STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
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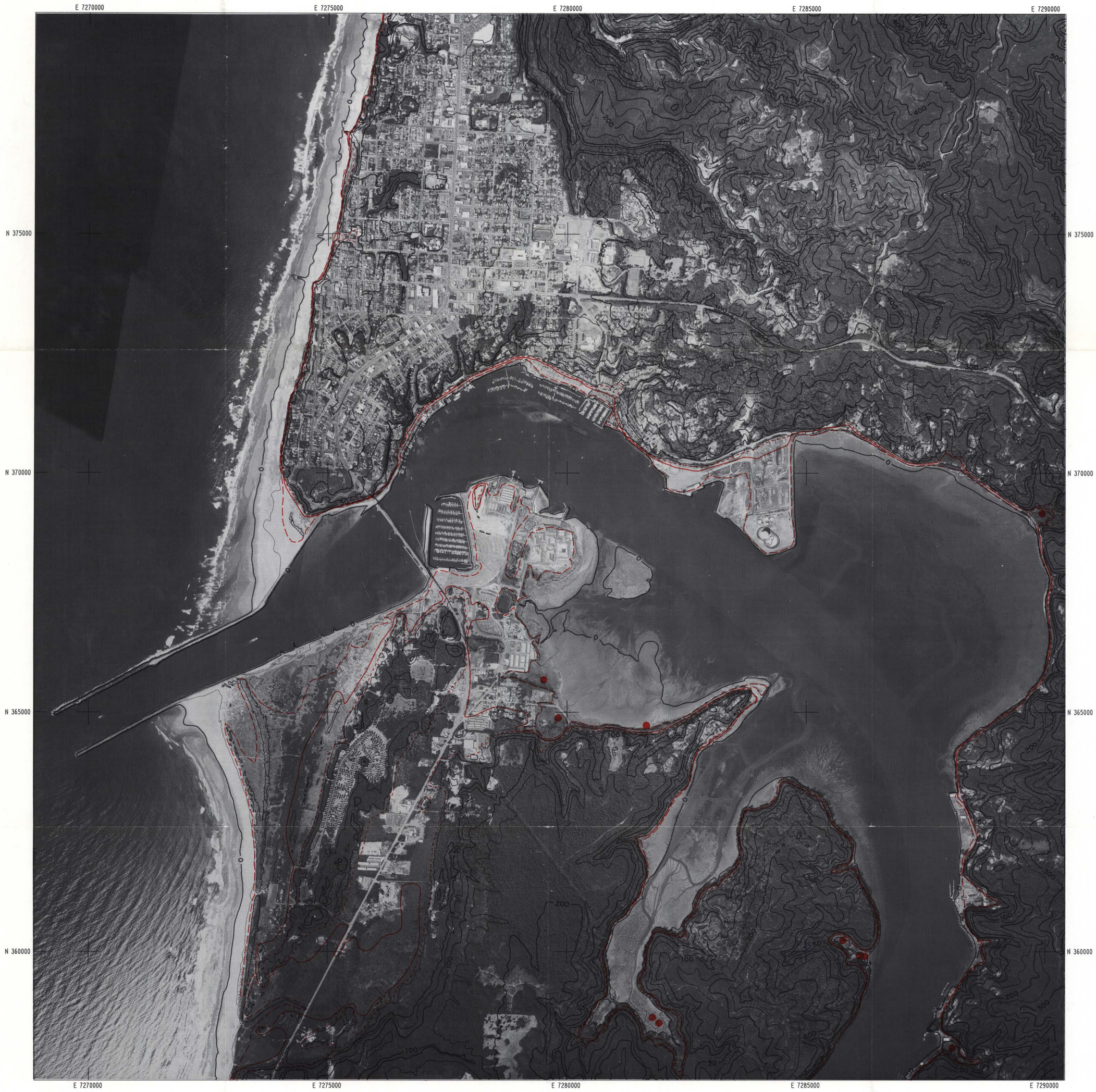
Tsunami Hazard Map of the Yaquina Bay Area, Lincoln County, Oregon

1997

IMS-2

Tsunami Hazard Map of the Yaquina Bay Area,
Lincoln County, Oregon

By G. R. Priest and others



1993 orthophotograph by Spencer B. Gross, Inc. in cooperation with Bergman Photographic Services, both of Portland, Oregon

Projection and 5,000-foot grid ticks: Oregon coordinate system, north zone (Lambert conformal conic).

