

HMSC Tsunami Building Quest

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Box Monitor: Oregon Coast Quests

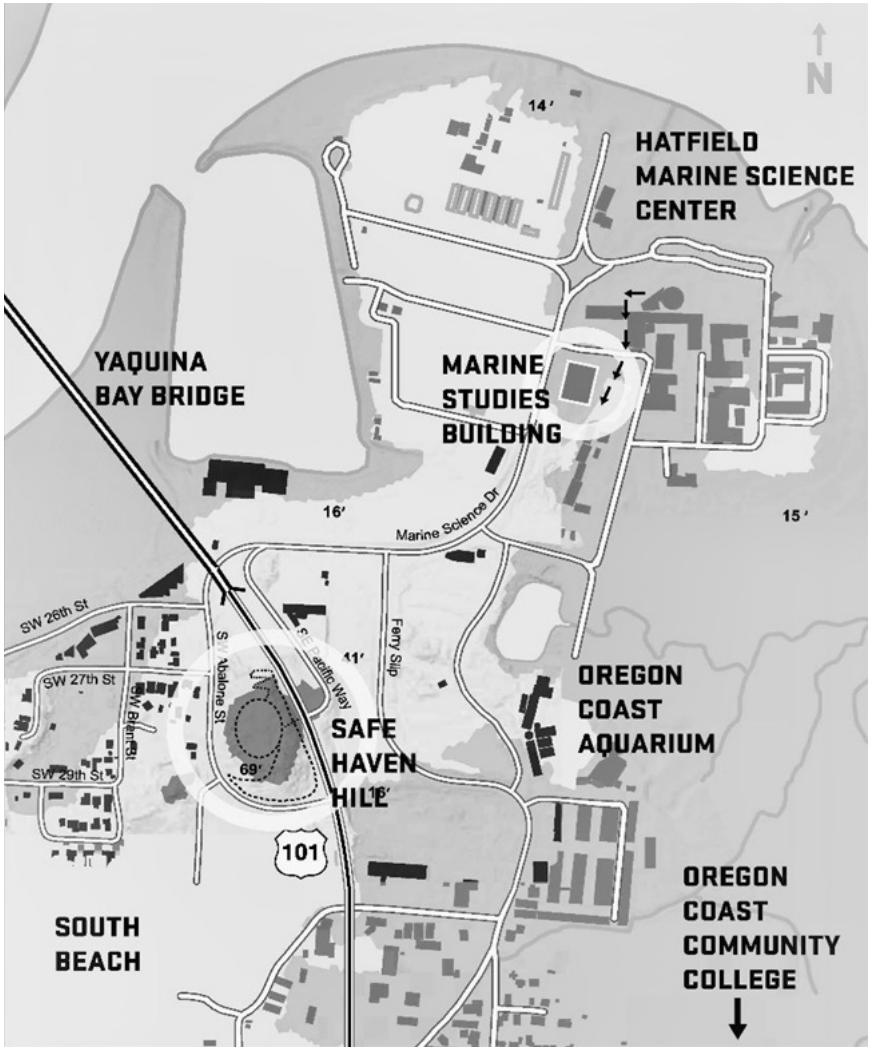
If the Oregon Coast experiences a large earthquake, a tsunami will reach low-lying areas within minutes. Therefore, it is important for coastal visitors and residents to know what to do. This Quest will help you learn how to find the high ground here at the Hatfield Marine Science Center (HMSC).

In a real emergency, you would want to evacuate on foot very quickly to the nearest high ground. However, when you are doing this Quest, you can take time to explore, search for clues, discuss ideas, and read signs about safety.

This Quest is open to the public during daylight hours. The route includes paved and grassy surfaces on the HMSC campus and includes a steep uphill walk. It will take about 30-45 minutes to complete your round-trip adventure.



Use this map to help you solve the Quest. Follow the directions and collect the letter clues to fill the numbered squares on the last page of this Quest. The message you uncover will help you find the hidden Quest Box.



Quest Partners

Hatfield Marine Science Center • Oregon Sea Grant

Let's begin!

Start your Quest at the flagpole in front of the HMSC Visitor Center. Look at the map next to the flagpole and find your position. Where is the Pacific Ocean located on the map? Look around and point to the ocean.

