24.

PRIMARY CONCERNS

The primary hazard associated with a CSZ earthquake is strong and prolonged shaking, or ground motion, and the forces that such shaking can impart on infrastructure and the built environment.

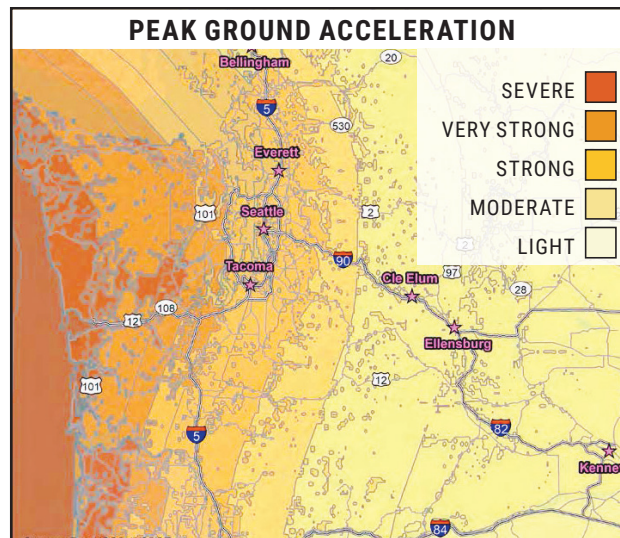
However, the primary earthquake also can trigger several secondary hazards: tsunamis and ground failure (e.g., landslides, ground displacement or deformation and, in the mountains, avalanches).

Both can cause significant damage affecting our ability to facilitate response and recovery efforts.

GROUND MOTION

Ground motion is the most apparent and direct hazard associated with an earthquake. The size of an earthquake is expressed most commonly (by USGS and others) using the Moment Magnitude Scale (MMS), which quantifies the amount of energy that an earthquake releases.

Peak ground acceleration (PGA) is a way to measure shaking intensity. Whereas MMS is a measure of an earthquake's overall size, PGA is a location-specific measure of ground shaking intensity and can be used to approximate the seismic forces that a specific location or structure will experience during an earthquake.



Generally speaking, PGA is:

- 0.001 g: perceptible by people
- 0.02 g: people lose their balance
- 0.50 g: very high. Well-designed buildings can survive if the duration is short (1 minute)

Projected PGA for Clallam county areas in the M9.0 CSZ scenario are:

- 0.16-22 near Sequim
- 0.23-30 near Port Angeles
- 0.30+ near Forks
- 0.36+ near Neah Bay

In addition to the intense shaking, the duration of shaking for a CSZ earthquake is projected to range from 2 to 6 minutes. The longer the shaking continues, the more potential there is for structures to sustain damage or to fail. Current seismic design does not consider shaking duration, so it's hard to know which buildings will survive, even if they are built to current construction code standards.

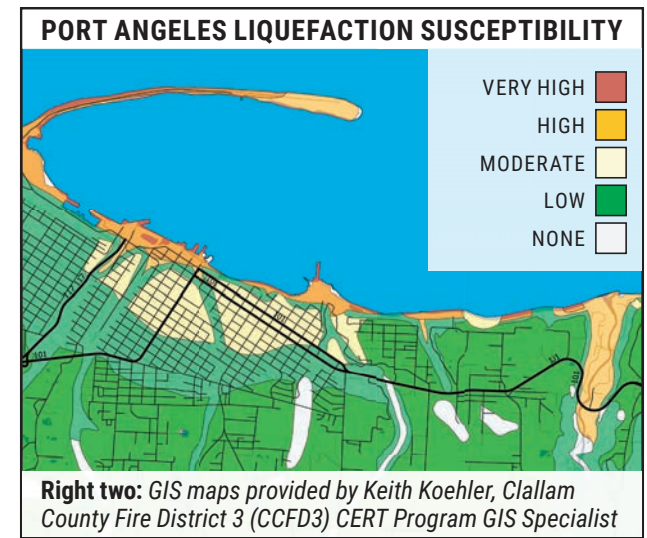
LIQUEFACTION

According to USGS, "Liquefaction takes place when loosely packed, water-logged sediments at or near the ground surface lose their strength in response to strong ground shaking. Liquefaction occurring beneath buildings and other structures can cause major damage during earthquakes."

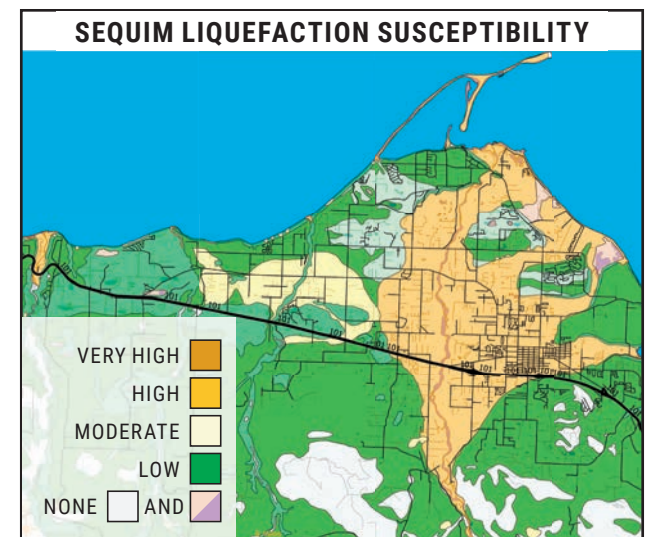
Fine-grained — sandy, silty and gravelly — soils are the most susceptible to liquefaction. Such soils tend to act like a gelatin mold in an earthquake, magnifying the shaking significantly. In extreme cases, structures and objects can sink into the liquefied soil like quicksand.

Highly liquefiable soils in Washington State occur most frequently along river valleys and the low-lying areas surrounding these rivers and streams.

Soils with some liquefaction susceptibility — ranging from very low to high — underlie much of the Puget Sound region. This includes downtown Port Angeles and the Dungeness river valley.



Right two: GIS maps provided by Keith Koehler, Clallam County Fire District 3 (CCFD3) CERT Program GIS Specialist





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SECONDARY HAZARDS

Peninsula roads will suffer significant damage — mainly from landslides, debris flows and rock falls.

Landslides, debris flows and rock falls are three types of slope failures that earthquakes can trigger. These types of slope failures occur along state highways in Washington even under normal conditions, and WSDOT mitigates them as part of ongoing highway operations and maintenance.

However, a major CSZ earthquake could cause additional slope failures to occur.

Lake Crescent, the Morse Creek gully on U.S. Highway 101 between Sequim and Port Angeles and much of 101 on the way to the rest of the state are subject to severe damage or obstruction after an earthquake.

The RRAP research team reviewed the available landslide data in WSDOT's Unstable Slope Management Program (USMP). However, it must be stressed that the USMP only addresses known slope hazards — that is, historic or chronic slope failures across the state. It does not catalog potential unstable slopes or slope failures that a major earthquake or other natural event could trigger.

WSDOT did note that some known landslides could prove quite time consuming to clear.

The severity of their impacts and number of slides following a CSZ is uncertain and difficult to predict.

TSUNAMIS

A tsunami is a large sea wave (or series of waves) that occurs when some incident or disruption displaces a large volume of water.

In the context of a CSZ earthquake, displacements in the ocean floor associated with a fault rupture will create an ocean wave; the amplitude of the wave will increase as it travels out from the fault line and approaches shallower water near the coastline.

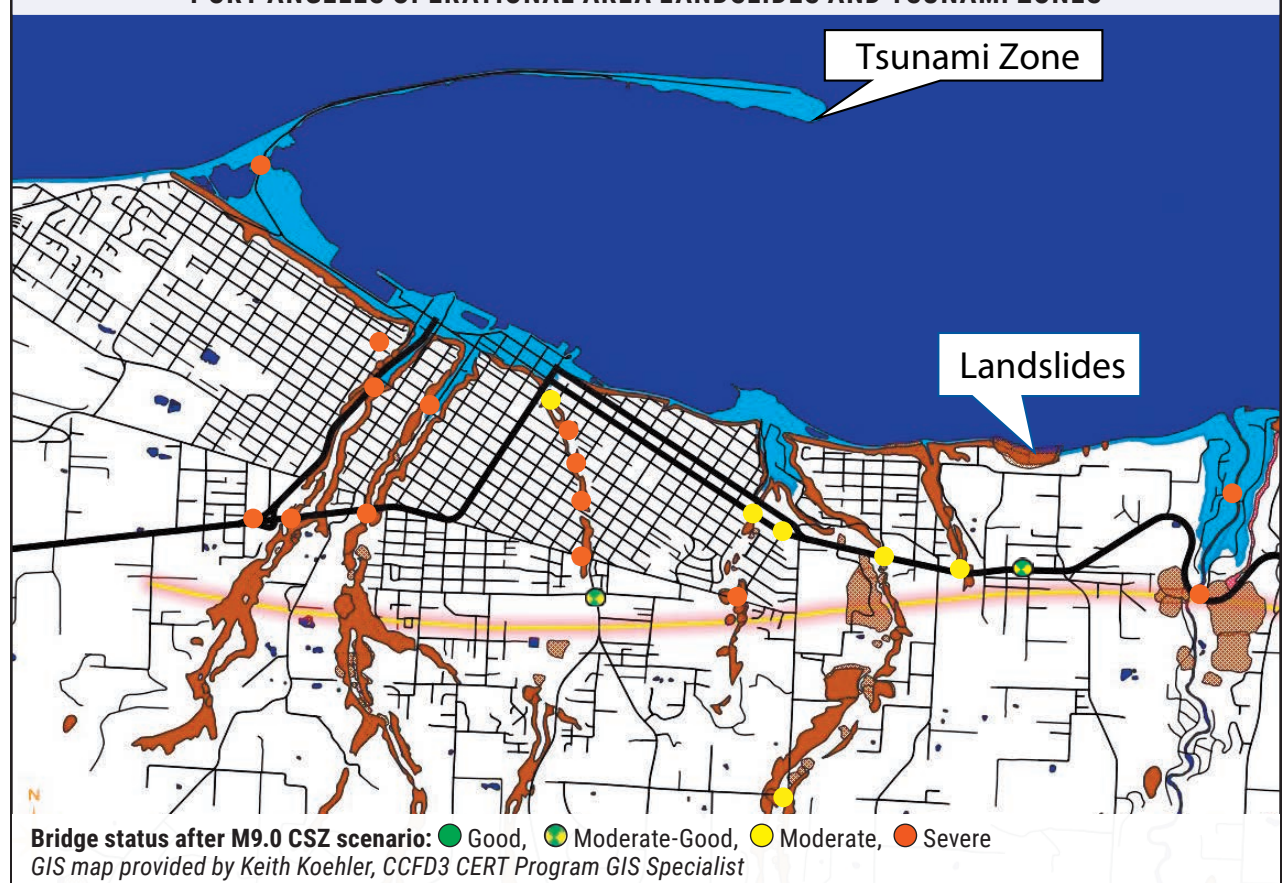
The first CSZ tsunami wave is projected to reach the coastline within 20 to 30 minutes of the initial earthquake with wave heights up to 30 to 40 feet.

This initial tsunami wave could be followed by subsequent waves in the hours following the earthquake.

