STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
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Modeled Pedestrian Evacuation Times at 4 Feet per Second During an L1 Local Tsunami Event, Seaside, Clatsop County, Oregon: Hypothetical Vertical Evacuation Structure at TrendwestResort All Bridges Intact

2015

OPEN-FILE REPORT O-15-02
Local Tsunami Evacuation Analysis of Seaside and Gearhart, Clatsop County, Oregon

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PLATE 6

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Key

Time required after initial earthquake to reach ground outside the hazard area if walking at a rate of 4 feet/second (22 minutes/mile)

- 0-10 minutes
- 10-15 minutes
- 15-20 minutes
- 20-25 minutes
- 25-30 minutes
- 30-35 minutes
- 35-40 minutes
- 40-45 minutes
- 45+ minutes

- Location of hypothetical vertical evacuation structure
- Evacuation Flow Zone
- Evacuation route
- Bridge
- Building
- 17 Tsunami wave arrival time at key points (minutes)
- Safety (L1 inundation limit)
- A Assembly Area

Note: For legibility of the evacuation modeling data, roads on this map are emphasized by extending the width 12 feet from the road edge; thus road ends appear to have a 12 ft extension that does not actually exist.

How to Use This Map

1. Find your location on the map and note the color of the closest street.
2. Look at the map legend to see how long it will take to reach an area outside the hazard area from your location if you follow the path indicated by the arrows and travel at 4 ft/second (22 minutes/mile). Remember that EVACUATION FLOW ZONE boundaries are where it is equally efficient to follow two different routes to safety.
3. Check times at key tsunami wave arrival points, such as at bridges. You must be beyond this point at the time indicated to beat

Explanation

This map shows how long it should take to walk to a hypothetical vertical evacuation structure near the Trend West Resort or to ground outside the hazard area for a large (L1) tsunami caused by a magnitude 9.0 Cascadia subduction zone earthquake. Black arrows on the map show the fastest routes. The color at any location gives the walking time along the route. The routes follow paths or roads everywhere except the on beach. The time is based on a walking speed of 4 feet per second (22 minutes per mile) and takes into account variations in speed from slope and type of surface (e.g., pavement versus sand).

The map also shows the estimated time of tsunami arrival where major evacuation routes reach ground outside the hazard area and at key points such as bridges. Tsunami arrival time is counted from the start of the local earthquake. When estimating your own evacuation time remember that the earthquake may shake violently for 3-5 minutes, during which time you should "drop, cover, and hold on." In addition to this delay you should consider other factors such as your physical limitations, the possibility of evacuation at night or in bad weather, and earthquake damage to evacuation routes. Streets may be cracked or covered in wet sand from liquefaction, overhead electrical lines may be down, window glass and bricks may have fallen into the streets, and bridges may be damaged. When practicing your evacuation route, find out which bridges have and have not been designed to withstand a large earthquake.