To check your bearings, go to the orange and black Hatfield Marine Science Center sign between two large anchors and follow these directions:

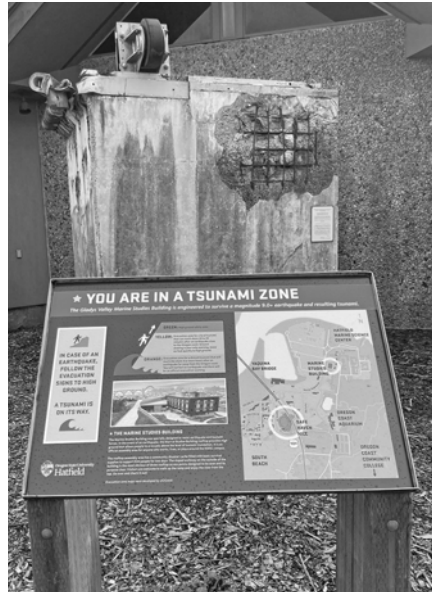
**Turn your back to the sign
And look across the Bay.
You are now facing North.
This will help us find our way.**

**Look West past the flagpole.
The bridge you will see.
Beyond it lies the ocean
Which is cold and salty.**

**Now you know two directions.
Can you find the rest?
Point yourself to the southeast
To continue your Quest.**

Walk southeast to the concrete structure near the Visitor Center building. Stop at the sign that reads **YOU ARE IN A TSUNAMI ZONE**. Find your position on this map.

The Cascadia Subduction Zone is a fault that lies just off the



Oregon coast, about 50 miles west from where you are standing.

The oceanic Juan de Fuca plate is slowly sliding underneath the North American continental plate, a movement that has produced dozens of earthquakes along this fault over the past 10,000 years. These earthquakes generate tsunami waves that travel to shore and cause dangerous flooding in low-lying areas. The most recent megathrust Cascadia earthquake and tsunami happened on January 26, 1700. Scientists predict that there is a 10-15% chance that Oregon will experience another very large Cascadia earthquake and tsunami in the next 50 years.

Here's what we can expect from a large Cascadia earthquake:

1. We will feel the ground shake here on land, likely for several minutes.
2. The earthquake will generate a tsunami that will come ashore 10-20 minutes after the ground shake starts.

**How will you know
A tsunami is on the way?
The shaking is your warning.
Evacuate without delay.**

**Check the colors on the map
Orange, yellow and green.
See the key on the sign
To find out what they mean.**

**What color on the map
Shows a safer, high place?
Put the first letter of this color
In the clue #1 space.**

Did You Know?

After a local earthquake, both the orange AND yellow areas on the map could be inundated (flooded) by tsunami waves.

Read the map carefully to learn about the difference between distant and local tsunamis. Which type of tsunami would be generated from a Cascadia earthquake? Take

the first letter of your answer and write it in square #2.

**What color is the map
Where you are standing right now?
Let's go to high ground!
But do we know how?**

**Keep an eye out
For signs white and blue.
They're round and have arrows
And can really help you.**



Go to the entrance of the Visitor Center. Stand with your back to the front doors and look straight ahead. Do you see a helpful round sign? Write the first letter of the second word on the sign in clue square #3.

Follow the arrow and walk down a path that takes you toward an even

larger blue and white sign. As you turn the corner, see a tall building ahead of you. This is the Gladys Valley Marine Studies Building.

The marine studies building

Is three stories high.

Near its top corners,

What do you spy?

Blue signs stick out

To let us all know

That the roof of this building

Is where we can go.

This building is special.

Its very design

Was built with tsunami

Evacuation in mind.

The Gladys Valley Marine Studies Building was built to be a Vertical Evacuation Structure (V.E.S.) so that in the event of an earthquake, people in this area could go quickly up to the roof to escape a tsunami. To make this building, the engineers first had to make sure the building would be able to withstand a magnitude 9+

earthquake. Then they had to make sure the building would withstand tsunami waves and debris crashing into the building. This building is unique! It is the ONLY tsunami V.E.S. in the state of Oregon.

How many stick people

Are on each graphic up there?

Put the number's first letter

In the #4 square.

Follow the sidewalk around toward the east entrance of the building.

Stop when you get to a sign that reads BUILDING TOWARDS THE FUTURE. Look at the picture and point to where you are standing right now.

Read about all the features

That make this building strong,

Withstanding both an earthquake

And what's next to come along.

What three points lead

To the roof up high?

Stairs, elevator, and _____

Can all be found nearby.



Did You Know?

This sign is unique to a V.E.S. It shows people escaping a tsunami wave by running toward a building. The image of the person in the wheelchair indicates that this evacuation option accommodates all mobility levels.

**Write the first letter
Of the missing word above
In square #5.
It fits like a glove.**

If you are Questing during weekday business hours (M-F 7am-5pm), take a moment to enter the building lobby through the nearest glass door so you can see the elevator and the staircase which lead to the roof. This lobby door remains unlocked 24/7 for emergency evacuation purposes. If there is no emergency, please do not enter the building after hours.

