

EMERGENCY PREPAREDNESS MANAGER

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# OSU EMERGENCY MANAGEMENT

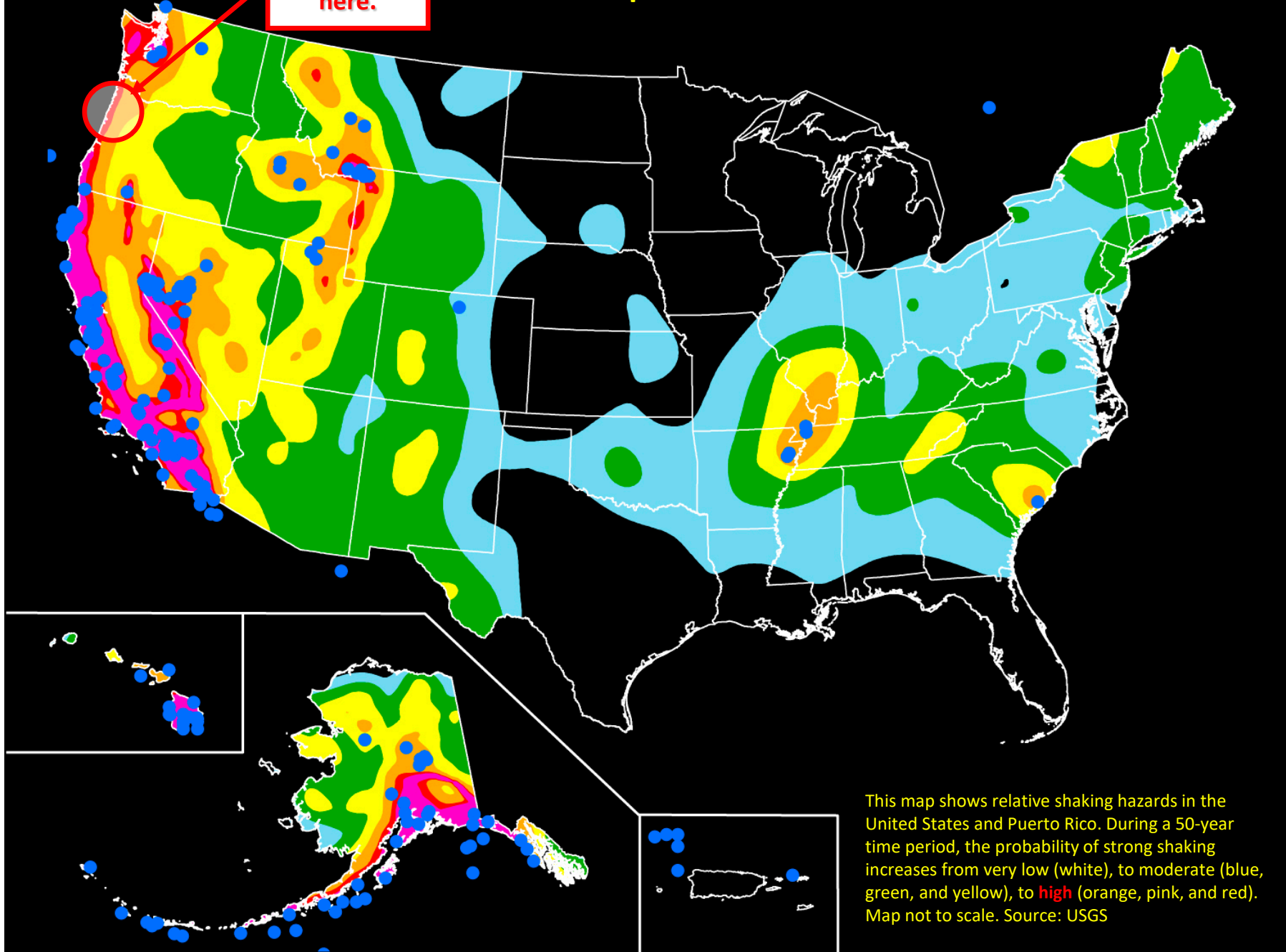
## A LAYPERSON'S OVERVIEW OF THE CASCADIA SUBDUCTION ZONE THREAT AND PREPAREDNESS



**Oregon State**  
University

We are here.

