

# Seismometer gives early warning of ground motion

Who do you call when you need to upgrade a seismometer? That's easy: the Pacific Northwest Seismic Network, a partner of the U.S. Geological Survey, the University of Washington and the University of Oregon among others.

SEEN FROM SEASIDE

R.J. MARX



The Seaside seismometer is one of many along the coast of Oregon and Washington to provide the ShakeAlert early warning system. Hidden in an equipment room in the back of the Seaside Museum and Historical Society, the seismometer may have a crucial role in history of its own in the not-so-distant future.

"A seismometer is an instrument that detects ground motion in the form of acceleration of the ground itself," the University of Oregon's field technician and ShakeAlert Project Manager Leland O'Driscoll said.

Is it a predictor? "Not at all," O'Driscoll said. "Prediction is not currently feasible by science, so it is strictly an observational tool."

Can seismologists draw deductions from the measurements?

"Yes, that's the point," he said. "When we see energy arise that looks like an earthquake, first we confirm that it is. Then we look at nearby sensors to have cross-verification. Once we have that, we measure the size and location of the earthquake's epicenter."

## Early warning

The ShakeAlert program began in 2006 and first sent alerts to test users in 2012.

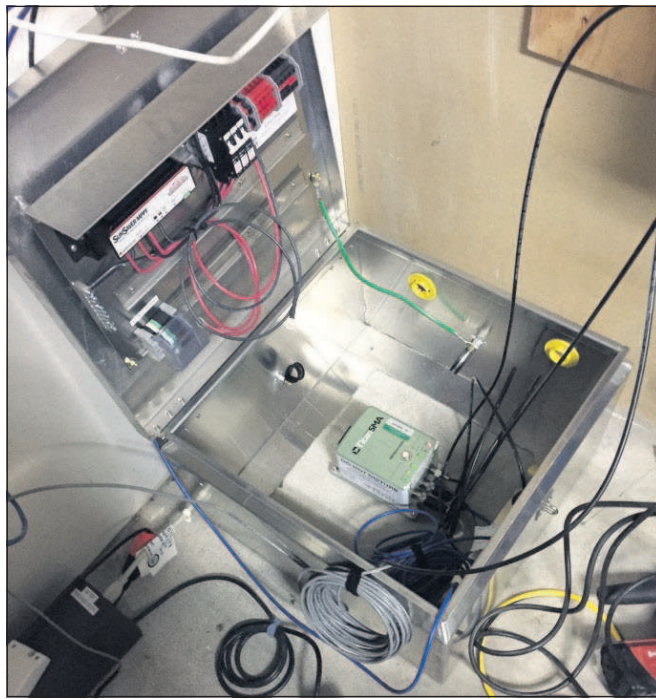
When ShakeAlert detects a quake, a map pops up on a user's screen to show the location of the epicenter and of waves moving toward the user. Also shown is the time remaining until waves reach the user's location and an estimate of the intensity of shaking.

"We can provide an advance warning that earthquake will be arriving at a remote location during an event," O'Driscoll said. "What this will facilitate is a warning to a user that they can have tens of seconds or minutes before ground motion actually starts."

If it happened here, we wouldn't have much time. But if it happened in the northern California region, O'Driscoll said, we'd have roughly 1 1/2 to 2 minutes to react.

This early warning — although hardly enough time to make a run for it — could be life-saving if broadcast to hospitals, building operations teams and other critical personnel.

"The concept of 10 seconds of advance ground motion is daunting when thinking what can I do," O'Driscoll said. "But when you think of multiple minutes, you have more options. Hospitals can say 'stop



LEFT, Members of the Pacific Northwest Seismic Network seek to provide an early warning system through the data streaming through this seismometer located in the Seaside Museum. ABOVE, Leland O'Driscoll of the Pacific Northwest Seismic Network.

R.J. MARX/SEASIDE SIGNAL

surgery.' An elevator can open its doors before ground motion."

## Upgrade

O'Driscoll and his team arrived in Seaside earlier this month equipped with tools, wires and equipment to upgrade the original seismometer at the museum, installed in 2004. All were affiliated with the Pacific Northwest Seismic Network, with headquarters at the University of Washington and operations support at the University of Oregon in Eugene.

In a rear room behind the museum library, geophysicist Lynn Simmons, research engineer Marc Biundo and field technician Brendan Pratt upgraded the strong motion accelerometer, a sensor that measures acceleration like a speedometer measures speed, including motion so subtle only precise, specialized can record it. This information is fed by the seismometer to a live data feed.

Outside, standing on a ladder near the back of the museum building, field technician Sara Meyer worked with outreach coordinator Lindsey Walsh to upgrade the unit's global positioning satellite.