Horizontal datum: 1983 North American Datum.

Vertical datum: National Geodetic Vertical Datum of 1929.

PROJECT LOCATION

N

SCALE 1:12,000

.5 0 1 2
KILOMETERS

1000 0 7000
FEET

.5 0 1
MILES

Contour interval: Solid lines are at 25 foot intervals; dotted line is at the 10 foot elevation

Map prepared by: George R. Priest, Oregon Department of Geology and Mineral Industries, from numerical simulations of Edward Myers and Antonio Baptista, Oregon Graduate Institute of Science & Technology, Robert A. Kamphaus, Center for the Tsunami Inundation Mapping Effort, National Oceanographic and Atmospheric Administration, and from core data of Curt D. Peterson and Mark E. Darienzo of Portland State University. All of these individuals are co-authors on this map and should be listed in order indicated.

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MAP SYMBOLS

- High run-up from a Cascadia subduction zone tsunami[1]
- Moderately high run-up from a Cascadia subduction zone tsunami[2]
- Moderately low run-up from a Cascadia subduction zone tsunami[3]
- Core site with buried soils capped with one or more tsunami sand layers

[1]Approximates the tsunami run-up from a magnitude 9.1 subduction zone earthquake with doubling of the fault slip immediately offshore owing to an asperity (rough spot) on the fault plane. The model asperity is a Gaussian (bell-shaped) uplift superimposed on the model Cascadia subduction zone fault of Fleuck and others (in press). The uplift is approximately 6 m high and centered on the continental slope.
[2]Approximates the tsunami run-up from a magnitude 9.1 earthquake utilizing the general fault model of Fleuck and others (in press). a 1,050-km-long rupture, and about 15-20 m of slip.
[3]Approximates the tsunami run-up from a magnitude 8.6 earthquake utilizing the general fault inclination of Fleuck and others (in press,), a 450-km-long rupture, about 7 m of slip, and a 43-50-km-wide locked zone at the continental slope-shelf break.

When planning evacuation routes and destinations go to the least hazardous site on the map by the shortest route; make sure that the route is not compromised by other earthquake hazards such as liquefaction or earthquake-induced landslides. Bridges may fail in the event of an earthquake. Consult with government transportation authorities about the seismic stability of bridges used for evacuation.

Additional Detailed Information: See Oregon Department of Geology and Mineral Industries Open-File Report O-97-34 (Priest and others, 1997) for a detailed explanation of the fault dislocation models used to produce the tsunami simulations.

References:

Priest, G.R., Myers, E., Baptista, A., Kamphaus R.A., Peterson, C.D., 1997, Final technical report to the National Earthquake Hazard Reduction Program, Cascadia subduction zone tsunamis: hazard mapping at Yaquina Bay, Oregon: Oregon Department of Geology and Mineral Industries, Open-File Report O-97-34.

Flueck, P., Hyndman, R.D., and Wang, K., in press, 3-D dislocation model for great earthquakes of the Cascadia subduction zone, Journal of Geophysical Research.

How to Use the Map: Mapped boundaries may be viewed as guides for evacuation planning in the event of an earthquake and tsunami. *If an earthquake occurs with 20 seconds or more of shaking that is strong enough to make standing difficult, plan on going immediately to the lowest risk site available. A tsunami could arrive within a few minutes of the earthquake.* Figure 1 shows the likely timing of waves arriving at the open coast and the central part of Yaquina Bay at the marina. Figure 2 illustrates probable current velocities in Yaquina Bay for the moderately high run-up scenario.

Figure 1. The figure is given to show the general pattern of tsunami wave activity for about 4 hours after a magnitude 9.1 subduction zone earthquake. Patterns are illustrated for sites at the open coast and in central Yaquina Bay near the main marina. The moderately high run-up scenario is illustrated.

Figure 2. Time histories of current velocities for various parts of Yaquina Bay for the moderately high run-up scenario.