Disaster Preparedness

Cascadia EarthScope Earthquake & Tsunami Education Program
Sue Graves ~ August 2013
Objectives

Local Event
- Survive a Cascadia Earthquake
- Escape a Local Tsunami
- Prepare for Island Life

Distant Event
- Understand Distant Tsunami
- Plan for Before, During & After
Distant Tsunami

- Earthquake Far Away
- You won’t feel the ground shake
- 4+ hours before waves arrive
- Limited Inundation
Know the “Distant” Zone

- Beaches
- Harbors
- Rivers, Inlets
- Other low-lying areas
<table>
<thead>
<tr>
<th>Alert Level</th>
<th>Threat</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Statement</td>
<td>Minor waves at most</td>
<td>No action suggested</td>
</tr>
<tr>
<td>Watch</td>
<td>Danger level not yet known</td>
<td>Stay alert for more info</td>
</tr>
<tr>
<td>Advisory</td>
<td>Strong currents likely</td>
<td>Stay away from the shore</td>
</tr>
<tr>
<td>Warning</td>
<td>Inundating waves possible</td>
<td>Full evacuation suggested</td>
</tr>
</tbody>
</table>
Distant Tsunami Notification

- NOAA Alert Radio
- Sirens
- Mass Notification Systems
- Social Media
- TV/Radio
Evacuation

Before a Distant Tsunami

- WHO: Only those in the distant tsunami zone
- HOW: Probably by car
- WHERE: ???
After a Distant Tsunami

Re-entry

- Cancellation Message
- Re-enter with Caution

Damage
- Harbors
- Beaches
- Low-lying areas
- Roads, Bridges

Clean up
SHOULD ANYONE DIE
FROM A DISTANT TSUNAMI?

NO
Local (Cascadia) Earthquake

- Cascadia Subduction Zone
- Magnitude 8 to 9.0 Earthquake
- 4-6 minutes of intense shaking
2011 Japan Earthquake

- Magnitude 9.0
- Shaking lasted 6 minutes
- 250 mile stretch of coastline dropped 2 feet
Damage to Homes
Damage to Schools
Damage to Businesses
Roads Damaged
Landslides – Roads Blocked

Yaquina Bay Mudslide March 2012
What are the risks & impacts based on our assumptions?

- Infrastructure and lifelines will be seriously damaged.
  - In Oregon, 399 bridges would have totally or partially collapsed under an M 9.0 Cascadia Subduction Zone earthquake, and 621 bridges would have been heavily damaged.
  - Most state routes connecting Interstate I-5 with the Oregon Coast Highway would be closed. The estimated time of closure could be 3 to 12 months.
  - The restoration of the entire transportation network could take 3 to 5 years, and would require a nationwide effort.

Althea Rizzo, Ph. D.
Geologic Hazards Program Coordinator
What are the Implications?
Water Supply Damage
Estimated Water Infrastructure Damage
Is this Realistic?
Hypothermia

- Hypothermia is a significant risk

- Rainy Coastal Environment
What if we only had the EARTHQUAKE
Survive the Earthquake

Prevention
- Modify Your Environment

Protection
- Modify Your Behavior
Secure Heavy Furniture

- Velcro straps
- L brackets
What if you’re in bed when the ground shakes?

- Flashlight/Head-Lamp
- Sturdy Shoes
- Leather Gloves

Tie Supplies to Bed
Secure Water Heater

- Source of Drinking Water
- Prevent Damage
- Gas leaks - fire
Gas Shut-Off
Secure House to Foundation

Earthquake Resistant Bracing System (for mobile homes)
Take Action!

- Secure Furniture
- Nothing Above Bed
- Tie Supplies to Bed
- Secure Water Heater
- Strengthen Foundation
- Gas Shut-Off
Duck, Cover & Hold
LCSD Earthquake/Tsunami Video

http://lincoln.k12.or.us/dept_programs/safety_videos.php
Be a SMALL Target

Body Position
- On knees
- Protecting neck/head
- Hold onto furniture
- Curl into a ball

Face Position
- Turn away from windows
- Close eyes
Notice Anything?
During the Shaking

If Inside, Stay Inside

- Classroom
- Gymnasium
- Band Room

If Outside, Stay Outside

Get away from buildings, trees, light poles, power lines, utilities
In a Car or Bus