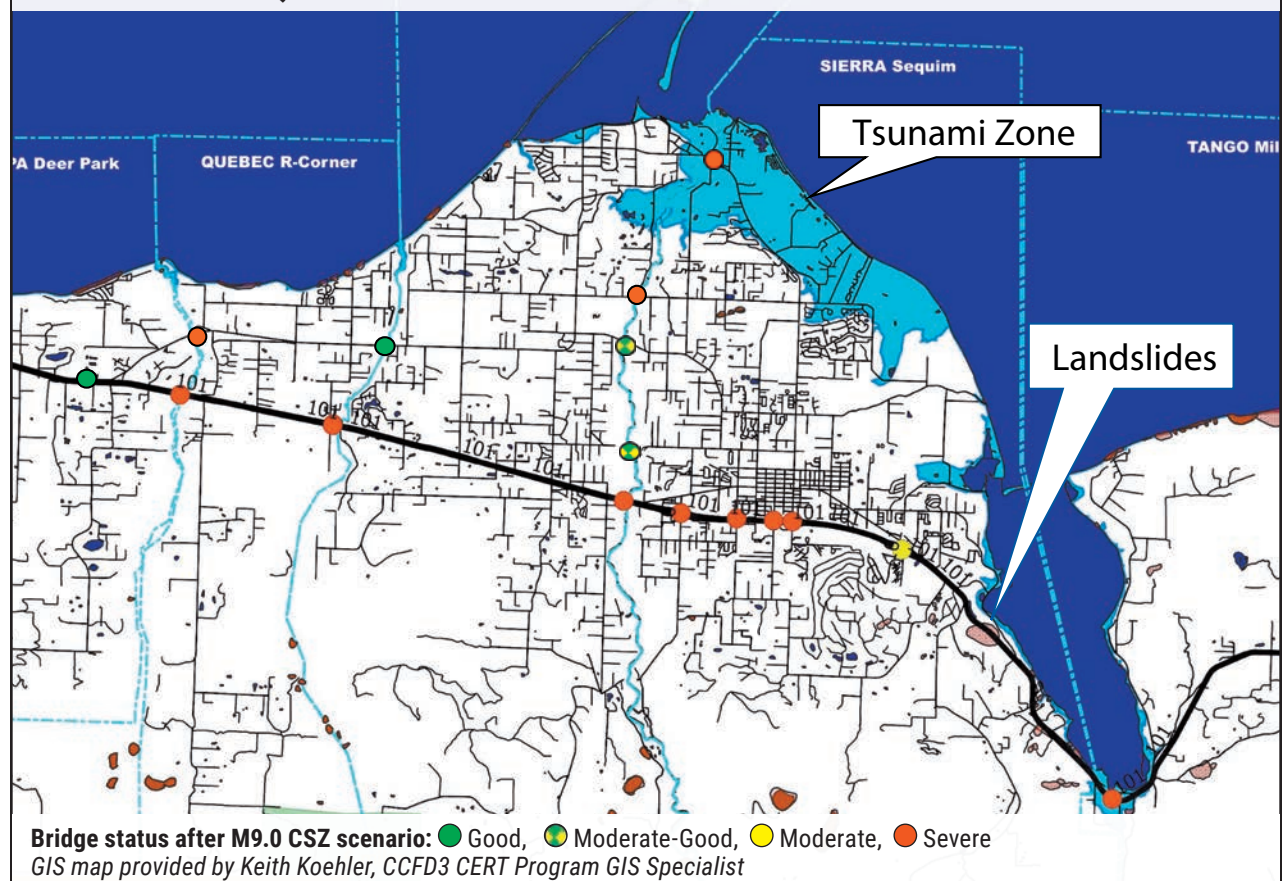
Large portions of the Dungeness river valley are expected to suffer inundation, along with Port Angeles harbor and downtown streets — anything within 50 feet elevation should be evacuated after a CSZ event.

For an excellent article on what the potential size of a CSZ tsunami might be, see Jim Buck's article from last year's PEPG, "Tsunami wave height."

PORT ANGELES OPERATIONAL AREA LANDSLIDES AND TSUNAMI ZONES

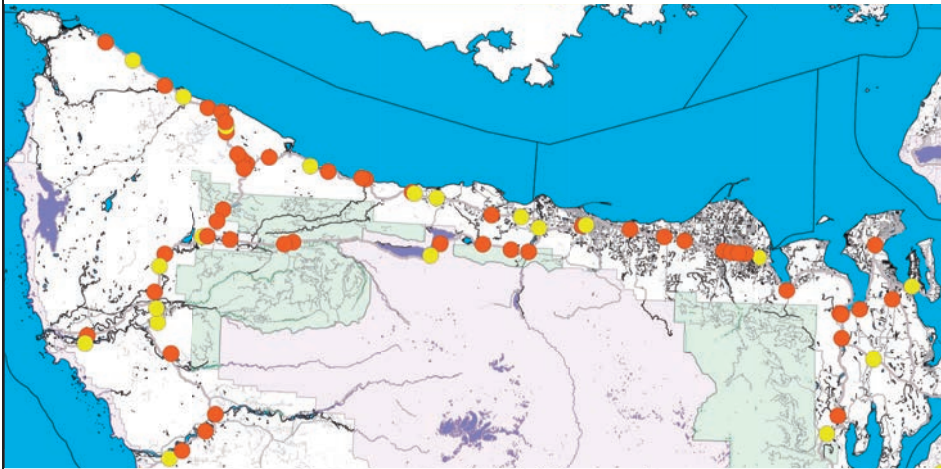


SEQUIM OPERATIONAL AREA LANDSLIDES AND TSUNAMI ZONES



IMPACT ON INFRASTRUCTURE

OLYMPIC PENINSULA BRIDGE FAILURES



Bridge damage level after M9.0 CSZ scenario: ● Minor (none), ● Moderate, ● Severe
GIS map provided by Keith Koehler, CCFD3 CERT Program GIS Specialist

Don't expect any degree of travel to be easy.

In western Washington and the Puget Sound region, RRAP results indicate a high concentration of bridges with damage types related to inadequate seismic design (PGA) and combined inadequate seismic design and potential soil liquefaction (PGA/liquefaction).

Approximately 80 percent of the more than 7,000 centerline miles of state-owned highways are built on soils with some liquefaction susceptibility;

Approximately 23 percent are built on soils with moderate-to-high or high liquefaction susceptibility.

DAMAGE EXPECTED ALONG PRIMARY SUPPLY ROUTES

Major damage

- Flyover at 104 down on U.S. Highway 101: 74 days to build temporary road around
- U.S. Highway 101 bridge to Sequim Fat Smitty's and Route 20: 548 days or more to build new bridge over water
- Snug Harbor bridge at Discovery Bay: 548 days or more to build new bridge over water
- Jimmy Come Lately at Blyn: 548 days or more to build new bridge over water

- Simdar overpass: 30 days to build temporary road around
- Third St. overpass, Sequim: 30 days to build temporary road around
- Seventh St. overpass, Sequim: 30 days to build temporary road around
- River St. overpass, Sequim: 30 days to build temporary road around
- Dungeness River bridge: 913 days or more to build new bridge over water
- McDonnald Creek bridge: 730-913 days or more to repair and build new bridge over water
- Siebert Creek bridge: 730 days or more to build new bridge over water
- Morse Creek bridge: 913 days or more to build new bridge over water, plus significant road repairs due to slides

RRAP did not provide an assessment for these city bridges

- Lee Creek bridge, Port Angeles
- Ennis Creek bridge, Port Angeles
- White Creek bridge, Port Angeles
- Peabody Creek bridge, Port Angeles
- Tumwater Creek truck route bridge, Port Angeles
- Valley Creek bridge, Port Angeles

Minor damage (require temporary road around)

- Pine St. bridge: 14 days
- Tumwater Creek culvert under First St.: 14 days
- Tumwater Creek culvert under Second St.: 14 days
- Tumwater Creek at U.S. Highway 101 main route flyover: 36 days



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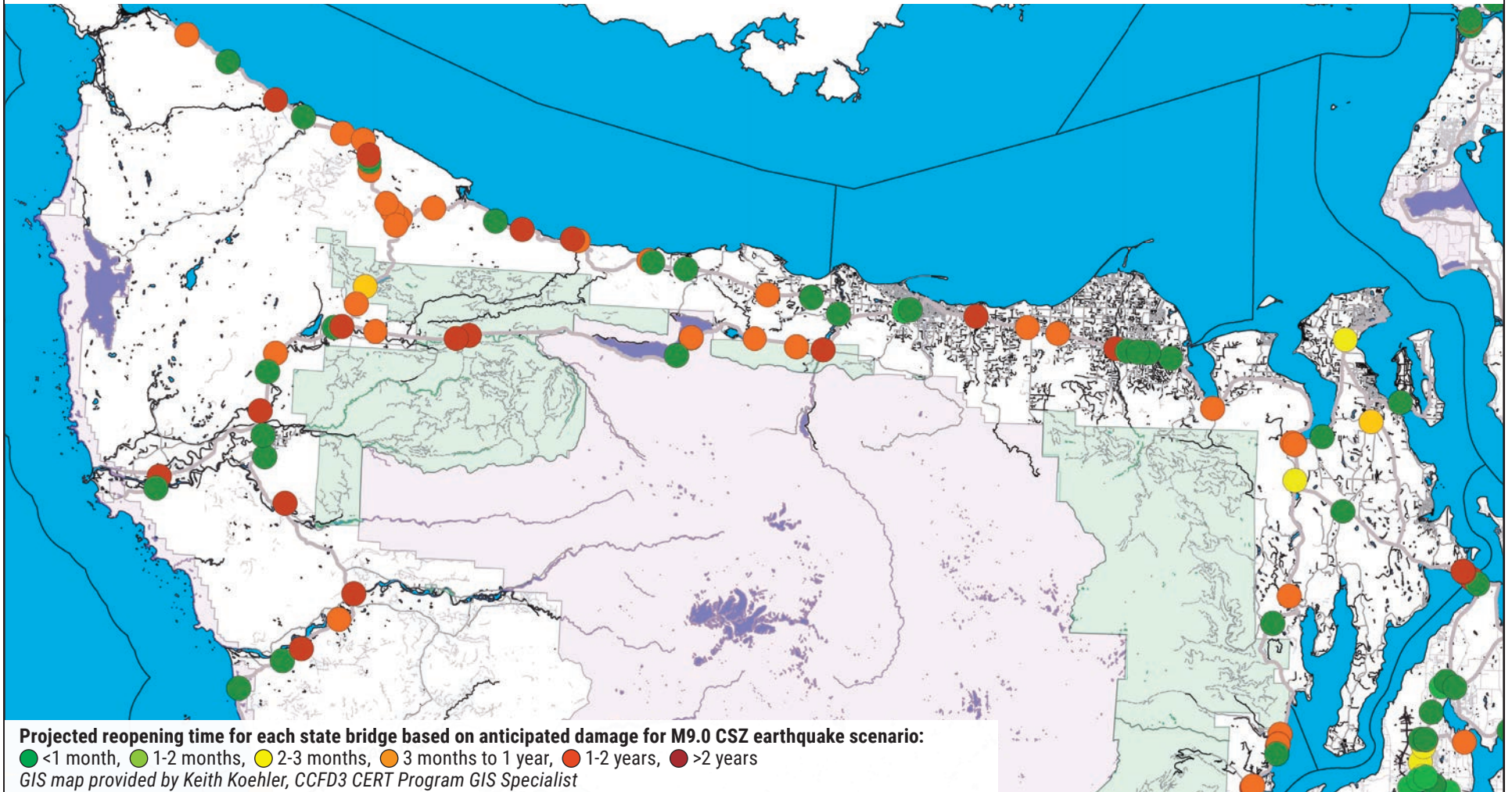
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KEY FINDINGS

30 DAYS' ISOLATION (OR MORE)

EXPECTED REOPENING TIMES FOR STATE BRIDGES ON THE OLYMPIC PENINSULA



The Peninsula has extreme potential for disruption from a major earthquake.

The primary purpose of this RRAP project was to determine which transportation routes will be fastest to reopen following a CSZ earthquake so that post-disaster emergency supply chains can be established.

Based on the findings from this report, a prioritized state highway route has been planned to act as transportation links between staging areas for response and recovery efforts.

Under the FEMA plan, incident support bases (ISBs) will receive resources from across the United States at locations outside of the area primarily impacted by the earthquake. Resources will then be transported from these bases to the federal staging areas (FSAs) within the impacted areas for

distribution to surrounding communities.

One of the FSAs may be at William Fairchild Airport, but these staging areas will not be stocked until after disaster strikes — state and federal agencies will establish ISBs or FSAs post-disaster based on actual damage impacts along with local government and disaster survivor needs.

This means that, if/when the CSZ earthquake occurs, help from outside will be limited to maritime and air until road transportation can be reestablished.

Nearly 29 percent of bridges evaluated across Washington would require over one year to reopen, and in many cases, two years or more. Repair and reopening times are greatest in the Puget Sound and southwestern coastal regions of the state, and on the Olympic Peninsula.

Communities in these locations will be hit hardest.

Although repair will begin immediately, it is important to remember that repair times are going to be somewhat cumulative. Heavy equipment, building materials and knowledgeable personnel are

all required elements for completing repairs — not enough of which are housed locally.