# U.S. Earthquake Hazard



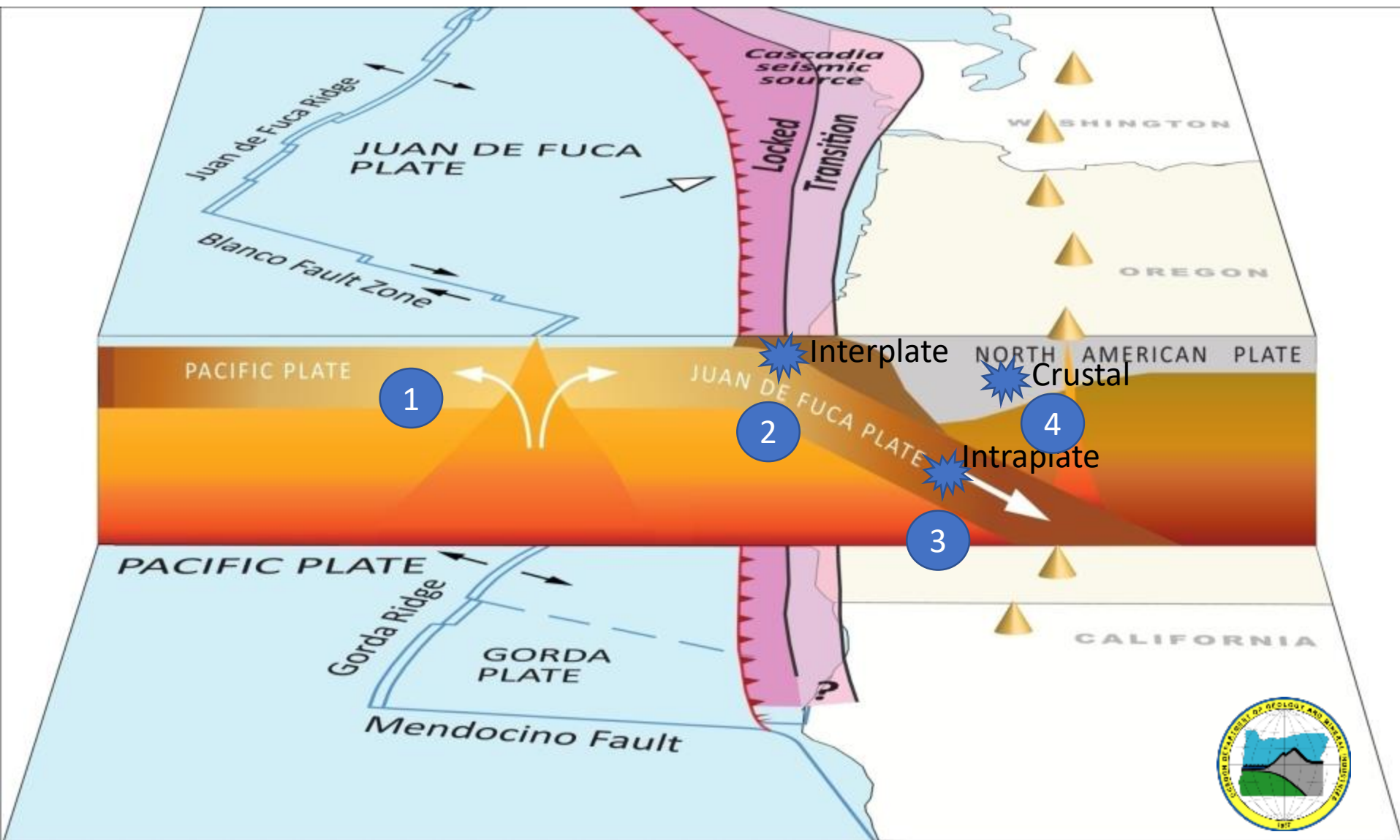
# Earthquakes

- Cascadia Subduction Zone event
- 9M, 3-5 minutes of shaking
- Aftershocks of 8+M for several hours
- Pre – 2000
  - Not a matter of If, but When
- Circa 2006
  - Next 100 years (10-15% chance)
- 2013
  - Sometime during our life time (next 50 years) (37% chance)



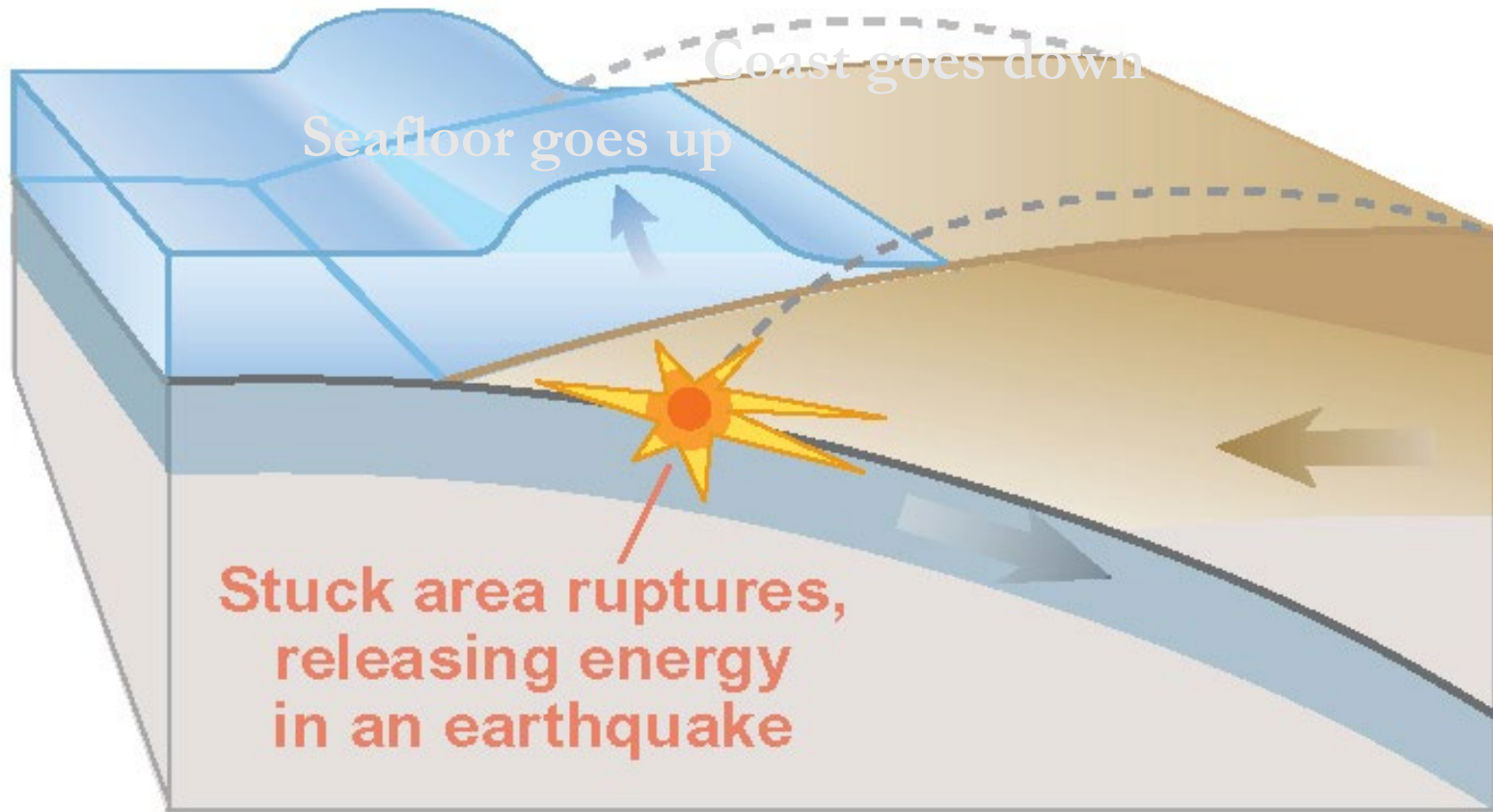
<http://thewatchers.adorraeli.com/2012/08/08/new-study-shows-cascadia-subduction-zone-earthquake-risk-to-be-much-higher-than-previously-thought/>