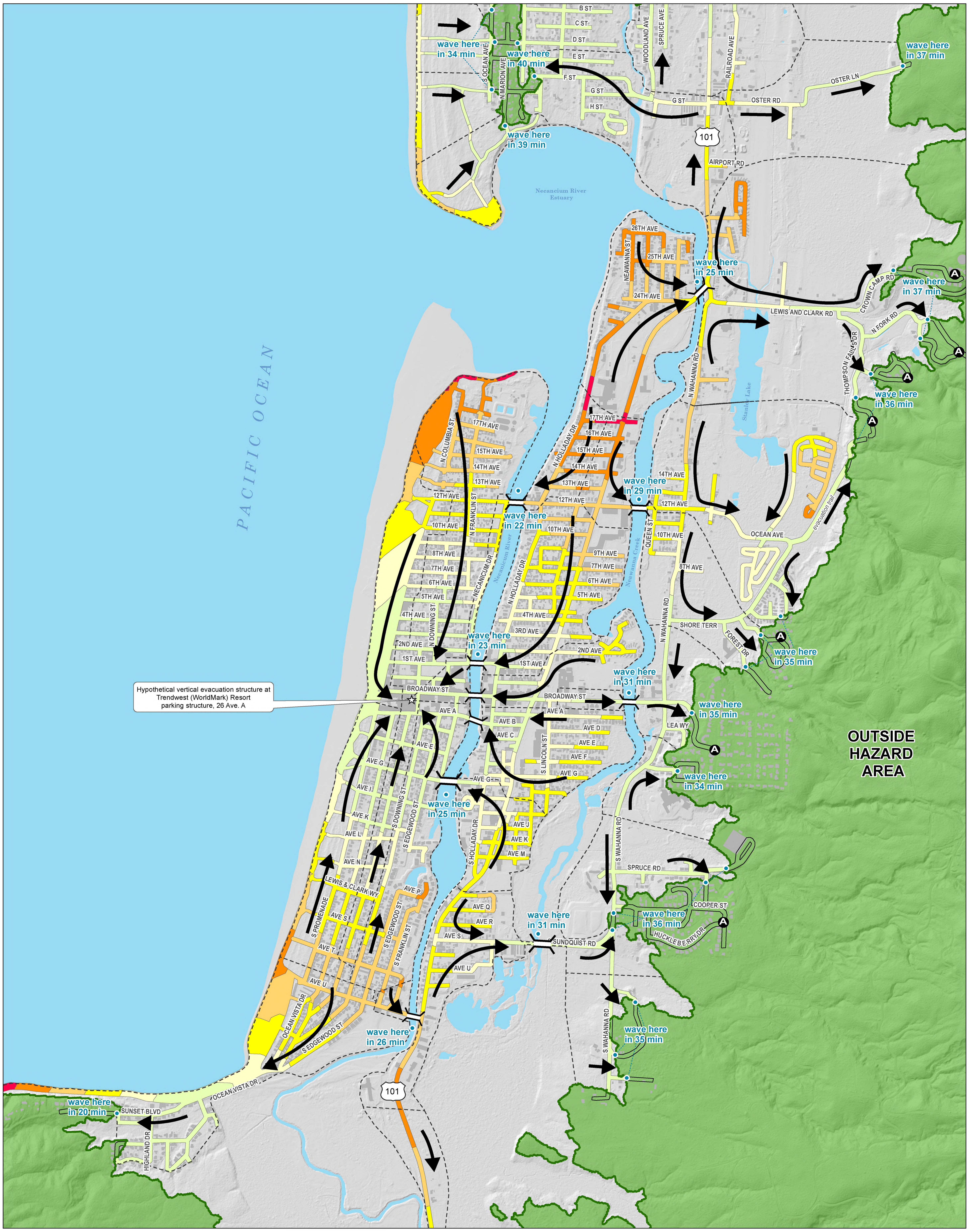
Note that this evacuation modeling approach restricts evacuation to streets and trails; thus, in some cases small areas above the tsunami inundation but with no street or trail connection are ignored. If you know there is ready access to such areas, then consider these off-street routes when planning your evacuation.

See the text from this open-file report for technical information on mapping methods. See DOGAMI Special Paper 43 or DOGAMI Open-File Report O-13-19 for explanations of the tsunami scenario used for these maps.

References

Priest, G. R., Witter, R. C., Zhang, Y. J., Wang, K., Goldfinger, C., Stimely, L. L., English, J. T., Pickner, S. G., Hughes, K. L. B., Wille, T. E., and Smith, R. L., 2013, Tsunami inundation scenarios for Oregon: Oregon Department of Geology and Mineral Industries, Open-File Report O-13-19, 18 p., GIS data.

Witter, R. C., Zhang, Y., Wang, K., Priest, G. R., Goldfinger, C., Stimely, L. L., English, J. T., and Ferro, P. A., 2011, Simulating tsunami inundation at Bandon, Coos County, Oregon, using hypothetical Cascadia and Alaska earthquake scenarios: Oregon Department of Geology and Mineral Industries, Special Paper 43, 57 p., 3 pls., GIS data.



Location Map

Source Data:
This map is based on hydrodynamic tsunami modeling by Joseph Zhang, Oregon Health and Science University, Portland, Oregon. Model data input were created by John T. English and George R. Priest, DOGAMI. Tsunami arrival time scenarios and evacuation difficulty analyses were conducted by George R. Priest, Rudie J. Watzig, and Ian P. Madin, DOGAMI.

Transportation data (2011) provided by Clatsop County were edited by DOGAMI to improve the spatial accuracy of the features or to add newly constructed roads not present in the original data layer. Bridge locations (2011) are from Oregon Department of Transportation. Assembly area locations were taken from the Seaside and Gearhart tsunami evacuation brochure (2013) by DOGAMI. Building footprints were created by DOGAMI.

Lidar data are from DOGAMI Lidar Data Quadrangles LDQ-2011-45123-H8-Tillamook Head and LDQ-2011-46123-A8-Gearhart.

Coordinate System: Oregon Statewide Lambert Conformal Conic, Unit: International Feet, Horizontal Datum: NAD 1983 HARN, Vertical Datum: NAVD 1988.

Software: Esri ArcGIS® 10.1

SCALE: 1:8,500

0 0.125 0.25 0.5 0.75 1 Miles

0 625 1,250 2,500 3,750 5,000 Feet

0 0.125 0.25 0.5 0.75 1 Kilometers

TRUE NORTH
MAGNETIC NORTH
15 1/2°
APPROX. MEAN DECLINATION, 2014