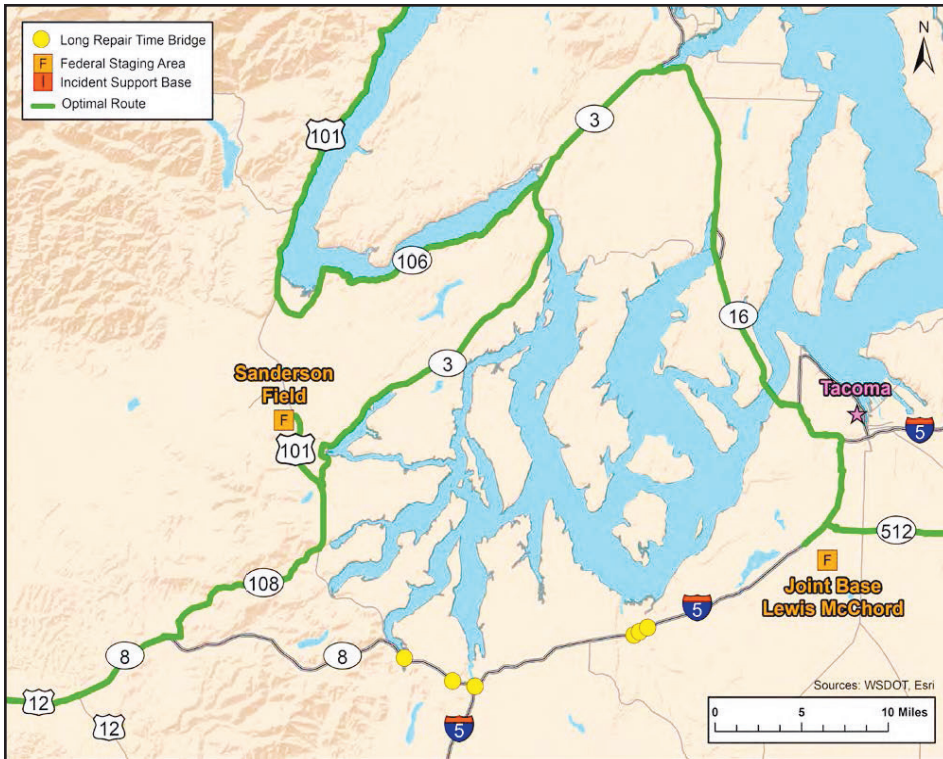
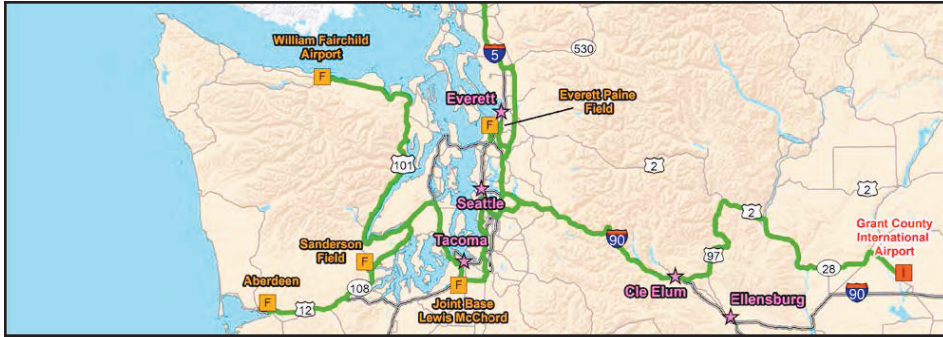
As a result, before repairs can begin on any bridge, the one before it on the priority route must first be repaired sufficiently before work can begin on the next bridge in the route.

This results in a “daisy chain” effect and further underlines the importance of having your own stock of survival supplies that will last at least 30 days, despite the fact that some bridges may take less than 30 days to repair on an individual basis.

Maritime and air resources may help, but first we have to be able to get to the airports and rebuild the docks.

Since most docks and shipping facilities likely will be highly damaged due to the tsunami waves, any aid brought by boat will need to land on beaches, including Neah Bay and Sequim. Such access points will continue to leave people throughout the Peninsula, who often rely on bridge access to get around, without any supplies they didn't already have on hand.

FEDERAL RESPONSE TO CASCADIA



The optimal route solution that connects the FSA at Joint Base Lewis McChord to the Peninsula FSA uses the Tacoma Narrows Bridge and a series of State and US Routes beyond, instead of a more physically direct connection around the southern portion of Puget Sound.

The study team compared these two routing options and found that, due to the level of repair needed for several bridges on Interstate 5 and State Route 8 near Olympia, the Tacoma Narrows route is 12.3 percent faster than using the direct route.

We have a plan — time to take action.

Incident support bases will be at the following locations:

- Tri-Cities Airport
 - Grant County Int. Airport
 - Fairchild Air Force Base
- Grant and Fairchild will feed the Western Washington federal staging

areas, but volume will be limited until road travel can be reestablished.

Federal Staging Areas:

- Aberdeen
- Port Angeles William Fairchild Airport
- Bellingham Airport
- Sanderson Field Shelton
- Lewis/McChord
- Everett/Paine Field

The State's Transportation Plan will support this federal plan.

What to do when the lights go out...

Check your breakers

Many outages are merely tripped circuit breakers. Before calling the PUD, check your electrical panel to see if one or more breakers has tripped. If so, try resetting.

Check your neighbors

Before reporting, check to see if your neighbors are also without power. This helps the PUD understand what type of outage you may have.

Check our website

Check the outage map on our website jeffpud.org to see if your outage is part of a larger affected area. If the outage is widespread, the phone lines will likely be busy.

Report the outage

Call (360) 385-5800 and choose option 3. Give your name and physical address. You can also report the outage on Smart Hub from your phone.

Stay up to date on social media

Keep a back-up battery charged and use a smart phone to follow PUD outage updates on Facebook or Twitter.

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While regional response plans indicate reliance on air support in the initial stages of response, air transportation's ability to move the large volume of resources that will be necessary to sustain the affected population in the mid- to long-term is limited.

Surface transportation modes (i.e., road, rail, maritime) are better able to move large volumes of goods and resources but, due to the volume of road repairs required to get to the Olympic Peninsula, transport by road will not be available for a couple weeks to a couple months, depending on circumstances. Maritime support also will take some time to respond and distribute supplies. Then you also have the multiple bridge failures between members of the community and potential drop points.

There is no doubt that developing and implementing solutions to these problems will be slow, expensive and tedious. However, the community must work diligently to mitigate the hazards unveiled by the new RRAP study data before an earthquake such as the M9.0 CSZ scenario happens, whenever that might be.

Using the information from this study, governments, organizations and communities can begin working ahead of the problem. With enough planning, resources and cooperation, we can start to fortify our infrastructure against this potential disaster. That's what the recently passed school levy was all about —building a safer future.

In the meantime, you should be prepared to provide for yourself and your family. Remember, thousands of people live on the Peninsula. Local relief efforts cannot supply enough shelter, food, water, medicines and trained personnel for thousands of people.

Look at how quickly basic necessities vanished in the panic surrounding the recent/ongoing COVID-19 outbreak — and that was with all supply chains functioning normally!

In a disaster that interrupts the flow of goods, we'll run out of building materials, medical supplies, bottled water, pantry items and, yes, toilet paper almost immediately.



RRAP SUMMARY

Roads:

Surface transportation is highly vulnerable to a Cascadia Subduction Zone (CSZ) earthquake. A M9.0 seismic event has the potential to significantly disrupt the movement of emergency supplies and resources.

Priority Route:

Washington State has identified priority response routes with the shortest re-opening times, but the Peninsula still is 80 miles from the nearest FSA.

Ports:

Commercial ports in Washington State will suffer high impact from shaking, liquefaction and tsunamis. However, the ports have not undertaken internal assessments of their seismic resilience or developed processes to support to recovery.

Ferries:

Washington State Ferries (WSF) has undertaken a large seismic analysis and retrofit effort over the past decade and continues to do so, but most terminals in their current state would be unusable following a major earthquake. The WSF is using every year it can get to improve its resilience.

Rail:

There is no rail on the Peninsula.

UNRESOLVED ISSUES

- **Road and Bridges damage will be significantly greater than earlier views.**
- **Time to repair is much greater than earlier DOT predictions.**
- **Hood Canal Bridge may be unavailable for up to two years or more.**
- **Ferry terminals may be significantly damaged.**
- **State will only focus on state routes.**
- **County roads are the local governments' responsibility. Initial opening will only support emergency traffic, public use will be six or more months.**

POSITIVE NOTES

- **Study validates "ground truth" work on road damage & need for Operational Areas approach.**
- **"Knowing is half the battle." Now we can all prepare accordingly.**
- **William Fairchild Airport designation as a FSA is a significant achievement, and will save lives in the county.**
- **Clallam County is on the Green priority road to the FSA at William Fairchild Airport, so federal & state resources will be committed to it.**
- **30 day supplies/preparation approach may need to be increased. It is always best to over-prepare.**

12-MONTH EMERGENCY PLANNING CALENDAR

PROBABLE DISASTER <small>AS DETERMINED BY CCEM FOR THE CLALLAM COUNTY HAZARD MITIGATION PLAN</small>	MAGNITUDE <small>1 = LOWEST; 5 = HIGHEST</small>	ONSET <small>1 = SLOWEST; 5 = FASTEST</small>	DURATION <small>1 = SHORTEST; 5 = LONGEST</small>	FREQUENCY <small>1 = LOWEST; 5 = HIGHEST</small>	RANK <small>BY AVERAGE</small>
CASCADIA EARTHQUAKE (M9.0)	4.75	4.83	3.08	1.25	1
EARTHQUAKE	4.33	4.67	3.17	1.42	2
DISEASE	3.58	3.17	3.83	2.82	3
POWER OUTAGES	1.75	4.50	2.83	4.17	4
WILDFIRE	2.25	4.00	3.25	2.75	5
WINDSTORM	1.92	3.50	2.33	4.42	6
WINTER STORM	2.00	3.25	2.75	4.00	7
ACTIVE SHOOTER	2.92	5.00	2.17	1.42	8
HAZARDOUS MATERIALS ACCIDENT	1.92	4.92	2.67	1.83	9
LANDSLIDE	1.50	4.42	2.58	2.67	10
FLOODING	1.67	3.33	2.42	3.25	11
TSUNAMI	3.25	4.08	2.17	1.08	12
DROUGHT	1.83	1.58	3.92	2.67	13

Take it a month at a time to make the process easier.

BY JIM BUCK, CLALLAM COUNTY EMERGENCY MANAGEMENT

These eight pages are designed as a stand-alone section that you can pull out and keep as a workbook for the upcoming year.

The exercise provided here is intended to make your planning process easier. Rather than providing a bunch of lists that make preparing for emergencies feel like an overwhelming task of accumulation, we're going to walk you through a 12-month preparation process.

For a lot of guidance and ideas on specific items, refer to last year's pullout online at bit.ly/2019PEPG.

Take the list of emergencies Clallam County Emergency Management (CCEM) predicted could threaten you as a Peninsula resident.

Your job is to figure out which emergencies affect you where you live and work. Use your common sense: If you don't live in a landslide, flood or tsunami zone, you may eliminate them from consideration. Everybody will be affected by an earthquake, so that needs to be in the plan. You may not be in a wildfire zone, but it never hurts to consider what you would do if your home was damaged by fire. That leaves windstorms and power outages as the most likely emergencies. Hazardous materials accidents and active shooter scenarios may require short-term evacuation and should be included for home and work. The following table can help you decide which emergencies to consider. Fill in the table below to identify which threats you need to plan for.

These emergencies require one of two actions. You become temporarily isolated and go to your property to shelter in place OR you evacuate. Shelter in place requires you to take different actions than when you evacuate. You need to make a plan for each scenario.

A shelter in place plan means you have looked at your possessions and planned how to use materials you have on hand to stay on your property. You may stay in your house, if it is safe, or in an outbuilding, RV camper or tent.

If it is not safe to stay on your property, you will need to evacuate. An evacuation plan involves taking a kit you can carry to a safe family rally point. The rally point may be a family or friend's home, landmark or well-known facility. You should pick the rally point in advance so family members know where to reunite. Be sure to discuss it with everyone so they remember what to do.

MONTH 1 IDENTIFY YOUR RISKS

Record and categorize your family's circumstances.

There are two types of disasters to plan for — those that permit you to shelter in place and those that require you to evacuate. For example, if you live in a tsunami zone you may shelter in place during a power failure, however, you must evacuate when facing a tsunami. When an emergency happens, you may have to decide what to do very quickly. Planning ahead will make it easier to make the right decisions if/when any emergency happens.

ACTIVITIES

- Identify the emergencies you and your family face (CCEM can help).
- Determine which emergencies require shelter in place and which require evacuation. More information on this step in Month 4
- Check your home for how these emergencies affect your ability to stay in it.
- Inventory your possessions (especially camping gear) and plan how to use your on-hand stuff in an emergency.
- What do you have that you can use to survive in your home? Be creative.
- What do you have that you can use if you have to evacuate? Consider weight and bulk.
- Use your inventory to make a shelter in place plan and an evacuation plan.
- Establish an out-of-state emergency contact number where you can leave messages for family and friends (CCEM can assist).
- Check with your child's day care or school to find out what must be done for reunification.
- Plan how your family can get home from school, work or wherever in an emergency.