# Plate Tectonic Map of the Pacific Northwest – the “Cascadia” Region – 3 Earthquake Sources



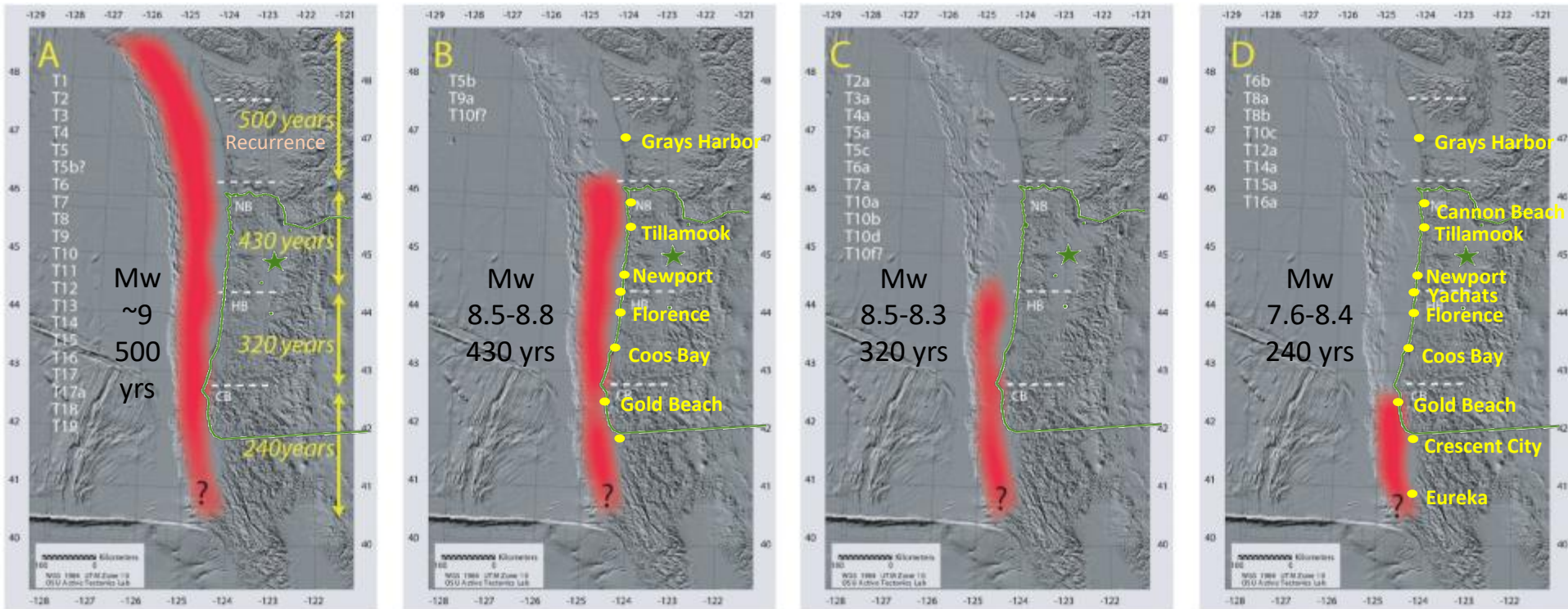
# During an Earthquake

*Earthquake starts tsunami*



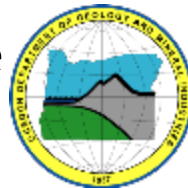
# Cascadia Subduction Zone Earthquakes

Turbidites show how much of the subduction zone ruptured in ~42 earthquakes over the last 10,000 years.



- 20 earthquakes ruptured all on the subduction zone.
- 2 to 3 earthquakes ruptured three quarters of subduction zone.
- 19 earthquakes ruptured the southern half or quarter of the subduction zone.

(Modified from Goldfinger et al. (in press) by adding magnitude estimates and some labels)



# Damaged, but life safety survivable





2001 Nisqually -- Collapsed URM, Seattle, Utah Avenue





# Liquefaction



**Earthquake shaking can cause soils to behave like a liquid and lose their ability to support structures.**

**1964 magnitude 7.5 Niigata earthquake in Japan**



# Response

- If you feel an earthquake:

- Drop, cover and hold



- Earthquake will seriously delay emergency response.
  - Strong ground motions for 3 to 5 minutes.
  - Liquefaction and earthquake force will cause extensive landslides, cutting lifelines
  - Most bridges will be damaged and damage may not be obvious to a lay observer
  - Nearly all buildings will be damaged by the earthquake, including those that may be designated as emergency shelters.
  - Coast will be cut up into “islands” by slides and bridge failure, probably for weeks.