Data is filtered by sensors that compare results of other seismometers to determine if shaking is due to an earthquake or some other factor, like a jackhammer or truck.

If sensors respond all along the coast, "We know we have an earthquake," O'Driscoll said.

## Network growth

The network started at University of Washington in the 1970s. After the Mount St. Helens eruption in 1980, the network "dramatically expanded," O'Driscoll said. Now there's a seismometer every 20 miles from southern Oregon to the northern Washington border. In Cannon Beach, a seismometer is stored in an IT room at the firehouse.

Locations are "very tricky," Biundo said. "Where's the power? Where's the sig-

nal? How do you get the electrical energy to power it?"

In case of a power outage, a four-day battery accompanies the installation.

For decades now the network has tracked seismicity, including tectonic earthquakes generated by faults and Cascadia Subduction Zone quakes where the fault zone is offshore.

Seismometers charted the 1993 Salem "Spring Break Quake" and the 6.8 magnitude Nisqually Quake of 2001 in the southern Puget Sound region.

The Seaside site was chosen by the University of Washington. The original communications director knew Seaside's city planner at the time, O'Driscoll said. "It was chosen because there's internet access on site, there's a quiet room on the side of the building, and there's a need to have a sensor in Seaside."

Costs to complete the earthquake early warning system are estimated at \$36 million, O'Driscoll said, and an additional \$16 million for ongoing operations.

If sensors are to be installed on the ocean bottom or offshore, "we're looking at the order of \$200 million to \$300 million," he said.

"I'd like the public to know we're building out a system that will build out the resiliency to lead to earthquake preparedness in the state," O'Driscoll said. "As soon as we learn what to do with this advance warning for a quake, we can take effective actions to reduce the loss of life and reduce the loss of property and damage."

While we live in a hazardous region, the programs offer steps to living in a safer and more resilient region.

Meanwhile, the team is looking to expand the network.

"We go as fast as we can," O'Driscoll said. "There's a series of stages. Finding good viable locations, permits, going through the avenues, all the prep — we can put in a dozen new sensors a year. We have a goal of 15 to 20 sensors this year to reach our final goal of density."

# Mourning the loss of good friend Evelyn Redkey

SCENE & HEARD  
CLAIRE LOVELL



Editor's note: Claire Lovell died March 15. This column is reprinted from the May 8, 2003, Seaside Signal.

Happy May Day! I should have hung a woven basket on your front door knob with a few posies in it.

You knew I wouldn't like those trees planted in the middle of the sidewalk, didn't you? How many other items do we need to run into while we're trying to take a walk — besides people, that is?

We went to visit John at the hospital on Tuesday and Lynda directed us to the best restaurant close to Portland — something about sweet tomatoes. It was mostly salad with dozens of elements to toss together and many kinds of dressing. There was also a pasta corner with soups, chili and chowder. And finally desserts, which I skipped. It was great. There was just one drawback. They were quick to pick up your dishes and utensils while you still needed them. It was a pleasant atmosphere too and the employees were attentive and courteous. I can surely recommend it.

Some handy workmen at the Episcopal vicarage cleaned out the old fence and ivy at the back entrance, opened up the whole space and made it look so much better. With two more pickets for the remaining fence, it will be practically perfect.

A house on the prom has a fence which I thought was a new enamel paint job. On closer examination, it turned out to be plastic! It looks good now, but how long will it last?

I guess it was the Elks' Convention underway when those people were in and out at the convention center. There was no information on the crappy sign but its rarely readable anyway and the chamber reader board had a line or two.

I hope they have good weather. During my walk I noted that blackberry runners are beginning to take over on the planted section at the south west end of the First Avenue Pearl Harbor Bridge.

Hey, we can't have that! In two separate places, I found robins' eggshells, although I don't have many birds around my home, some of them are nesting. Compared to hummingbirds, robins lay a pretty good sized egg.

On the Real Arbor Day, April 25, several members of the Sou'Wester Garden Club gathered near the tennis court in Gearhart to plant their copper beech tree on the east side. These are long-lived deciduous trees and Doris Snodgrass donated this particular specimen which she won at a previous garden raffle. It was getting too big for its pot. Shirley See, president of the club, explained a little about the origin of Arbor Day. It was a day for the public planting of trees in Nebraska and through J. Sterling Morton, president of the State Board of Agriculture, the idea was established in 1885 as a legal holiday in Nebraska. The idea spread rapidly throughout the U.S. and almost every state and territory now celebrates the idea of such a day or legal or school holiday.

In Gearhart, a plaque at the site commemorated the event and will be placed in cement.

My dear friend Evelyn Redkey died Sunday morning, April 27, after a protracted illness with many setbacks. Ravaged by symptoms which did not seem to respond to treatment, here last weeks for everyone were difficult to watch and for her to endure. The many prayers sent up for her were pulling against the obvious fact that it was time for her to go. She'd had several surgeries — none minor — and approached each one with courage and determination.