Inventory what you have and only purchase items you don't already have on hand.

MONTH 2 FAMILY NEEDS

Understand how emergencies threaten your family and what you have to do to protect them.

There are thousands of families in Clallam County and every one is different. Not only that, every family lives in a unique location that faces its own list of threats (i.e., if you are disabled in a tsunami zone you are not facing the same problems a healthy teenager faces on good ground near the airport). So, it is not very practical for CCEM to publish a generic family needs guide.

THREAT TYPE	HOME	WORK	SCHOOL/CARE FACILITY
EARTHQUAKE	STAY EVAC N/A	STAY EVAC N/A	STAY EVAC N/A
DISEASE	STAY EVAC N/A	STAY EVAC N/A	STAY EVAC N/A
POWER OUTAGE	STAY EVAC N/A	STAY EVAC N/A	STAY EVAC N/A
FIRE	STAY EVAC N/A	STAY EVAC N/A	STAY EVAC N/A
WINDSTORM	STAY EVAC N/A	STAY EVAC N/A	STAY EVAC N/A
SNOWSTORM	STAY EVAC N/A	STAY EVAC N/A	STAY EVAC N/A
ACTIVE SHOOTER	STAY EVAC N/A	STAY EVAC N/A	STAY EVAC N/A
HAZMAT SPILL	STAY EVAC N/A	STAY EVAC N/A	STAY EVAC N/A
LANDSLIDE	STAY EVAC N/A	STAY EVAC N/A	STAY EVAC N/A
FLOOD	STAY EVAC N/A	STAY EVAC N/A	STAY EVAC N/A
TSUNAMI	STAY EVAC N/A	STAY EVAC N/A	STAY EVAC N/A
DROUGHT	STAY EVAC N/A	STAY EVAC N/A	STAY EVAC N/A

CAR KIT

In the event of an evacuation, you may not have much time to pack. If this happens, you'll feel better knowing that your car kit is all ready to go.

- sharp pocket knife and sharpener
- scissors
- sewing kit
- zipper ties and rope
- car tool set
- maps
- wool blankets
- small first aid kit
- another copy of personal documents
- snack bars and water
- extra change of clothes and shoes

EVACUATION PLANS

Develop plans and procedures for each hazard and place scenario:

- Choose a safe place for your family to meet.
- Identify multiple evacuation routes.
- Prepare relocation site maps with directions.

Primary relocation: _____
 Address: _____
 Phone: _____
 Secondary relocation: _____
 Address: _____
 Phone: _____
 Other notes: _____

However, we can help you develop a plan that meets your family's needs in the place your family lives. Here is a suggested approach.

ACTIVITIES:

- Use CCEM maps to identify hazards that threaten your home and the places (school, work, child care, elder care) your family members spend away from home (referred to as “place” hereafter).
- Use CCEM maps to identify routes to and from your family members’ places. Identify alternate routes you may use to bring your family members home.
- Evaluate special needs required by family members at home and at the places (infant supplies, elder care, day care, dietary needs, oxygen generation, dialysis, paratransit, medications).
- Make a plan for each family member to be safe for each place in their routines (use your chart from Month 1). Most places have some emergency plans. You need to familiarize yourself with the ones that apply to family members and adjust your plans accordingly.
- Gather a backup supply of medicine(s). Have a list of prescribed medications you can take to a pharmacy for refills. This includes medical alert jewelry and documents for wallets.
- Film your home, including contents, for insurance purposes. Record serial numbers, makes and models for all high-value electronics and equipment. Store the CD/DVD/jumpdrive with friends or family who live out of town.
- Plan how you can meet family needs at home during an emergency (meds, feminine supplies, counseling, entertainment).
- Plan how you can coordinate with places to reunite with family members during an emergency.
- Schoolchildren: If you have schoolchildren, state law dictates how schools can release pupils in an emergency. Understand your school’s policy for releasing children in an emergency.

You must make advance arrangements to comply with the school’s (or other care facilities’) release policy.

You may designate authorized persons to pick up your child in an emergency.

IF YOUR FAMILY DEALS WITH SPECIAL CIRCUMSTANCES, YOU PROBABLY ALREADY HAVE WHAT YOU NEED:

- Any foods for special dietary needs, such as diabetes or gluten intolerance. Dialysis patients require a special emergency diet if they can’t get care.
- Backup supply of essential medications
- Extra baby supplies
- Feminine hygiene supplies
- Hearing aid batteries
- Spare glasses
- Alternate oxygen supply
- Pet needs
- Specialty equipment

MONTH 3 COMMUNITY

Get to know your neighbors and how you can support each other in an emergency.

History shows that in time of emergency, neighbors band together to help each other. Neighbors can be volunteer firefighters, EMTs, nurses, doctors, policemen or teachers, counselors, equipment operators, childcare workers and any of hundreds of different talents and skills – OR – they can be the kid next door who helps you clean up your house. FEMA likes to talk about whole-community involvement during disaster planning and response. Whole-community involvement means everyone can help in an emergency.

There are numerous opportunities at the county/city/tribal level for volunteers to join fire districts, county search and rescue, HAM radio groups and police reserves. Non-government organizations such as Joyce Emergency Planning and Prep (JEPP), The American Red Cross and numerous faith-based organizations are organizing plans to provide emergency shelters, but they do not have the capacity to handle a community-wide disaster. This is why a high rate of preparation in the general community makes such a big difference to the resilience of each area’s citizens. There are even groups that specialize in animal rescue and shelter.

On the neighborhood level, CCEM provides training for Map Your Neighborhood (MYN) and Community Emergency Response Teams (CERT). These two groups are designed to canvas a neighborhood after a disaster, gather information and provide light search and rescue before fire/rescue arrives. Information they gather can help fire units respond where they are needed most. It can also help the county inform state emergency management about conditions we face.

Join your local program now and ensure your family, neighborhood and friends are ready for the possibility of any scale emergency situation.

ACTIVITIES:

- Get to know your neighbors and talk about problems the neighborhood might face.
- Talk with neighbors to find out who may have skills or training that would be beneficial after a disaster (i.e., first aid, child care, amateur radio, tree removal, small engine repair, heavy equipment operations, wilderness survival, light rescue, carpentry).
- Do any of your neighbors have needs that require electricity, such as insulin or a breathing apparatus? If someone else has a generator, perhaps arrangements can be made to offer help.
- Identify neighbors who might need help in an emergency (limited mobility, health problems, children home alone, etc.)
- Meet with neighbors to inventory equipment that could be shared in the event of an emergency such as first aid supplies, chain saws, chippers/shredders, utility trailers, snow blowers, and four-wheel drive vehicles.
- Exchange work, home and emergency contact phone numbers with neighbors for use during an emergency.
- Talk with your neighbor about organizing a formal Map Your Neighborhood program.
- Talk with your neighborhood about being part of a CERT team.

Contact information for joining various programs and volunteer services is available on page 26.

UNDER-THE-BED BAG

These are the minimum emergency items you will need, especially if the disaster occurs while you're in bed. Don't turn on lights if you think there is damage to the electrical system.

- sturdy shoes
- leather work gloves
- light-weight clothing
- N95/P100 Mask
- flashlight
- copies of documents
- whistle
- special needs?

Place all items inside a zipper seal bag and tie under your bed or stuff between the mattress and frame so you can find it immediately and in the dark. You never know what conditions will be.

JOIN MAP YOUR NEIGHBORHOOD (MYN)

Map Your Neighborhood advocates community relationships as the best resource in an emergency and has a 90-minute course to get people started. We challenge you to learn about three of your neighbors and write down their names, phone numbers, pets (and names), special needs and discuss emergency preparedness options. Give them your info, too. Agree to check on one another if a disaster occurs. Contact info is available on Page 26.

MONTH 4 SHELTER IN PLACE OR EVACUATE

Make a decision — should I stay or should I go?

Shelter in place or evacuate? This is a question you need to answer fast. If a storm shuts off power and wipes out the Hood Canal Bridge but does not damage your house, you have a few days to set up a shelter in place. In this case, your biggest problem is how to survive an interruption of your supply chain for an unknown length of time.

The last two winters, which brought record snowfalls and trapped many people in their homes without notice, have convinced many members of the Peninsula community to prepare for this already.

In the event of an emergency, you may only have a few days to work out how to survive with your family and community.

But, if a storm shuts off power, wipes out the Hood Canal Bridge and your house is damaged, you may have to evacuate. Destruction of your home may require relocation for weeks or months. Evacuation may be as short as hours or as much as several days or even weeks for fire, active shooter or hazardous material spills, depending on the specifics of the situation. Use your imagination to assess scenarios.

It may be necessary to relocate some or all of the family if a family member requires out-of-county medical attention. You and your family's safety are the critical consideration.

After you escape, what will you do? Where will you reunite with family members? How will you let loved ones across the country know where you are? Where will you stay? What do you need to take? How will you get back on your feet? Prior planning is way more desirable than figuring out what to do after the fact.

Using the information provided in this and last year's guide (bit.ly/2019PEPG), as well as your common sense, determine whether you are likely to need to shelter in place or evacuate for each threat type in the chart on Page 12. Circle the option you think is best for your home, work and the places your family spends time on a regular basis. If any of these places is not impacted by a given threat — for example, if your home is on a hillside, tsunami is not likely to be a problem — circle “not applicable” (N/A).

This will be your guide for the rest of your planning.

SHELTER IN PLACE ACTIVITIES:

- Learn how to determine if your shelter is safe to occupy (i.e., partially collapsed homes or buildings with tilted walls are not safe to occupy).
- Make a plan for how you will shelter in place (i.e., we will stay in the garage or one room to conserve heat). Think of ways to use what you already have.
- Designate a safe storage area for emergency supplies.
- Plan how you can use things you own to build and maintain your shelter. Be prepared to “camp” in your house. For more information, check out Jim Buck's “Camping in your house” handout, available online at bit.ly/campinyourhouse.

EVACUATION ACTIVITIES:

- Talk with family and friends about temporary shelter opportunities in their homes.
- Discuss plans for evacuation with your family (reunification, rally point, communications).
- Make a kit (digital) with copies of driver's license, prescriptions, addresses, phone numbers, banking data, insurance policies and vital documents (people in Puerto Rico lacking this information had problems getting cash and medicine after Hurricane Maria).
- Discuss how your property can be secured or how you can store your possessions while you are gone.
- Discuss arrangements for pet and stock care.

PURCHASE OR HAVE ON HAND:

You don't have to spend a lot of money. You already own most of the items you will need to shelter in place. Think about how you can use stuff you have on hand in an emergency. Handy things to have:

- Tarps or sheets of plastic for covering broken windows.
- Duct tape (not “duck” tape — there is a significant difference in quality).
- Plastic hay bale twine (it's strong, cheaper than parachute cord/rope and doesn't rot).
- Candles and oil lamps can help heat small spaces, but be mindful of the fire hazard and only burn fuels in well ventilated spaces.

NEVER USE CHARCOAL OR A GENERATOR INSIDE OF YOUR SHELTER.

SHELTER SUPPLIES

If you need to shelter in place, consider these items.

- battery-operated AM radio, extra batteries
- flashlight
- simple can opener
- fire extinguisher
- toilet paper and wet wipes/towelettes
- paper cups, plates and plastic utensils
- “OK”/“HELP” sign
- liquid soap
- plastic sheeting (roll)
- duct tape/rope
- crow bar/hammer
- utility shut-off tool(s)
- caution tape
- heavy kitchen gloves
- heavy trash bags

MONTH 5 SAFETY

Make sure everyone in your family understands emergency safety.

This is a big order because different emergencies present different safety issues. The most important safety skill to develop is situational awareness. The old saw “stop, look and listen before you ...” is useful in all emergencies. The easiest way to avoid a safety problem is to identify it and stay away from it.

Identifying a problem can be anything from an alert by a smoke/CO detector, to a tsunami siren, to a weather forecast. Getting correct information during an emergency is the key to taking safe action. Understand, you may not be able to take safe action if you are unprepared. Here are some ideas to help you be prepared.

HOME PREPARATION

- Smoke and carbon monoxide alarms save lives. Be sure they work and change batteries regularly. Look up the guidelines for where they should be placed.
- Shoes, flashlight, gloves in a bag tied to a leg of the bed or stuffed between the mattress and frame. This will ensure they stay where you expect them in the event of extreme shaking.
- Fire extinguishers should be placed strategically around your home, especially near fireplaces, in the kitchen and anywhere else you identify potential fire risk. Be aware that electrical fires should be put out with a specialty extinguisher.
- Secure furnishings that might fall during an earthquake. Secure shelves, cabinets and drawers with “child-proof” latches to prevent them from falling and/or opening during earthquakes.
- First aid kits are always useful. It doesn't need to be a big one — just keep the basics.