KNOW THE RESOURCES IN YOUR ISLAND AND PLAN ACCORDINGLY



# Select the best cover available

## Good

- Protect the whole body
- Hard surface
- Able to support weight of falling objects
- Can exit from underneath afterwards

## OK

- Doorway
  - Can swing and pinch
  - Nobody is 4 inches wide
  - Not all are load bearing
- Wall or furniture
  - Get low
  - Provides protection on 1 side
  - Might create a safe space if debris falls

## Poor

- Laying down or standing in the middle of the room
- Squeezing under Cover that you cannot get back from (under bed)

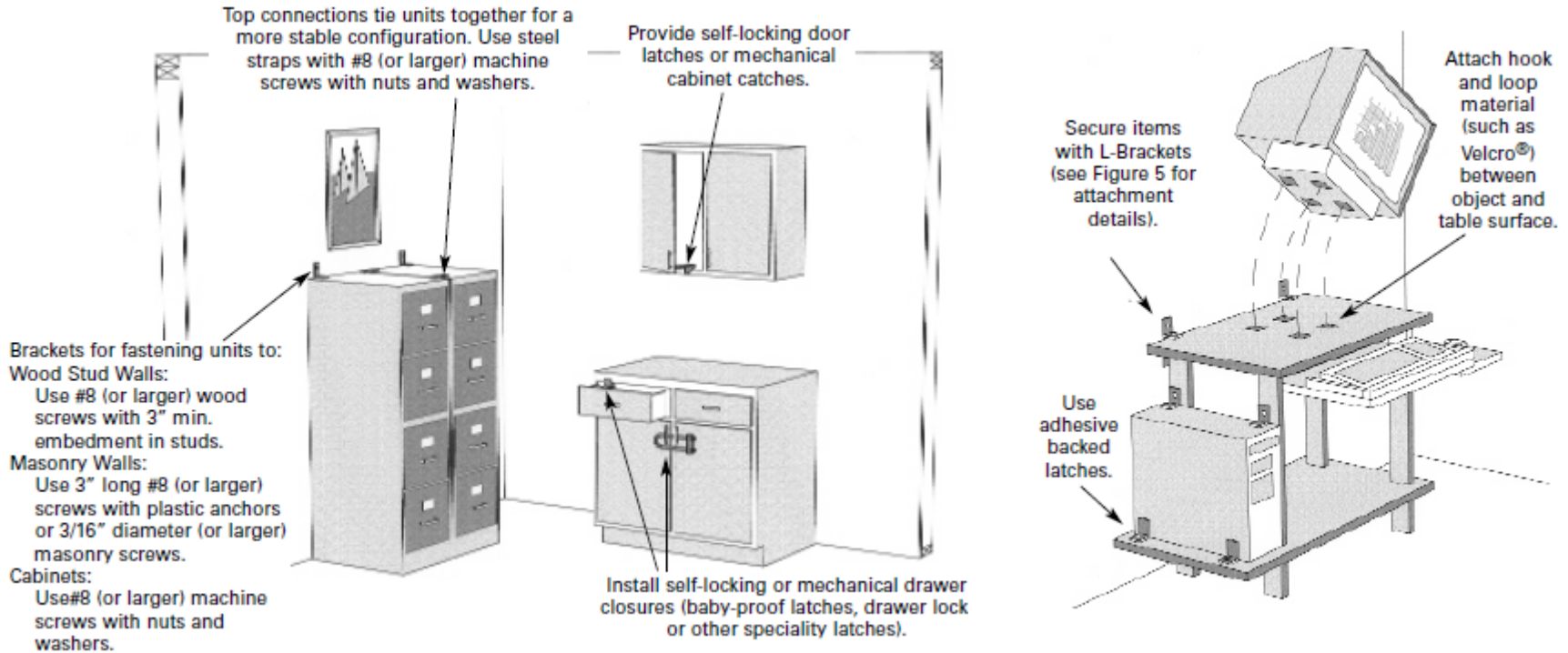


# Mitigation

- Fasten items to walls
- Don't place glass above your bed
- Fasten your water heater to the wall
- Place shoes, with socks in them, under your bed
  - Place in bag and tie to bed leg
  - Consider placing gloves and clothing in the bag