The staircases and elevator shaft have been engineered to withstand a major earthquake, and these structures can be used to help evacuate people to the roof. The elevator may be the best option for



people with limited mobility who could find it difficult to use stairs or walk up the ramp outside.

**Now let's find the ramp
We've heard so much about.
Clockwise around the building,
You'll see it, no doubt.**



**As you walk up the hill,
Look down near your feet.
Stop at the MEDIUM
Metal line that you meet.**

**Like t-shirts, seismic events
Are measured by size.
Models help predict
How high the water will rise.**

A Cascadia earthquake with a magnitude of about 8.9 is considered “MEDIUM”, and the resulting tsunami is expected to flood the coast with water reaching the level that is indicated by the metal mark on the ground. Stand on this metal marker and look around. What structures would be affected by a tsunami driven by a MEDIUM seismic event?

**Keep walking up the ramp.
There’s another line to see.
The LARGE water line
Is much higher, you’ll agree.**

**But wait, there are still
Two more lines for your eyes.
The bigger the earthquake,
The higher the water will rise.**

**See the highest two lines?
The first letter, they share.
Place the letter in common
Into the 6th square.**

The predicted wave heights marked on the ramp are based on five

scenarios that modeled a variety of factors that influence seismic events. The resulting wave heights were then grouped and named like the sizes of a t-shirt: S, M, L, XL and XXL. Research shows that small and medium earthquakes occur more frequently than larger quakes. While it might not be the most likely event, this building was built to withstand the worst-case scenario that was modeled: XXL.



**Though the top water mark
Is as tall as a hill,
The height of the roof
Is higher still.**

**At the top of the ramp
On the roof you will see
That this is the place
To escape a tsunami.**

**A sign with three people
And a wave below
Confirms that this place
Is where we should go.**

**The letter that begins
Word one and word two
Is the letter you need
For your Quest’s 7th clue.**

After reaching the safety of the roof, evacuees should stay on this high ground. They may be on the rooftop for two days as secondary waves and aftershocks pass. Multiple tsunami waves are expected to come ashore for many hours after the initial event, and the waves that follow can be bigger than the first.

**Notice the railings
With rocks just past.
This is the ‘crumple zone’.
These parts won’t last.**

**This “bumper” will compress
When debris hits.
But the rest of the roof
Will stay right where it sits.**

**Only one kind of personnel
Is allowed on the rocks.
The first letter of the answer
Goes in clue 8’s box.**

**Stay behind the rails
On solid high ground.
Now that you’re up here,
Take a look around.**

This building is 47 feet tall, which is well above the worst-case tsunami inundation line. The top of the V.E.S. is open to the public during daylight hours and provides a great view of Yaquina Bay.

From here you can see other areas of high ground. Across the river, you can see that people at the Bayfront could evacuate north up the hill to get out of the tsunami zone. Here on the south side of the bay, find the tree-covered “Safe Haven Hill” evacuation site located at the south end of the bridge. Further south the tree-covered hills show more high ground near Oregon Coast Community College. In the event of an earthquake, people who work, live, and play in South Beach can choose the evacuation site that is closest so they can get to high ground quickly.

**Remain on high ground.
This strategy is wise.
Fortunately,
There’s a cache with supplies.**

**The ‘hallway’ you find
Points the way to the stash.
Read the sign called “Community
Disaster Cache.”**

**Water, radios,
Food, tents, and first aid.
Our survival is why
This cache has been made.**

**What is stored inside
Big drums that are blue?
The third letter of the answer
Is your #9 clue.**

Be prepared! After a major disaster, it could take days or weeks for first responders to reach everyone impacted. In addition to a community cache like this one, all Oregonians are encouraged to prepare for disasters on a personal level. Do you have survival supplies at your home and in your car? Guidance and supply lists are available from the Oregon Department of Emergency Management: <https://beav.es/Si2>.



**Search the south side of the V.E.S.
Near the metal stair.
Use your clue to find the box
We've hidden for you there!**

**Now it's time to leave.
Walk back down the ramp.
Use the letters you collected
To help you find your stamp.**

**When you find the Quest Box
Stamp your page, sign your name.
Then return it to its hiding spot
So others can play this game.**



Fill in the boxes with the answers to the clues to solve the Quest.

3	6	9	5	8	3	6	4	5	7

2	8	5	1	3

When you've found the Quest Box, sign your name and stamp the back of your book to mark your accomplishment. Don't forget to seal the box tightly and return it to its hiding place for the next person to find!

For more information about tsunami safety on the coast visit www.oregontsunami.org.

If you enjoyed this Quest, check out *The Oregon Coast Quest Book 2023-24 Edition*, which contains maps and directions for this Quest and 29 other clue-directed hunts across seven counties.

For more information and to find a bookseller, visit seagrant.oregonstate.edu/quests.