ALWAYS DROP, COVER AND HOLD DURING EARTHQUAKES

AUTO

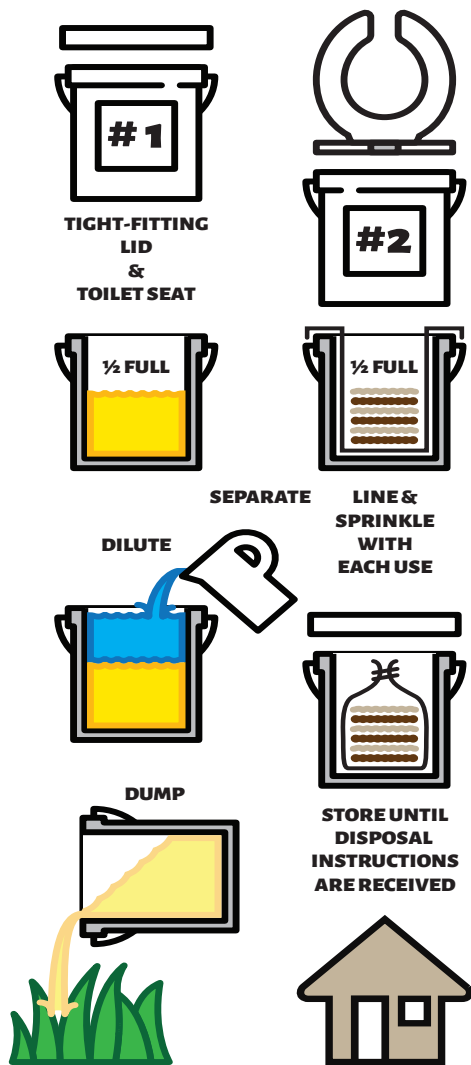
- Have a pack with water, flashlight, food, blanket and hiking shoes.
- Have roadside emergency kit with reflectors and flares.
- Wear weather-appropriate clothing.
- Keep cold-weather gear backups in your car and/or heavy blankets.
- Be sure the exhaust pipe is not blocked when stranded in snow.

CLEANUP AND SANITATION

Emergencies almost always leave a mess to clean up. It is critical to clean shelters of debris and materials that can injure people. Handling broken glass, shattered wood or sharp metal debris is a recipe for trouble if you are not prepared. Work gloves, safety glasses, boots, proper clothing and headgear prevent injuries.

Be prepared to use your on-hand cleaning supplies to clean your shelter and keep it clean. Sewer lines ruptured during the Christchurch, New Zealand, earthquake and contaminated the streets. People tracked contaminants into shelters and homes. This caused illness and infections. You can avoid this by having shoes you only wear outdoors and an indoor pair.

Disposal of human waste will be an issue. You may collect waste in buckets and deposit it in your septic tank if you have a septic system. Be sure you understand how this can affect your drain field. If you are on a sewer system you may need to compost your solid waste. CCEM can provide information about how to do this. "Sanitation for your family," from last year's guide, explains the basics of a short-term bucket system, *bit.ly/2019PEPG*.



MONTH 6 COMMUNICATION

Know how to contact family members and community during a disaster.

In the age of cellphones, everybody can make a phone call almost anywhere. In normal circumstances this is not a problem, but history shows us that people will go to extremes to contact family members in an emergency. People in Puerto Rico spent hours and precious fuel traveling around the island trying to find a cell signal to make a call after Hurricane Maria. People in Olympia instantly jammed cell communications after the 2001 earthquake. Cellphone towers quickly become overloaded with people trying to reach friends and family. If the power is out at your home, cordless phones, internet and email will not work either.

There are a number of ways to improve your ability to contact family members. Sending a text message takes far less cell tower capacity than a standard phone call. You may be able to text if you can't talk. None of this works if you run your battery down, so it is prudent to have a phone cord and cellphone battery charger for your car. Hand-cranked and solar rechargers are available for cellphones.

Families that are still hooked up to landline service may be able to communicate using cabled phones.

There are other alternatives for voice communications. These include CB radio, FRS (Family Radio System), HAM radio communications and satellite phones. CBs and RFS radios are affordable and can communicate line-of-sight from a few hundred yards to several miles. HAM and satellite systems can be expensive and are out of reach for most families.

Communications is more than talking to or texting each other. Your family needs to know what is going on in your community. CCEM will work with U.S. and Canadian commercial AM/FM radio stations to provide up-to-date emergency information via the county public information officer. You can get this on your car radio. If the power is off, you will need a battery-powered transistor radio. Some emergency radios come with a hand crank that allows you to recharge the unit or listen while you turn the crank.

In worst-case scenarios, CCEM may provide emergency information via loudspeaker, messenger or via message centers throughout the community. Joyce plans to have a community bulletin board in its Disaster Service Center to keep residents informed.

It is common for rumors to spark panic after an emergency. Good communications between emergency management and the public is key to avoiding this problem. CCEM is working to establish a robust communications system that coordinates government, commercial and private resources to provide the community with vital information. You can help by sharing the information with family and friends.

ACTIVITIES:

- Evaluate your cellphone and FRS/CB equipment. Fill equipment and battery gaps.
- Evaluate your AM/FM radio equipment.
- Make sure your family has a list of important phone numbers.
- Whistles make excellent signaling devices.

EMERGENCY CONTACTS

DAYCARE/SCHOOL

Name: _____

Address: _____

Phone: _____

Email: _____

FAMILY WORK

Name: _____

Address: _____

Phone: _____

Email: _____

CLOSEST RELATIVE

This should be a relative who lives near to you.

Name: _____

Address: _____

Phone: _____

Email: _____

MEDICAL/DOCTOR

Name: _____

Phone: _____

Other: _____

INSURANCE AGENT NUMBERS

Home/Rental: _____

Car: _____

Medical: _____

MONTH 7 WATER SUPPLIES

Understand how to provide safe drinking water for your family (don't forget pets).

Whether you live in the country or the city, your water supply relies on electricity. During a power outage your water supply may become unsafe to drink.

People (and pets) need 1.1 gallons of drinking water per day. You need to have enough bottled water on hand for your family to last three days. This gives you time to find a water supply and set up a system to provide safe drinking water purification. This may involve commercial filters, chemical treatment or boiling. Commercial filters and chemical treatment will require you to purchase materials in advance. Boiling will require fuel which may not be available in an emergency.

ACTIVITIES:

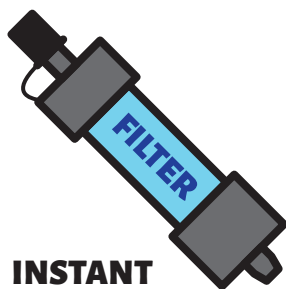
- Procure 1.1 gallons of commercially packaged drinking water per family member (and pets) per day for three days. Drinking water will always be drinking water – if you are worried about quality, boil or chlorinate it.
- Be prepared to filter, chemically treat or boil at least 1.1 gallons of water per person (and pet) per day.

HAVE ON HAND OR PURCHASE:

- Filtration system or chemical treatment supplies to purify water. See “Water purification” in last year’s issue, bit.ly/2019PEPG

LIQUID CHLORINE BLEACH HAS A LIMITED SHELF LIFE. DO NOT STORE LONGER THAN FOUR MONTHS. CLOROX PRODUCTS WITH CLOROMAX REQUIRE DIFFERENT RATIOS THAN STANDARD CLOROX PRODUCTS.

CLOUDY WATER



MONTH 8 EMERGENCY FOOD SUPPLIES

Have at least 30 days of food stored for your family.

CCEM believes it will take 30 days or more after a major disaster for FEMA to organize a temporary supply chain for Clallam County. Your goal is to have enough food on hand in your refrigerator, freezer, pantry and emergency stores to last that long.

When the power goes off you should eat the food in the refrigerator first. You may be able to stretch the frozen food in your freezer for 10 days (longer if you have a generator). Consider preserving it by drying, smoking, canning or salting. If you have more than you can use please share it with those in need — shame on us if we allow food to spoil. Your canned food is your third choice. Dried survival food is the last thing to use.

Your emergency food supply doesn't have to sit on a shelf, ready for disaster to strike (although it can). It can be part of the food you use every day. The key to a good food storage plan is make sure you stock items you like to eat and keep a minimum stock.

Replace items before they run out and buy them when they are on sale. Rotate your stock so the oldest items are always used first.

Mac and cheese, tuna helper, hamburger helper, spaghetti, chili, rice and beans are all easy to store and way cheaper than freeze-dried survival food. If you choose an emergency larder, plastic totes with lids are inexpensive and hold plenty of food.

You will need at least 2,200 calories per person per day. Be sure you consider any special dietary needs. Check with your doctor to see if a short-term 30-day emergency diet will cause you problems.

For your pets, the easiest option is to keep 30-60 day ahead of your needs. Buy two bags instead of one until you have enough backup food to last at least a month. Use the oldest bags first.

ACTIVITIES:

- Check your fridge, freezer, kitchen shelves and pantry to see how many days of food you have on hand. Plan on using everything (you can add the old dust-covered can of lima beans to chili and nobody will know).
- If you do not have enough for 30 days, consider slowly adding to your stock. Be sure to purchase foods your family likes. Good food is a morale builder. It will help people deal with the stress of the emergency.
- Find and learn how to use hand-operated can openers.

PURCHASE OR HAVE ON HAND:

- You know what your family likes to eat. Try to accumulate a 30-day stock. Try to pick flavorful foods that can be extended with beans, rice and pasta. If diets permit, peanut butter is a good supplement that doesn't take up a lot of room but provides lots of calories.

DO NOT STORE PLASTIC CONTAINERS OF FOOD OR WATER ON CONCRETE FLOORS. LIME IN THE CONCRETE WILL LEACH THROUGH THE PLASTIC AND SPOIL THE CONTENTS. LINOLEUM OR PLYWOOD FLOOR COVERS WILL PREVENT THE SPOILAGE.

EAT SAFE FOOD

If your power goes out and you don't have a backup generator, keep your fridge and freezer closed. In general, keep food grouped together to improve the time they will stay cold.

If you have one, transfer items to a high quality cooler and pack with ice jugs.

After a flood or power outage, some food may not be safe to eat and must be thrown out.

Throw out perishable food (such as meat, fish, eggs, milk and leftovers) in your refrigerator when the power has been off for 4 or more hours. Food in the freezer may keep up to two days. Thawed frozen food that still contains ice crystals can be refrozen or cooked. If not, throw it away.

MONTH 9 REPAIRS

Be able to make temporary repairs to your shelter and equipment.

Most emergencies will not damage your home. You may be able to stay in it with minimal modifications for your safety and comfort. A few events may damage your structure and you will need to make repairs before you can stay in it. This website explains how to determine if your shelter is safe to occupy bit.ly/spotdamage. Keep a printed copy in your survival kit.

You will need to recheck your shelter after each earthquake aftershock.

Repairs can be anything including putting a tarp over a hole in the roof, covering a broken window or sewing a blanket into a sleeping bag. In either case, sooner or later, something is going to break and it will have to be fixed.

Tools are the common denominator for repairs. (know-how is nice, but if you don't know how to do something, it's a safe bet that someone in your neighborhood does). Almost everybody has tools – you don't have to run out and buy lots of them. Some folks have a few and some have lots but most every community will have at least one of every tool it needs. Part of your job back in the “Month 3 – Community” segment was to get to know your neighbors and find out who has skills and who has tools. This knowledge will benefit everyone because everyone is going to have something that needs fixing.

Let's imagine how to make repairs after the power goes off. Battery-powered drills and saws will work until the batteries run down. Gasoline-powered saws and generators can be used for charging batteries and running power tools until the gasoline runs out.

However, every minute a generator powers a tool is a minute it can't run freezers, radios, phone chargers, lighting or other vital equipment. Use of fuel can be minimized by organizing the repair work so the generator only runs for the minimum time needed to do a task or the community can use hand tools.

Hammers, chisels, hand saws, braces and bit ruled the world before electricity. They save lives in developing countries every day and they can here, too. These tools will be invaluable in remote locations or places where there is no power. They are cheap at garage sales and often can be found at secondhand stores, antique dealers or online.

WHAT KIND OF REPAIRS CAN BE EXPECTED?