# Non-structural Mitigation



# Tsunami Maps

<http://www.oregongeology.org/tsuclearinghouse/>

## IF YOU FEEL AN EARTHQUAKE:

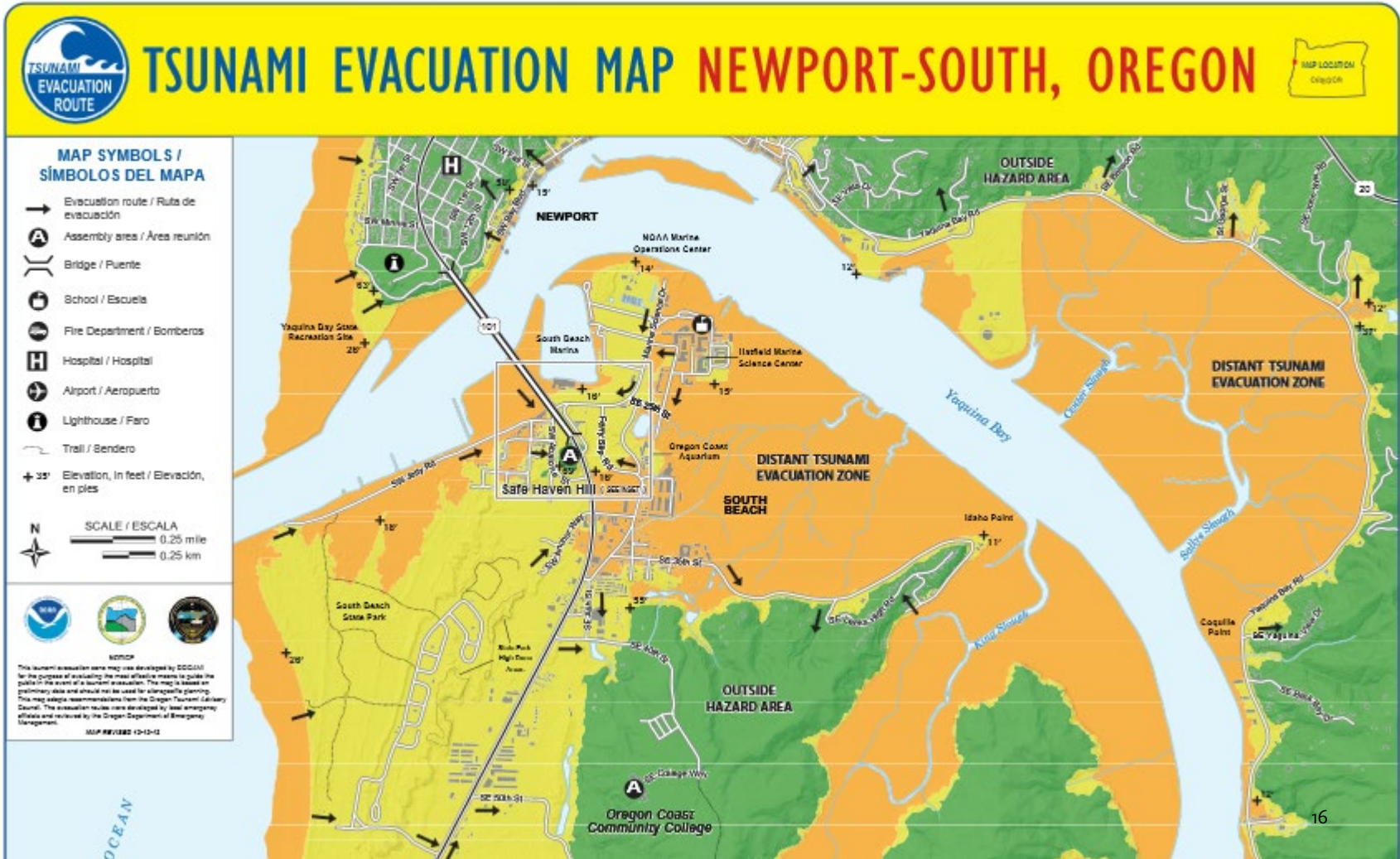
- Drop, cover, and hold
- Move immediately inland to higher ground
- Do not wait for an official warning

## SI USTED SIENTE EL TEMBLOR:

- Tírese al suelo, cúbrase, y espere
- Diríjase de inmediato a un lugar más alto que el nivel del mar
- No espere por un aviso oficial



<b>OUTSIDE HAZARD AREA:</b> Evacuate to this area for all tsunami warnings or if you feel an earthquake.	<b>ZONA DE PELIGRO EXTERIOR:</b> Evacúe a esta área para todas las advertencias del maremoto o si usted siente un temblor.
<b>LOCAL CASCADIA EARTHQUAKE AND TSUNAMI:</b> Evacuation zone for a local tsunami from an earthquake at the Oregon coast.	<b>MAREMOTO LOCAL (terremoto de Cascadia):</b> Zona de evacuación para un tsunami local de un temblor cerca de la costa de Oregon.
<b>DISTANT TSUNAMI:</b> Evacuation zone for a distant tsunami from an earthquake far away from the Oregon coast.	<b>MAREMOTO DISTANTE:</b> Zona de evacuación para un tsunami distante de un temblor lejos de la costa de Oregon.



## TSUNAMI EVACUATION MAP NEWPORT-SOUTH, OREGON



### MAP SYMBOLS / SÍMBOLOS DEL MAPA

- Evacuation route / Ruta de evacuación
- (A) Assembly area / Área reunión
- ( ) Bridge / Puente
- (S) School / Escuela
- (FD) Fire Department / Bomberos
- (H) Hospital / Hospital
- (A) Airport / Aeropuerto
- (L) Lighthouse / Faro
- Trail / Sendero
- + 35' Elevation, in feet / Elevación, en pies

SCALE / ESCALA  
 0.25 mile  
 0.25 km



This tsunami evacuation map was developed by ODEEM for the purpose of evaluating the most effective means to guide the public in the event of a tsunami evacuation. This map is based on preliminary data and should not be used for strategic planning. This map adopts recommendations from the Oregon Tsunami Advisory Council. The evacuation routes were developed by local emergency officials and reviewed by the Oregon Department of Emergency Management.  
 MAP REVISED 10-12-12



OPB <https://www.opb.org/news/series/unprepared/>

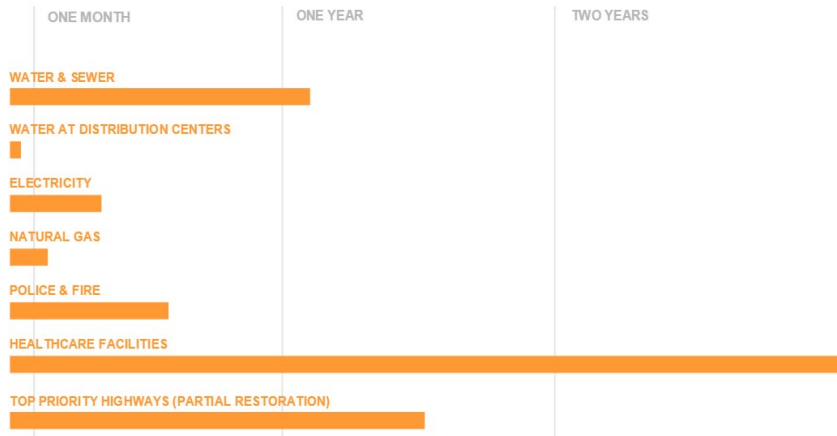


# <http://www.opb.org/aftershock/>

Corvallis, OR

## YOUR COMMUNITY'S RECOVERY

Experts project it could take several months to restore your community to its normal function based on damage to pipes, infrastructure, and the transportation corridors needed for recovery efforts.