Evelyn and I were going the same direction from 6th grade when her family arrived in Seaside from Canada. We did our homework together and her dad Duncan Stewart became a surrogate father for me, although her mother Mary was also very dear and had a profound influence on my life. June Petersen, Evelyn and I were all born the same year, had the first name Evelyn and played a little game as to who was oldest and Evelyn had that privilege. We wish we could have celebrated another birthday again in June but will remember her when it comes.

I'll miss my regular "tea times" with Evelyn although no one should be sad that her misery is over or that her daughters can return to their own lives with their children and grandchildren. They've been so faithful. Evelyn was a wonderful lady and brought much joy to the world. Our sincere sympathies to all loved ones and friends who mourn her loss. She'll be missed for a long time.

Claire Lovell passed away March 15, 2017. She was a native of Seaside and was a columnist with the Seaside Signal for 27 years.

# What books have changed your life?

If you grew up as a reader, chances are that different books appealed to you at different times of your life. In thinking back through my life time of reading, there were some pivotal books that either changed my thinking, opened up new worlds, or just in general made me happier because I read them. What are some pivotal books you may think of in your life?

The Bible is the first book that comes to my mind since I was read to from it ever since I was very little. I got my first library card when I was eight years old at the Astoria Public Library and growing up I read through pretty much the entire children's room section of the Astoria Library. Some of my favorite books when I was really little were the Mercer Mayer wordless books. There is one called "hiccup" involving hiccups and a hippo that is particularly funny, the illustration sell this story, with only one word repeated in the whole book and you can probably guess from the title what that is. I also loved a book called "Chameleon was a Spy" by Diane Redfield Massie. Obviously chameleons with their ability to blend in make for naturally talented spies and when it comes to the world's best pickle recipe, this Chameleon is on the job. Miss Rumphius by Barbara Cooney was my favorite simply for its illustrations. I wanted to live inside the covers of this book! When I got a little older, Little House in the Big Woods by Laura Ingalls Wilder was one

BETWEEN THE COVERS  
ESTHER MOBERG



of my favorite books. My favorite in the entire series was that of Farmer Boy. The descriptions of farm life seemed idyllic and perfect and I was happy to read them, very far removed from real life dirt and dust and smelly pigs! I also enjoyed the Miss Pickerelell series which I think is out of print now. Miss Pickerelell was a wacky lady who somehow seemed to have a knack for solving the weirdest and wildest situations. By this time I had also stumbled on to all the books written by L. Frank Baum who wrote the Wizard of Oz, and Howard Pyle, each full of magic in their own way. Howard Pyle books are no longer popular but I would describe them as original heroic or fairy tale stories. Knights and fairies galloped through these stories. My sister and I definitely went through a period growing up where we devoured fairy tales. We would each take home one of the Andrew Lang fairy books, each named for a different color, read it, then trade. I can remember laying upside down in an easy chair reading through dozens of fairy tales.

As I grew older, mysteries became my favorite reading. The Three Investigators,

Hardy Boys, Nancy Drew, Dana Girls, and many other mysteries series I devoured. I moved into the teen section of the library and discovered Cynthia Voigt's "Jackaroo" and Rosemary Sutcliff's "The Mark of the Horse Lord." For some reason at that point nobody was writing mysteries for teenagers so I started reading all of Agatha Christie's mysteries, Ellery Queen, and Sir Arthur Conan Doyle.

Some of the books that changed me for life included "Anne of Green Gables" by L.M. Montgomery, "The Count of Monte Cristo" by Alexandre Dumas, "Les Miserables" by Victor Hugo, and "The Princess Bride" by William Goldman. If I were stranded on a desert island, I would probably wish I had at least these books with me! Anne of Green Gables taught me it was okay to have imagination although sometimes too much imagination can lead to disaster. The Count of Monte Cristo showed me that revenge can eat away your soul and sometimes forgiveness is best. Les Miserables showed me that man can triumph over his life, no matter the hardships, and the Princess Bride just made me fall in love with fairy tales and storytelling all over again. My list of books I love could go on forever but these books impacted me perhaps in some of the best and deepest ways and these are books that I enjoy reading over again and they still speak to me or lose me in their stories.

SEASIDE  
**Signal**

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## Seaside Signal

The Seaside Signal is published every other week by EO Media Group, 1555 N. Roosevelt, Seaside, OR 97138. 503-738-5561 seasidesignal.com Copyright 2017 © Seaside Signal. Nothing can be reprinted or copied without consent of the owners.

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Annually: \$40.50 in county • \$58.00 in and out of county • e-Edition: only \$30.00

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