- Broken windows: cover opening.
- Fallen chimneys: cover/patch hole in roof and side of building.
- Cracked door/window frame: reinforce and provide temporary shoring (

DO NOT OCCUPY IF WALL IS LEANING SIGNIFICANTLY (THREE INCHES OR MORE) — THE STRUCTURE IS COMPROMISED.

- Safeguard mattress/bedding: Keep dry at all costs.
- Drainage: Reroute storm water around shelter.
- Building within a building: Construct temporary shelter inside structure.

WHAT KIND OF IMPROVEMENTS MIGHT BE CONSTRUCTED?

- Temporary outdoor cooking facilities.
- Outdoor toilet facilities.
- Debris removal from roads.
- Alter clothing to fit individuals
- Provide clothes-drying facilities
- Temporary camping structures

PORTABLE SHELTER ITEMS

Also known as camping gear. If you have to shelter away from your home, there is no guarantee a building will be available for you and your family. It's not easy to live out of a car, so having some basic supplies will make your life a lot easier while you wait for things return to normal.

- tent(s) that will house the entire family
It's easier to find good locations for a few smaller tents than one big one. They also increase privacy.
- Tents with a rainfly/inner screen tent combo are excellent for fighting condensation.
- extra stakes
- tarps and long ropes
for setting up covered cooking and seating areas, ground cloths under tents covering firewood and/or equipment
- thermal bed rolls
- high quality sleeping bags
Temperatures drop at night, even in summer.
- pillows
- wool blankets
Great for an extra level of protection between you and the ground and/or cold, damp air.
- LED solar lanterns with method for hanging
- waterproof windbreaker with hood
- firestarter kit with matches in sealed container
- towels
- “Foxhole” shovel and toilet paper
for digging temporary latrines, if needed

MONTH 10 UTILITIES

Have a plan for utility interruptions.

Clallam County has a simple utility structure. Bonneville Power Administration supplies electricity to Clallam Public Utility District and Port Angeles City Light. There is no natural gas supply.

However, some residents rely on propane for heat and cooking. Rural residents may get water from wells while others are supplied by PUD or water associations. Rural residents may dispose of sewage through septic systems while others rely on public sewer systems.

ELECTRICAL UTILITIES CAN BE INTERRUPTED BY ANY EMERGENCY THAT DOWNS POWER LINES.

NEVER APPROACH DOWNED POWER LINES.

- If you have a generator, be sure it is properly installed to avoid fire hazards or other problems.
- You may protect your electrical devices from surges by turning off your breakers until power is restored.

PROPANE CAN BE THREATENED BY EARTHQUAKES, FIRES, TSUNAMIS AND FLOODS.

- You may avoid an explosion hazard PLUS save your propane supply by anchoring your propane tank.
- Store the proper wrench near your emergency shutoff valve and know how to use it.

WATER CAN BE THREATENED BY POWER FAILURES, EARTHQUAKES, TSUNAMIS AND FLOODS.

- Secure your water heater to wall studs to prevent earthquake damage.
- Your hot water heater contains as much as 50 gallons of water you can use in an emergency.
- Refer to Month 2 for water purification procedures.

SEWER CAN BE THREATENED BY POWER FAILURES, EARTHQUAKES, TSUNAMIS AND FLOODS.

- Be aware that broken pipes can vent sewer gases into your shelter.
- You may dispose of sewage in a septic tank with a gravity-fed drain field. You may have to manually move contents to a fill point on pressurized or up-pump fields.
- Families on sewer systems may have to compost your solid waste. Diluted urine may be disposed of in a sump on your property. CCEM can provide instructions. See Page 15 for diagram.

MONTH 11 MEDICAL

Be prepared to meet your family's basic medical needs.

The family needs segment from Month 2 briefly considered medical issues. The 2018 windstorm and our recent snowstorms show ambulance services or private transportation to medical facilities may be impossible. This segment focuses on the subject of your family's daily medical needs, as well as first aid.

EVERYDAY

Your medical plans have to start with meeting needs the family faces every day. Consider what prescription drugs are needed and have a reserve stock on hand. Experience in Puerto Rico showed pharmacies were unavailable for days to weeks. Patients without printed prescriptions and cash had problems replacing meds. This may not be a severe problem during short power outages or snow storms but could well be serious during an event lasting weeks or months.

People dependent on insulin or oxygen generators need to have backup plans when normal operations fail. These can include reserves, alternate equipment or, in worst-case scenarios, travel to a medical facility.

Dialysis patients need backup emergency plans with prearranged transportation alternatives.

ILLNESS, ACHES AND PAINS

Common colds and flu make people miserable even in good times so it makes sense to have non-prescription products to make you feel better when you are stuck in an emergency. You probably have aspirin, Tylenol, ibuprofen and some cold medicines stashed in your medicine cabinet. These are items you only use when needed so there is no reason to go buy more. These are good items to replace when you run out so you always have some on hand. Just be mindful of expiration dates.

FIRST AID

First aid kits are handy to have around, but almost everyone has adhesive bandages, antiseptic, gauze and tape to take care of minor wounds and burns. These are good items to replace when you run out, so you always have some on hand. We recommend you have a first aid kit that will allow you to take care of more serious injuries until medical treatment is available. Kits come in all different sizes and can be quite expensive. Choose the size that fits your situation. Experienced medical people you met in your neighborhood during the "Month 3: Community segment" may be able to provide expertise and supplies.

ACTIVITIES:

- Take a first aid/CPR class

PURCHASE OR HAVE ON HAND:

- Family-size first aid kit
- Anti-diarrhea medicine
- Medical gloves (Buy six pairs and put in first aid kit)
- Antiseptic
- Pain and burn medicine

STORING INSULIN FOR DISASTERS

INSULIN FOR INJECTION DOES NOT KEEP WELL!

Insulin from various manufacturers is often made available to patients in an emergency and may be different from a patient's usual insulin. After a disaster, patients in the affected area may not have access to refrigeration.

According to the product labels from all three U.S. insulin manufacturers, it is recommended that insulin be stored in a refrigerator at approximately 36 to 46 degrees Fahrenheit. Unopened and stored in this manner, these products maintain potency until the expiration date on the package.

Insulin products contained in vials or cartridges supplied by the manufacturers (opened or unopened) may be left unrefrigerated at a temperature between 59 F and 86 F for up to 28 days and continue to work.

However, an insulin product that has been altered for the purpose of dilution or by removal from the manufacturer's original vial should be discarded within two weeks.

NOTE: INSULIN LOSES SOME EFFECTIVENESS WHEN EXPOSED TO EXTREME TEMPERATURES. THE LONGER THE EXPOSURE TO EXTREME TEMPERATURES, THE LESS EFFECTIVE THE INSULIN BECOMES. THIS CAN RESULT IN LOSS OF BLOOD GLUCOSE CONTROL OVER TIME. UNDER EMERGENCY CONDITIONS, YOU MIGHT STILL NEED TO USE INSULIN THAT HAS BEEN STORED ABOVE 86 F.

You should try to keep insulin as cool as possible. If you are using ice, avoid freezing the insulin. Do not use insulin that has been frozen. Keep insulin away from direct heat and out of direct sunlight. When properly stored insulin becomes available again, the insulin vials that have been exposed to these extreme conditions should be discarded and replaced as soon as possible.

MONTH 12 WRAP UP & MAINTAIN

Complete the 12-month preparation cycle.

The purpose of this pullout guide is to show readers how they can prepare for emergencies without spending a lot of money.

Chances are you already have most of the items you need for emergencies. The possessions you use to make your life comfortable before an emergency can serve the same purpose after the event. With a step-by-step thought process, you can think about the things you will need and how you can what you already have.

Our 12-month process provides a lot of food for thought. We hope it helps you think about how to respond to each month's topic. We also hope it helps you develop a positive mindset to understand it is possible to be prepared on a limited budget.

The goal of Month 12 is to encourage you to complete preparations that are not finished. Our focus on using the items you have on hand means you must replace stock you use. If you can, build up your normal pantry.

Emergency prep is an ongoing thought process. That is a good thing. Awareness of your changing family situation and conditions in your neighborhood will permit you to modify your plans and supplies. Thank you for getting ready.

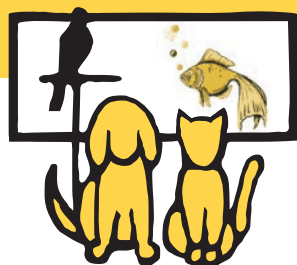


Pet Preparedness

PETS ARE FAMILY!

SO BE PREPARED:

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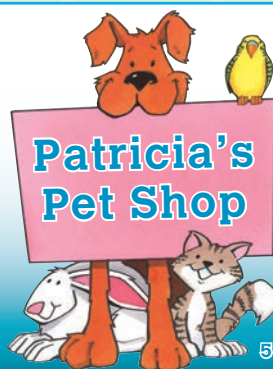
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THOUGHTS ON REMAINING IN BUSINESS AFTER A MAJOR NATURAL DISASTER

BY JIM McENTIRE, PORT ANGELES BUSINESS ASSOCIATION



How does one remain in business (or even start a business) after a severe earthquake?

First, one should think through what life will be like after the event. After the initial earthquake, we know that there will be a series of serious aftershocks, perhaps in the Magnitude 7.0 range.

The North Olympic Peninsula's transportation and utility infrastructure will be severely damaged or perhaps even in ruins. One can count on the fact that most, if not all, bridges will be collapsed, landslides will have made some roads impassible (think about U.S. 101 as it goes south along the Hood

Canal, and in places as 101 or State Road 112 and 113 traverse along the coast), and the tsunami generated by the initial Cascadia earthquake will have swept the Hood Canal Bridge away. Bonneville Power transmission lines will be down, and local power distribution lines will be severely damaged.

The North Olympic Peninsula will be essentially an island, with the only transportation on and off our "island" being by sea or by air. The Port of Port Townsend and Port of Port Angeles marine terminal infrastructure also will be largely unusable, at least in the short term.

In sum, we will have been transported immediately back to how life was in the 19th century, before electric power came to the North Olympic Peninsula.

The short-term, localized power outages we normally experience give us good training in how our businesses

can operate, but only if we use them to inform our plan for continuing operations during long-term service disruptions — perhaps for a year.

Household or industrial generators can provide power as long as fuel is available, and for solar-powered generators, when the sun shines or as long as battery packs hold out.

What the long-term lack of city- or PUD-provided power means is that telecommunications networks, including cellphone networks, will either be non-existent or of severely limited function. That will be our most significant limiting factor for the long haul as we think about getting businesses back up and running.

The implications of having no, or limited electrical power, and therefore essentially no telecommunications, are almost all-encompassing, given how we live our lives and do business in the 21st century.

Life will be very difficult here if businesses cannot quickly begin to function. But the good news is that they can function after a major natural disaster — we will need to think of how to adapt quickly to our changed world.

And function, businesses must.

Otherwise, livelihoods and incomes will vanish or significantly diminish, business investment and capital formation will slow to a crawl, and activities essential to rebuilding our lives and communities will be crippled.

Let's lay out some considerations for planning and some questions that you can ask yourself. We'll largely skip over the personal — the human need for food, water, clothing, shelter, basic sanitation and medicines, except as they relate to existing businesses for the same, or new opportunities that might be considered. A personal preparedness guide can be found here at mil.wa.gov/asset/5ba4202c2b79d or in last year's guide, bit.ly/2019PEPG.

YOUR EMPLOYEES AND YOUR PLACE OF BUSINESS

Will your place of business still be habitable and usable, and will your employees eventually be able to get to

work? It is completely understandable that, post-disaster, your employees' attention will be immediately focused on their own and their families' survival needs. You might want to think about helping them with their plans and securing a 30-day or more stock of food, water purification gear, etc., that will be necessary.

YOUR MARKETS AND THEIR GEOGRAPHIC REACH

Think about all the north-south ravines that have east-to-west highway bridges spanning them. Then think of the "micro-islands" created by those downed bridges. If you are in the service business with your customers coming to your store or shop for goods and/or services, will they still be able to get to you? If a crippled transportation or distribution network prevents the current scale of your business, how can you provide your goods or services to other micro-islands than your business location?

MICRO ISLANDS

With bridges and roads damaged, people will find themselves in isolated zones, where they are caught between bridges and roads that have failed or were destroyed by tsunami events.

We call these zones "micro-islands."

Damaged roads and bridges from a CSZ earthquake are expected to divide Clallam County into at least 20 micro-islands

Port Angeles has two such islands separated by Peabody Creek — division N on the west and division O to the east — and eight sub-micro-islands that would likely be separated by bridge and culvert failures.

If your business involves goods or services that might see lessened demand as your customers' disposable incomes diminish, and as demand goes up for other goods and services increases, how can you pivot to meet the new or increased market needs?