## HOW TO PREPARE

Given the hazards and preparedness level in your community, experts suggest keeping an emergency kit with enough supplies to last a minimum of two weeks. They also recommend connecting with community groups to boost your region's overall resiliency.



### YOUR SUPPLY KIT

Experts suggest you have the following:



**2** Weeks of supplies per person



**14** Gallons of water per person



**42** Meals per person

For more information on making your kit, check out these emergency supply lists from [OPB](#) and [American Red Cross](#).

# Preparedness - Short term thinking

- We understand 72-hours
  - Preparedness fits in a backpack
  - Still within the Rules of 3 of survival
- But 7 days, 14 days, 30 days?
  - Mentally, we are not prepared
  - Provisionally, we are not prepared



# Use the Rule of 3's to guide planning

You can live –

- 3 Seconds without blood 

- 3 minutes without air 

- 3 hours without shelter



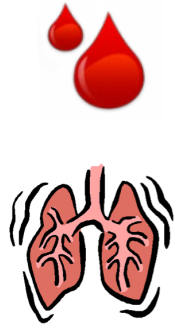
- 3 days without water



- 3 weeks without food



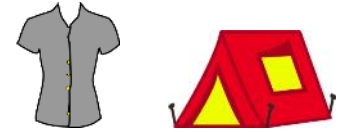
# 3 Seconds without blood, 3 minutes without air



- Take First Aid training
- Take CPR training
  - <http://recsports.oregonstate.edu/safety-classes>
- Purchase First Aid Materials
  - Buy a kit with contents that you know how to use
  - Build a kit if commercial kits give you too many “extra” things
- Don't forget the animals!



# 3 hours without shelter



- Clothing

- Warm
- Dry
- Seasonal



- Sleeping and living

- Community shelter
- Tarp, Tent, Canopy



- For each family member

- Change sizes as growth continues!
- Pack in plastic bags to keep dry

- Emergency Shelter

- Poncho
- Space blanket (mylar)



# 3 days without water



- Plan for 14 days
- 1 gallon per person per day ( and 1 gallon per pet per day)
  - Hygiene
  - Cooking
  - First Aid
  - Drinking
- Storage of water
- Purifying vs Filtering

# Water Storage (Quantity)

- Use metal bottles
- Use PBA free containers
- Use Lexan containers
- Glass containers break easily
- Do not use milk jugs or similar materials
- Water can be found in your hot water heater
  - Turn off in-coming lines in order not to contaminate your water supply
- Confirm with utilities if water is safe to drink (may take 3 days for them to know after an earthquake)
- Rotate water or apply preservative
- Store in cool, non-sunny location





# Water Quality



- **Filter** – Mechanically removes contaminants. Most filters, depending upon the filter pore size, can remove everything but viruses. Carefully read the manufacturer instructions to learn about capability
- **Purify** – Kills viruses and some bacteria but not all bacteria. Does not remove bad tastes or debris

	Purify	Filter
Boil	X	
Disinfectant	X	
Filter devices		X
Filter + disinfectant	X	X

# Chemical



Amount of Water	% Sodium Hypochlorite	Amount of Bleach to Add to Water
1 quart or liter	1%	10 drops
1 gallon		40 drops
2 quarts or liters		4 drops
1 gallon or 4 liters	4-6%	8 drops or 1/8 teaspoon
2.5 gallons		3/8 teaspoon
5 gallons		3/4 teaspoon
7 gallons		1 teaspoon
15 gallons		2 teaspoons
55 gallons		1/8 cup
1 quart or liter	7-10%	1 drop
1 gallon		4 drops
1 quart or liter	Unknown	10 drops
1 gallon		40 drops

Note: If the water is cloudy, murky, colored, or very cold, DOUBLE the amount of bleach added.



# 3 weeks without food



- Plan for a mix of food types
  - No cook – eat out of wrapper
    - Canned goods
    - MREs
    - Food bars
  - Rehydrate – can still be eaten without heat
    - Dehydrated
    - Freeze dried
  - Cook
    - Needed to kill germs/bacteria
- Eat Refrigerator and Freezer first
- Remember Food Allergies!
- Don't pack food you won't eat

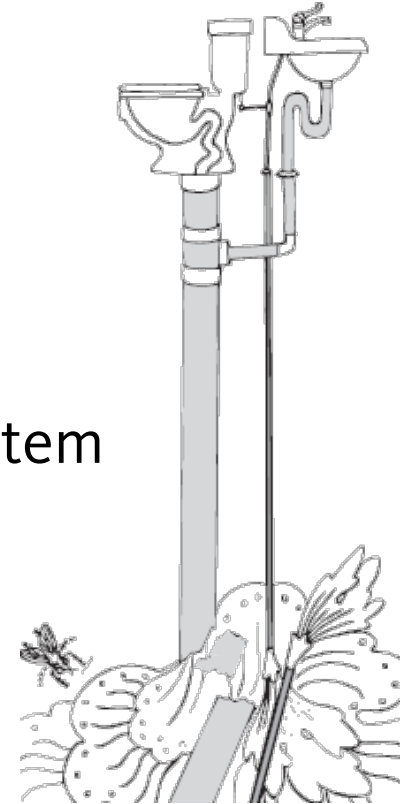
# What to look for:



- Long storage life
- Little cooking required
- Durable packaging
- Up to 2,800 calories/day for males, 2,200 calories/day for females
- A rounded diet
  - Protein
  - Fruit
  - Vegetables
  - Sweets