- Pull over to a safe location
- Stop & stay there
- Keep seat belt on
- After shaking stops, assess your situation
Wheel Chair Bound

- Roll into area with structural protection
- Apply brakes
- Cover head and eyes to best of ability
- **Be Advised:** rescuers need to drop, cover, and hold on, too!
What About Adults

- Staff should also Drop, Cover & Hold On during drills
- Supplies under staff desk
- Encourage staff to have a family emergency plan
3 Common MISTAKES

1. DO NOT believe the triangle of life!
2. DO NOT get in a doorway!
3. DO NOT run out of the building!
The Triangle of Life MYTHS

1. **Collapse**: Most buildings do not collapse
2. **Moving**: Strong shaking makes moving very difficult and dangerous
3. **Voids**: The direction of shaking and unique structural aspects of the building make this impossible.
4. **Furniture**: People DO survive under furniture or other shelters.
After the Earthquake

Assess
- Glass
- Dust
- Fire
- Darkness

Protect
- Gloves
- Mask
- Flashlight

Evacuate
- Obstacles
- Routes
- Assistance
2011 Japan Tsunami

Heights up to 133 feet
Traveled up to 6 miles inland
Buildings Destroyed
Fires
Fires
Harbors Destroyed
Aircraft & Airports Destroyed
Hazardous Materials
Debris
Roads Destroyed or Blocked
Injuries & Death
Rescues
Islands
Separated by...

- Failed Bridges
- Landslides
- Debris
- Hazardous Materials
Broken Communication
New Tidal Level
Escape the Tsunami

Practice
- Go on Foot
- Assist Others
- Consider Options

Learn
- Tsunami zones
- Evacuation Routes
- Safe Areas
Know the Zones

Tsunami Evacuation Maps
Tsunami Inundation Maps

Know the Zones

Local

Distant
Vertical Evacuation

Watch FEMA

Tsunami Vertical Evacuation Video

http://www.fema.gov/medialibrary/media_records/8086
Don’t Give Up!
Identify High Ground

- Signs
- Evacuation Routes
- Safe Areas
  - Temporary Assembly Areas
  - Vertical Evacuation Options
To Carry or Not To Carry Supplies

- Situation
- Ability
- Time
- Distance
WHEN DO YOU RETURN to the Tsunami Hazard Zone?
Prepare for Island Life

Physical
- Shelter & Warmth
- Water & Food
- Medical & Sanitation

Psychological
- Communication Plan
- Meeting Place
- Emotional Recovery
Family Plan

- Communication Plan
  - Out of State Contact
  - Photo
  - Insurance Info

- Update School Info

- Identify Meeting Places
Emotional Recovery

Imagine Extended Camp Life without infrastructure

Give Everyone a Job!
### Without Utilities

- No Running Water
- No Electricity
- No Communications
- No Sewer System
- No Garbage Pick-up
- No Fuel
- No Groceries in the Store
- No Pharmacy
Living Outside
Protection from the Rain
Make-shift Shelter

This is not a viable solution on the Oregon Coast – WIND!
Shelter & Warmth

High Occupancy Tent

Tube Tent
Water

55-Gallon Barrel of Water

Water Filter Straw
Food
Sanitation
First Aid & Medications
Expect Broken Windows

- Plastic Sheeting
- Duct Tape
Emergency Kits

- Backpack
- Roller Bag
- Car
- Home
- Friends
- School
Strengthen Your Community

- Map Your Neighborhood
- Cache of Supplies
  - Neighborhood Caches
  - School Caches
- Vertical Evacuation Options
- Drills
- Seismic Strengthening
Build Response Capacity

- Community Emergency Response Team
- Red Cross
  - Shelter Ops & Management
  - First Aid
- Amateur Radio Operator
- Post-Earthquake Building Evaluations
- Animals in Disasters
Summary

**Local Event**
- Survive a Cascadia Earthquake
- Escape a Local Tsunami
- Prepare for Island Life

**Distant Event**
- Understand Distant Tsunami
- Plan for Before, During & After
Will Your Behavior Change?

- Mass Notification Systems
- Prevention & Mitigation Actions
- Duck, Cover, Hold
- Practice Evacuation Routes
- Communication Plan
- Gather Supplies
- Build Community Capacity
Thank you!