LOGISTICS AND YOUR BUSINESS'S SUPPLY CHAIN

Again, think of the "micro-islands" created by downed bridges. The entire in-bound distribution system for our area runs through the I-5 corridor before it can get to us.

How will your suppliers get orders from your business? Will your suppliers guarantee that your orders will not be diverted to needs closer to major distribution hubs along I-5? Can your suppliers provide goods via sea routes through the old ports or over the beaches at Port Townsend, Quilcene, Brinnon, Diamond Point, Dungeness Bay, Sequim Bay, Port Angeles, Clallam Bay, Neah Bay or La Push? If your business has need of fuel in quantity, will it be available? And if so, can your supplier(s) guarantee delivery to where it is needed? It is best not to think that goods can be air-shipped — rotary-wing and fixed-wing aircraft will likely be requisitioned for the highest-priority needs, such as fuel, casualty evacuation, medical supplies and medicines.

CASH, INSURANCE AND CAPITAL

Will your financial institution extend credit to your business and provide the cash necessary to pay your suppliers and employees without electricity or rapid telecommunications? How was business done in the 19th century, other than on a cash-and-carry basis? Is a barter system appropriate for your business? Will your insurance provider still insure against your risks? How will those risks change? It is likely that the Legislature (assuming legislators can get to Olympia) will pass some array of emergency or temporary legislation to provide for good-faith business activities' indemnification and suspend some of the panoply of employment laws currently on the books. Can you justify and document

your business decisions in order to avoid penalties?

SECURITY

If your business involves physical goods, whether for wholesale or retail, existing inventory and goods in transit to your business location will need to be secured. Needless to say, if they are stolen, or are not delivered as expected, you cannot sell them and gain revenue. Will you be able to ensure security in the event of looters?

MENTAL RESILIENCE

Last, and most important, is the necessity of picking yourself up off the ground (maybe literally), and being able to make decisions in an unfamiliar situation. As an instructive example, this is why the military constantly trains for combat.

Preserving your mental readiness is vital to being able to function after a natural disaster strikes. Coaching your employees to do the same is equally vital. Mental toughness comes from using one's imagination, thinking ahead, creating contingency plans and being ready and able adapt those plans as necessary.

Thinking through how to function as if you are a 19th-century business is a tall order. But it's better to do so while there is time to plan ahead.

Jim McEntire chairs the Port Angeles Business Association's Government Affairs Committee. He is a retired U.S. Coast Guard officer, retired senior federal civil servant, and formerly served as a Port of Port Angeles commissioner, and Clallam County commissioner.

The Port Angeles Business Association is a member-driven nonprofit association with a mission of promoting business activities and development; business and job growth in the Greater Port Angeles area; and to retain the private enterprise system with free competitive markets.

BEING PREPARED FOR POWER OUTAGES

Following are some tips for planning ahead for a power outage:

- Have an emergency charging option for your mobile devices. If you use your car to re-charge devices, do NOT keep the car running in a garage, or partially enclosed space, this can lead to carbon monoxide poisoning.
- Know where the manual release lever of your electric garage door opener is located and how to operate it.
- Purchase ice or freeze water-filled plastic containers to help keep food cold during a temporary power outage.
- Only use flashlights (LED bulbs provide the best light and longest life) for emergency lighting - candles can cause fires.
- Keep refrigerator and freezer doors closed. An unopened refrigerator will keep food cold for about 4 hours. A full freezer will keep the temperature for about 48 hours.
- Only use portable generators away from your home, NEVER run inside a home or garage, or connect it to your home's electrical system.
- ***If you rely on anything that is battery-operated or power dependent like a medical device, you should determine a back-up plan.***



For more information visit:
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RED CROSS IN CLALLAM COUNTY



BY GERI ZANON, AMERICAN RED CROSS

If a major earthquake or a similar large-scale disaster were to strike the Olympic Peninsula, would resources be available to help local residents survive? For those living in this designated “big quake” zone, that is a crucial question.

In Clallam County, the local chapter of the American Red Cross works in partnership with the county’s Emergency Operations Center to plan for just such an emergency. For its part, the Red Cross maintains disaster trailers scattered throughout the county and filled with supplies such as cots, blankets and even generators. In other locations, including Port Angeles and Sequim, supplies are located in accessible buildings, ready for use when shelters are needed. Most importantly, volunteers are given ongoing training to prepare them for dealing with mass-care needs.

Still, apart from all the prior planning, the Red Cross echoes the basic message of public emergency managers: In the immediate aftermath of any major disaster, individuals must be first and foremost responsible for themselves.

Don Zanon of Port Angeles, who volunteers with Bill Wheeler of Sequim and helps coordinate Red Cross efforts in Clallam County, noted that many people rely on the Red Cross to be immediately available in a disaster. But in an area as far-flung as Clallam County, reaching all those who are affected can be a difficult task, which could be complicated by transportation difficulties. Even the process of setting up a Red Cross response shelter requires time and a lot of work by the agency’s volunteers.

As a result, Zanon said, it’s important for people to assemble disaster preparedness kits so they can survive the aftermath of a disaster on their own and in their own neighborhood. The Red Cross

recommends that individuals be prepared to care for themselves for as many as 30 days. To assist in putting together an emergency kit, the Red Cross has materials outlining what is recommended for a kit and offering a calendar-driven process for accumulating the supplies.

Red Cross preparedness resources for families, schools, workplaces and more can be found at redcross.org/get-help/how-to-prepare-for-emergencies.

In recent years, the Red Cross has expanded its efforts to distribute this information to local residents — through presentations to clubs, businesses and other organizations and at information centers set up at festivals and other public events.

Workshops also are offered for larger groups, such as church communities, with the goal of training them in the basics of caring for large numbers of people. Attendees learn about the nature of a shelter, the process of setting it up and the needs of those who might be using it, from basics like food and a place to sleep to more complex needs such as medical care or mental health counseling.

Zanon said these classes have established a foundation of residents ready to respond to the immediate needs of their families, friends and neighborhoods. In addition, the training has formed a group of knowledgeable volunteers who can be called on to help when shelters are opened.

While disaster education is an essential part of Red Cross focus in the county, Zanon noted that the most fundamental aspect of day-to-day Red Cross work is responding to local emergencies, primarily fires and floods. In 2019, the chapter responded to 22 events in the county from Forks to Gardiner.

This work is done by a corps of 31 volunteers, who maintain 24/7 on-call availability for emergency assistance. The Red Cross provides resources to meet temporary needs and supports those affected by disasters with referrals to local agencies that can help them recover from their loss.

The Red Cross also conducts fire alarm installation events throughout the county, called Sound the Alarm, in conjunction with local fire districts. It also provides support to active and veteran members of the armed forces and their families.

More volunteers are needed for all aspects of Red Cross work, and during March, which is Red Cross Month.

Persons interested in volunteering can go online to redcross.org and scroll to “volunteer.” Fill in the application and our chapter will be notified.

For more information on volunteer opportunities with the Red Cross or to arrange for a disaster preparedness program or a workshop on shelter operation, contact Zanon at 360-460-4739.

Photos provided by Don Zanon of the American Red Cross.



A memo on why it's so important that families are able to take care of themselves after a disaster ...

BY JIM BUCK

Emergency shelter during an emergency is delegated to the American Red Cross in accordance with Emergency Support Function 6.

Here is a synopsis of how the government approaches emergency assistance.

- The public is responsible for taking care of themselves.
- The public may call for local government assistance if they face events that exhaust their resources.
- The local government may call for county assistance if it faces events that exhaust its resources.
- The county government may call for state support if it faces events that exhaust its resources.
- State government may call for Federal support if it cannot address the emergency.

There is a difference between an emergency and a disaster. An emergency is a house fire, apartment fire or accident that leaves a small number of people with no place to stay. The county depends on the Red Cross to provide shelter for these victims. Our local American Red Cross (ARC) is good at this. Arrangements are usually for two or three days while the victims make more permanent arrangements. However, it is the victim's responsibility to recover from the emergency.

A disaster is an emergency on a larger scale. The Cascadia Subduction Zone Magnitude 9.0 Scenario, for example, would result in a community-wide disaster — one that is likely to leave thousands of people with emergency needs.

Our local Red Cross has the capability to temporarily shelter 200 people for three days. Unfortunately, they will need several days to mobilize the personnel from around the United States to do so.

ARC and the county do not have the capability to meet shelter needs during or following a major disaster such as a major destructive earthquake; ARC has agreements with about 10 facilities in the county that can be used for shelters. This is a good start, but there needs to be enough shelter space in the county to take care of several thousand people.

Aside from the structures and supplies, trained personnel are always the bottleneck in any shelter situation.

Arranging for a building is the easy part. The real work involves training shelter staff and planning how to set up the facility. Red Cross recommends a 20-person staff per shift for each 100 people in the shelter. They provide excellent guide books and training.

Just about everyone assumes the government has shelter accommodations all figured out. They see victims of hurricanes, tornadoes, floods, fires and whatever in shelters on TV all the time so shelters must be easy. Not so.

There is a lot of work involved in setting up a shelter. The Red Cross is responsible for providing emergency shelter — and they do a pretty good job — when dealing with short-term emergencies involving less than 20 people. The county does not currently have the capability to provide mass shelter facilities during a major disaster. I hope we can recruit churches, clubs and nonprofit organizations to prepare for an event that requires mass sheltering.

We have done so in Joyce. Let's engage the rest of the Peninsula in this effort and build a truly resilient community.

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REGIONAL RESILIENCY ASSESSMENT PROGRAM



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 - CISA
 - Infrastructure Security Division
 - National Risk Management Center
 - FEMA Region 10
 - USCG District 13
- U.S. Army Corps of Engineers
- U.S. Department of Energy
 - Pacific Northwest National Laboratory
 - Sandia National Laboratory
- U.S. Department of Transportation
- USGS



STATE GOVERNMENT

- Washington State Military Department
- Washington Emergency Management Division
- WSDOT
 - Emergency Management
 - Bridge Office
 - Highway Maintenance
 - WSF
 - Rail Office
 - Materials Lab
 - Avalanche Management
- University of Washington
- Washington State DNR
 - Washington Geological Survey



REGIONAL, COUNTY AND CITY GOVERNMENT

- City of Bellevue
 - Department of Transportation
- City of Seattle
 - Department of Transportation
- Grays Harbor County
 - Department of Emergency Management
- King County
 - Department of Transportation
- Pacific Northwest Economic Region
- Pierce County
 - Public Works
- Port of Bellingham
- Port of Everett
- Port of Grays Harbor
- Port of Port Angeles
- Port of Olympia
- Port of Seattle
- Port of Tacoma
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- U.S. Foods

“Across western Washington, highway reopening times following a large magnitude CSZ earthquake are almost entirely contingent on highway bridges being safely reopened for emergency use.”

PROGRAM OVERVIEW

The Washington State Transportation System’s project assessed the resilience of Washington State’s surface transportation systems to a Cascadia Subduction Zone (CSZ) earthquake and the ability of those systems to support post-disaster response and recovery activities.

This project was undertaken as part of the Department of Homeland Security (DHS) Cybersecurity and Infrastructure Security Agency (CISA) Regional Resiliency Assessment Program (RRAP) and in close coordination with the project’s sponsor, the Washington Emergency Management Division (EMD) and other state, federal, regional and local partners.

The RRAP is a cooperative assessment of specific critical infrastructure within a designated geographic area and a regional analysis of the surrounding infrastructure that address a range of infrastructure resilience issues that could have regionally and nationally significant consequences. These voluntary, non-regulatory RRAP projects are led by the Infrastructure Security Division within DHS CISA and are selected each year by the Department with input and guidance from federal, state and local partners.

PROGRAM GOAL AND PARTICIPANTS

The goal of the RRAP is to generate greater understanding and action among public and private sector partners to improve the resilience of a region’s critical infrastructure. To accomplish this, the RRAP does the following:

- Resolves infrastructure security and resilience knowledge gaps
- Informs risk management decisions
- Identifies opportunities and strategies to enhance infrastructure resilience
- Improves critical partnerships among the public and private sectors.

Strong partnerships with federal, state, local, tribal and territorial government officials and private sector organizations across multiple disciplines are essential to the RRAP process. These include private sector facility owners and operators, industry organizations, emergency response and recovery organizations, utility providers, transportation agencies and authorities, planning commissions, law enforcement, academic institutions and research centers.

METHODOLOGY

The Washington State highway system comprises 7,050 centerline miles of highways and 3,495 highway bridges, which serve as critical links within the state highway system across otherwise impassable rivers, terrain, and other roadways or obstacles.