# Output (Pee and Poo)

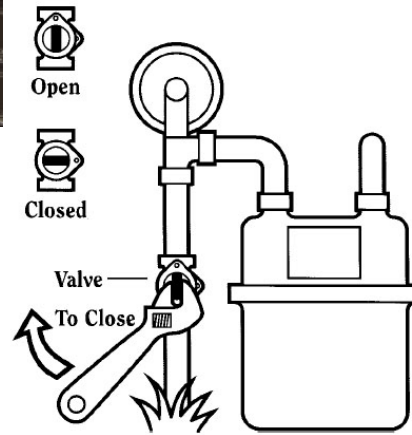
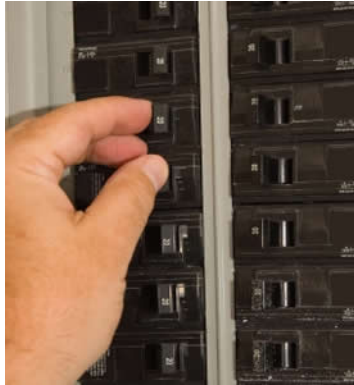
- Don't put anything down the pipes until you are sure the pipes are intact
- Health issues
  - Burying human waste
    - Health laws
    - Clay soil
  - Rodents, Flies, Disease
- Could be months to a year without sanitation system
- Several options
  - Pre-built camping toilets
  - Bucket system
- Need to plan it now, not later



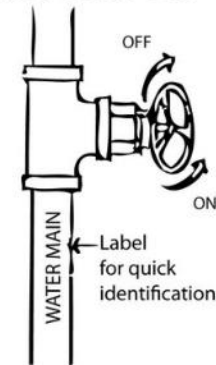


# Learn When and How to turn off Utilities

- Electrical
- Gas
- Water



Water Shut-Off



# Information

Oregon State University  
Emergency Preparedness

CONTACTS EMERGENCY PROCEDURES OSU ALERTS PLANNING **PREPAREDNESS TOPICS** TRAINING USEFUL LINKS

### OSU Emergency Preparedness

**Goal:** Through the DAM Ready movement, increase emergency preparedness in the campus community through planning and outreach.

**Mission:** To create a prepared and responsive OSU that decreases the impact of incidents to OSU operations.

**Vision:** OSU is DAM\* ready (\*Disaster and mission)

OSU HOME PAGE OSU PUBLIC SAFETY RECENT CAMPUS ALERTS CAMPUS EMERGENCY OPERATION PLANS

Emergency.oregonstate.edu

OEM  
Hazards and Preparedness

Hazards and Preparedness > 2 Weeks Ready

## 2 Weeks Ready

### 2 Weeks Ready

2017 Total Solar Eclipse

Business Preparedness

Cascadia Island Mapping

Cascadia Subduction Zone

Community Preparedness

Hazard Mitigation

Hazards in Oregon

If You See Something, Say Something



For many years, we've been talking about the importance of being prepared for 72 hours. This is a good start, and helpful in the event of short-term power outages or temporary evacuation. But a large earthquake and tsunami will leave much of the area's transportation routes destroyed. Oregonians will have to count on each other in the community, in the workplace and at home in order to be safe until responders can reach you.

Oregon's Office of Emergency Management encourages people to be prepared to be on their own for a minimum of two weeks. This lessens the strain on emergency responders who need to focus limited resources on injured and other vulnerable populations immediately following a disaster.

#### What does two weeks look like?

There is no one correct way to put together two weeks' worth of supplies since everyone has individual dietary and medical needs. If your family includes children, seniors or pets, you will have additional needs. Everyone's kit will look different but for a basic starting point, see the list of items on page 7 of the American Red Cross Cascade Region [Prepare! guide](#).

Our [2 Weeks Ready Facebook](#) page suggests activities or items to include in your preparedness kit. You probably have many 2 Weeks Ready items around the house.

<https://www.oregon.gov/OEM/hazardsprep/Pages/2-Weeks-Ready.aspx>



# Map Your Neighborhood (MYN)

**Building and Strengthening  
Disaster Readiness  
Among Neighbors**

from  
Washington State  
Emergency Management



<https://mil.wa.gov/map-your-neighborhood>

# Take away

- Earthquake is coming
  - If not that, then flood, wind, snow, landslide, locusts, blight, etc...
- Individually and as a business, we have to prepare
  - Mentally
  - 14 days minimum preparation
  - Business continuity prioritization of tasks
- Federal assistance isn't always guaranteed
  - Assistance provided on need
  - Higher density population, more likely to get federal resources due to # impacted

# Map Your Neighborhood (MYN)

**Building and Strengthening  
Disaster Readiness  
Among Neighbors**

from  
**Washington State  
Emergency Management**



**~ Remember ~**

**In a disaster,  
your most immediate source of  
help are the neighbors living  
around you**

# MYN - Overview

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- **Designed to improve disaster readiness at the neighborhood level (*urban, rural, condos, apartments*)**
  - *Those you can reach in the first hour after a disaster, the golden hour*
- **Teaches neighbors to rely on each other during the hours or days before fire, medical, police, or utility responders arrive**
- **Takes just one person to begin this process by inviting the neighborhood to his or her home for a 90-minute meeting, facilitated by the program DVD**

# Program Synopsis

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- **Learn the 9 Steps to Take Immediately Following a Disaster**
- **Identify Skills and Equipment Inventory List**
- **Create a Neighborhood Map**
  - **Natural Gas / Propane shut off valves**
  - **Water shut off location**
- **Create a Neighborhood Contact List (identify)**
  - **Latch Key Children**
  - **Elderly**
  - **Disabled**

# Program - Steps

## AT HOME:

**Step 1: Take care of your loved ones**

**Step 2: Protect your head, feet, and hands**

**Step 3: Check the natural gas or propane at your home**

**Step 4: Shut off water at the house main**

**Step 5: Place the Help or OK sign on your front door or window**

**Step 6: Put your fire extinguisher on the sidewalk or where neighbors can see it**

# Program - Steps

## WITH NEIGHBORS:

**Step 7: Go to the Neighborhood Gathering Site**

**Step 8: Form Teams**

- **Radio**
- **Check People - elderly, disability, children**
- **Gas/Propane**
- **Help/OK Card**