During a CSZ earthquake, highways and bridges may be exposed to ground failures that could result in significant damage to the highway surface or supporting soils, as well as to bridges, rendering the highway impassable.

When damaged, bridges can require significant time and resources to reopen and reestablish these connections, which can contribute significantly to the overall reopening time of highway routes owned and managed by WSDOT.

The RRAP research team worked collaboratively with WSDOT’s Maintenance Office and pavement engineers to develop the Highway Seismic Screening Tool (HSST) to assess the potential impacts that a CSZ earthquake could have on highway pavements and to determine approximate per-mile reopening times for highway segments.

The HSST calculates PGD on an individualized basis for each highway segment in the state highway network to assess the damage to pavements from CSZ earthquake-induced liquefaction in the underlying soils.

A similar tool was developed for assessing bridges, the Bridge Seismic Screening Tool (BSST). The BSST assigned approximate reopening times to bridges using damage types calculated during the seismic design analysis, liquefaction and scour considerations and additional bridge characteristic information such as bridge length and the obstacle that the bridge traverses (e.g., river, ravine, surface roadway).

DEVELOP HIGHWAY PAVEMENT NETWORK

CHARACTERIZE SEGMENTS

ESTIMATE PERMANENT GROUND DEFORMATION

ESTIMATE SEGMENT REPAIR TIME



The RRAP research team combined the results from the BSST and HSST analyses to determine the aggregate reopening times for statewide highways from both bridge and pavement repairs on a per-mile basis.

As with bridges, an important underlying assumption in these repair and reopening times was that they specify the amount of time necessary to repair pavements to a minimum acceptable state of repair to facilitate the movement of emergency response and supply vehicles, and not restoration to a pre-disaster state of repair.

WSDOT and the RRAP research team agreed that a temporary wearing surface composed of compacted crushed gravel would provide a sufficient surface for such activities and assumed that a single lane of travel would be sufficient for initial response operations, but could be expanded later during the ongoing response.

FINDINGS

The results of the highway seismic analysis indicate that although 8,434 of the segments evaluated are on liquefiable soils, the majority of highways will experience relatively low PGD — 74.1 percent of highway miles will experience less than 31 inches of PGD, with approximately 31 percent of those miles experiencing none at all.

The highest average per-mile repair and reopening times coincide with high PGD values projected to occur from the Interstate 5 corridor to the west, with the most significant PGD occurring in southwestern Washington and on the Olympic Peninsula.

The repair and reopening times for highway pavements largely mirror the results of projected PGD magnitudes;

however, some variability appears in repair times given the varying types and thicknesses of highway pavement structures.

The analysis projects that the longest highway repair and reopening times will occur in southwestern Washington and the Olympic Peninsula, with comparatively shorter times in the Puget Sound area.

The majority of highway segments have an average per-mile repair time of 0.5 days, with only 13 percent of affected highway mileage requiring more than two days per mile to repair.

One notable feature of the combined BSST and HSST results is the strong influence that bridge reopening times have on the aggregate per-mile reopening times. There is a strong correlation between segments with longer reopening times (i.e., greater than six months) and the locations of bridges with similarly long reopening times.

In fact, of the 1,305 one-mile highway segments with combined reopening times of two weeks or greater, bridge reopening times contributed more than 90 percent of the combined per-mile reopening times in all but 71 cases (or 5.4 percent of segments).

The extent of highway segments with longer reopening times are greater on the Olympic Peninsula and in southwestern Washington. As discussed earlier, these locations have a generally higher occurrence of liquefiable soils that can lead to greater pavement damage and also necessitate bridges over waterways, which have comparatively longer reopening times.

OUTCOMES

The culmination of RRAP activities, research and analysis is presented in a Resiliency Assessment report documenting project results and findings, including key regional resilience gaps and options for addressing these shortfalls.

Each RRAP project typically involves a year-long process to collect and analyze data on the critical infrastructure within the designated area, followed by continued technical assistance to enhance the infrastructure's resilience.

Facility owners and operators, regional organizations and government agencies can use the results to help guide strategic investments in equipment, planning, training and infrastructure development to enhance the resilience and security of facilities, surrounding communities and entire regions.



Now Recruiting Volunteers

for the 2020 Wildland Firefighting Season

Contact the administrative office for more details: 360.385.2626 or at estewart@ejfr.org

Wildland Field Days: June 6th & 7th

Also accepting applications for Volunteer Public Information Officers, EMS, Structural Firefighters and Support Volunteers. Applications are available at www.ejfr.org and due no later than April 9th. Training provided by the department - no experience necessary.



Keep your property lean and green to help protect your family and home this Wildfire Season.

Vertical Spacing

Remove all tree branches at least 6 feet from the ground and allow extra vertical space between shrubs and trees. Lack of vertical space can allow a fire to move from the ground to the brush to the tree tops like a ladder. To determine the proper vertical spacing between shrubs and the lowest branches of trees, use the following example: A five foot shrub is growing near a tree. $3 \times 5 = 15$ feet of clearance needed between the top of the shrub and the lowest tree branch.

Plant and Tree Spacing

Distance between grass, shrubs, and trees is crucial to reduce the spread of wildfires. The spacing needed is determined by the type and size of brush and trees, as well as the slope of the land. For example, a property on a steep slope with larger vegetation requires greater spacing between trees and shrubs than a level property that has small, sparse vegetation.

<http://bit.ly/EJFRFirewise>

EMERGENCY CONTACTS

Learn how to make a difference in your community.

- Know how to respond to each kind of hazard.

Some advice has changed over the years. Even if you think you know, give it a quick scan; you'll probably see at least one new thing. Take a look at last year's Preparedness Guide online for detailed info on some of the Peninsula's most likely natural hazards, bit.ly/2019PEPG.

- Prepare your home.

Home adjustments and maintenance can be done beforehand for earthquakes, wildfires and winter weather. Specific recommendations can be found online in Washington's Preparedness Guide at bit.ly/WashingtonEPG.

- Be self-reliant.

Gather and store enough supplies for you, your family and pets for at least seven days. If you can (or slowly over time), increase your supplies to 30 days or more; response timelines show Peninsula residents should not discount the possibility of up to three months' isolation in severe, community-wide disasters.

- Expand your skills.

Learn CPR/First Aid.

Join a Community Emergency Response Team (CERT), Volunteer in Police Service (VIPS), Search and Rescue or Community Policing team or other emergency-related education programs.

Get licensed and become a member of Amateur Radio Emergency Services (ARES).

Become a volunteer firefighter. There are several districts that run only on volunteers.

FIRE & RESCUE

CLALLAM COUNTY FIRE DISTRICT 3

For questions regarding insert materials or for group presentations, contact us.

- Office: 323 N. Fifth St., Sequim
- Contacts:
 - Dan Orr, 360-683-4242, ext. 114, dorr@ccfd3.org
 - Blaine Zechenelly, bzechenelly@ccfd3.org

COMMUNITY EMERGENCY RESPONSE TEAM (CERT)

For Eastern Clallam County, Gardiner and West Discovery Bay

- Contact: Cindy Zechenelly, czechenelly@ccfd3.org

MAP YOUR NEIGHBORHOOD (MYN)

- Contact: Lynne Schlosser, Lynne5977@live.com

CLALLAM COUNTY

CLALLAM COUNTY EMERGENCY MANAGEMENT (CCEM)

- 223 E. Fourth St., Suite 12, Port Angeles
- clallam.net/emergencymanagement
- ccem@co.clallam.wa.us
 - Ron Cameron, 360-417-2544 rcameron@co.clallam.wa.us

COMMUNITY EMERGENCY RESPONSE TEAM (CERT)

For Western Clallam County and Port Angeles, west of Deer Park

- Contact: Becca Yucha, 360-417-2525, byucha@co.clallam.wa.us

MAP YOUR NEIGHBORHOOD (MYN)

- Contact: Ann Chastain, 360-417-2483 achastain@co.clallam.wa.us

JEFFERSON COUNTY

JEFFERSON COUNTY DEPARTMENT OF EMERGENCY MANAGEMENT

CERT and MYN for Jefferson (except Gardiner and West Discovery Bay)

- Office: 81 Elkins Road, Port Hadlock
- Phone: 360-385-9368
- Email: jcdem@co.jefferson.wa.us
- Contact: Willie Bence, 360-344-9729 wbence@co.jefferson.wa.us, jcdem@co.jefferson.wa.us
co.jefferson.wa.us/950/Dept-of-Emergency-Management

JOYCE PREPAREDNESS

JOYCE EMERGENCY PLANNING AND PREPAREDNESS (JEPP)

- Website: jeppgroup.org
- Social Media Page: facebook.com/JEPPgroup
- Contact: Jim Buck, 360-808-2105, buckdj@olympen.org

There. When You Need Us.®

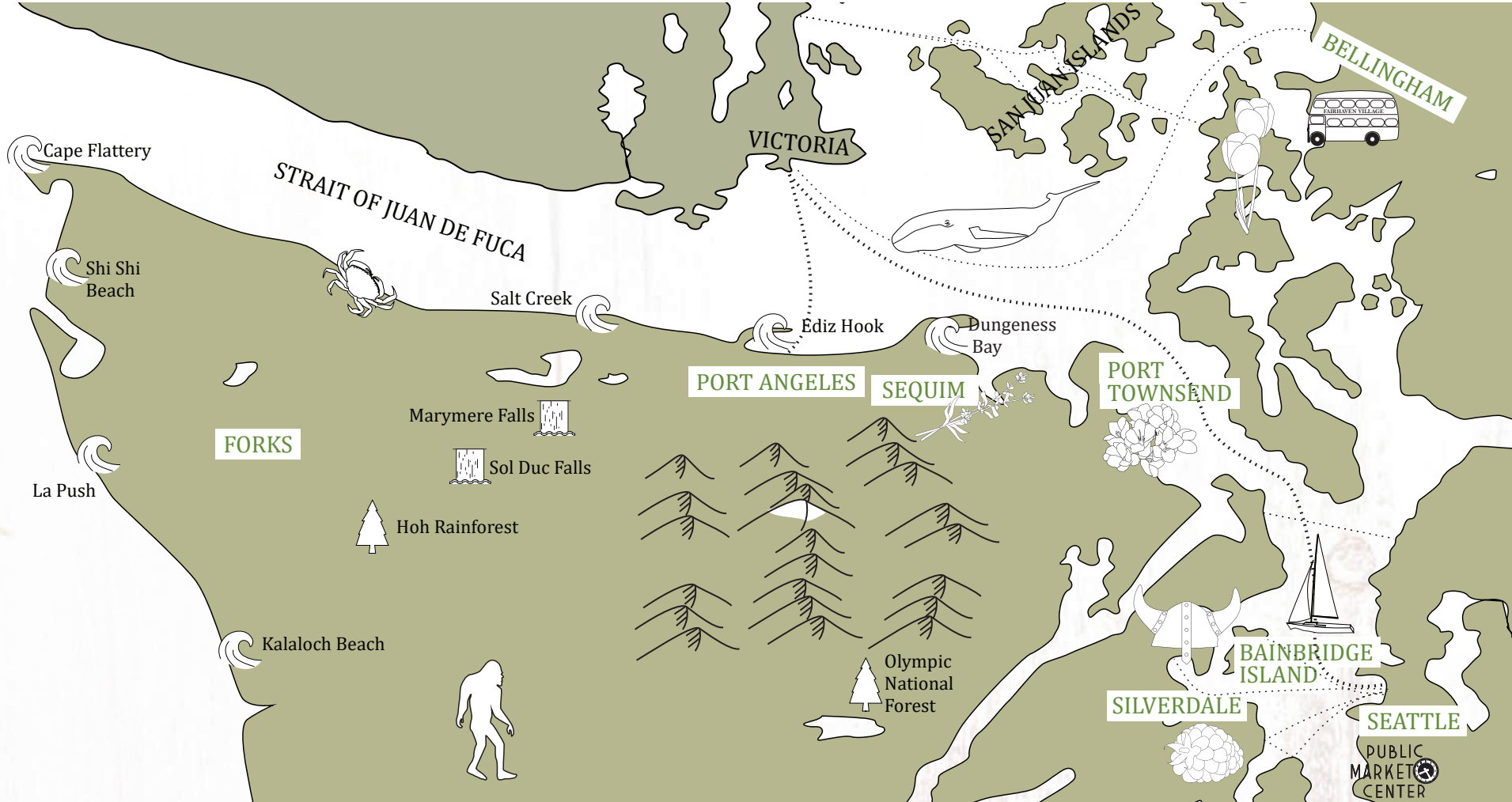


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