**Step 9: Return to Neighborhood Gathering Site – report out**





## Overview of Map Your Neighborhood

PRINTER FRIENDLY HANDOUT: [PDF \(3 mb\)](#)

**Map Your Neighborhood  
(MYN)**

**Building and Strengthening  
Disaster Readiness  
Among Neighbors**

from  
**Washington State  
Emergency Management**

Slide 1

[← Where to Get Map Your Neighborhood Materials](#)   [up](#)   [Preparing Neighborhoods as Disaster Responders >](#)



# How to shut off utilities in an emergency:

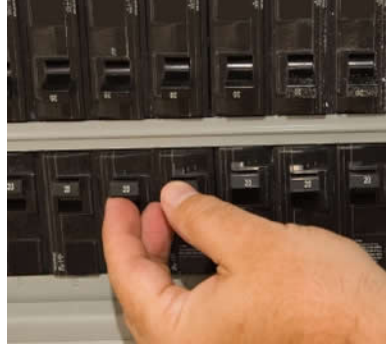
Locate each of these utility control points at home:

- Power (Electricity)
- Gas (natural, propane, or LPG)
- Water

## How to turn the Power Off and On at home:

You can turn off or on the power at the circuit electrical panel.  
To turn off the power:

1. Flip the breaker to “off.”
2. Start with the smaller breakers first.
3. Flip each breaker one by one.
4. Flip the main breaker last.



To turn on the power, repeat steps 1 to 4 by flipping the breaker to “on.”

## What to do if you lose power:

- Check your electrical panel for tripped breakers or blown fuses. Reset the breakers by turning them “off” then “on.” Replace any blown fuses.
- Call your utility company and report the outage.
- Turn on an outside light to help the utility crews know when you have power again.
- When the power has been turned back on, turn off major appliances, computers and television to keep the circuits from overloading. Check on your neighbors or people who may not be able to cope without power.

## When you are without power for some time:

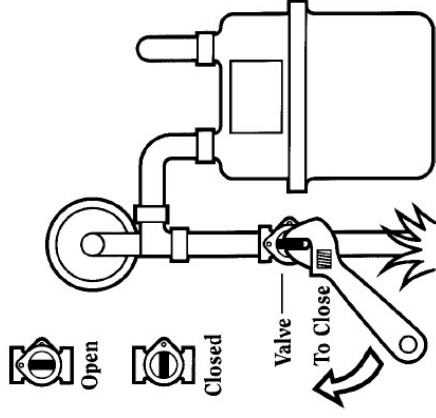
- Use flashlights or light sticks, instead of candles. Candles can start fires.
- Keep refrigerator and freezer doors closed to keep contents cool. A full freezer will stay cold longer. Fill in empty spaces with milk jugs of water. (it is best to do this before a power outage.)
- If your stove does not work, use a camp stove or barbecue outside. **Do not use the camp stove or barbecue indoors.**
- If your heater does not work, use your fireplace or woodstove. **Do not use kerosene or propane heaters inside without proper ventilation.** They create dangerous fumes.
- If you have a generator, be sure to use it correctly. Make sure it ventilates away from your home. Ask a professional for help.

## When you are outdoors:

- Stay clear of downed power lines.

### How to turn the Natural Gas off:

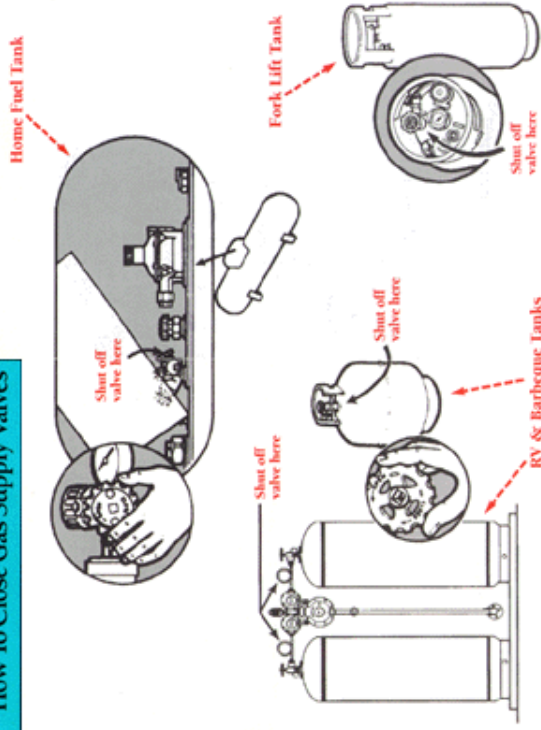
1. Use an adjustable wrench.
2. Tighten the wrench around the shut off valve. The shut off valve is on the stand pipe that goes into the gas meter.
3. Turn the wrench one quarter turn.
4. **Once the gas is off, leave it off.** Call the gas company when you are ready for the gas to be turned back on.



### When to turn the Natural Gas off at the meter:

- Shut off your gas only if you smell gas or hear a hissing noise or have some reason to believe there is a problem or break in the gas line.
- **Once the gas is off, leave it off.** Call the gas company when you are ready for the gas to be turned back on.

### How To Close Gas Supply Valves



### How to turn the Propane Gas or LPG off at the meter:

1. Open the top of the tank.
2. Find either a regular turn knob or a quarter turn valve.
3. For turn knobs, turn the knob to your right to shut off the flow of propane into your house.
4. For quarter turn valves, see instructions for natural gas.
5. **Once the gas is off, leave it off.** Call the gas company when you are ready for the gas to be turned back on.

### How to turn Off or On the main Water supply to your home:

1. Find the main water valve.
2. To turn **off** the water, turn the valve to your right.
3. To turn **on** the water, turn the valve to your left.

