May 2000 Tsunami Inundation Mapping Progress Report

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ALASKA

I. SUMMARY OF INUNDATION MAPPING STATUS

AK STATUS MAP

- A revised 1964 source scenario was constructed using data from a combined tsunami waveform inversion and geodetic data to get a more detailed slip distribution (Johnson and others 1996). The revised scenario will be used as the worst case scenario for the Kodiak area inundation studies.
- Due to the proximity of the three study areas (**City of Kodiak** , **USCG Base**, and **Women s Bay**), all are presently included in the same numerical grid. The finest resolution grid is presently 2.67 arc seconds (44 meters x 82.4 meters). The Kodiak inundation modeling code now incorporates 5 different grids of varying resolution (6 min, 2 min, 24 sec, 8 sec, and 2.667 sec).
- The final grid requirements were revised by UAFGI last week; TIME is preparing the final grids. The final grid spacing is planned to be about 22 m x 27 m or (8/6)" x (8/9)". This was possible due to special high resolution topography and bathymetry coverage in this region. This resolution may not be possible for future work.

FUTURE WORK:

ADES (Brown and Simmons) convened a meeting / teleconference including ADES personnel, representatives of the scientific community in Alaska, TIME, and the WC/ATWC to refine the 'short list' of communities for future work. Future work will be supported by the Alaska Science and Technology Foundation (ASTF) funded proposal led by Roger Hansen at UAFGI. The meeting produced a prioritized list of nine communities as follows:

1. Seward - cannot be mapped until better bathymetry data available
2. Sitka
3. Sand Point
4. Homer
5. Seldovia - should be mapped concurrently with Homer
6. Unalaska
7. Yakutat

8. Whittier
9. Cordova - cannot be mapped until better bathymetry data available

II. EVACUATION MAP STATUS

III. ADDITIONAL INFORMATION

UAF GI Report (Roger Hansen and Elena Suleimani)

CALIFORNIA

I. SUMMARY OF INUNDATION MAPPING STATUS

CA STATUS MAP

- **San Francisco Area** - Final model runs made, draft map completed. Final runs were made on a 100 meter grid for the target shoreline, 300 meter elsewhere, using a 30 km by 15 km seismic source in varied locations; runup values were similar to those observed during the PNG field survey. The draft map, based on a 12 meter maximum runup, was presented at a local tsunami planning meeting and is under review.
- **Santa Barbara Area** - Final model runs made, draft map completed. Final runs for this area were made on a 500 meter grid with a supplemental 250 meter grid for the Santa Barbara Channel; results for both grids were identical. Both seismic and landslide sources were used in simulations, with landslide sources placed offshore of Santa Barbara (where there is evidence of past slope failures) producing the largest runups (15 meters). The draft map, based on a 9 meter runup, was presented at a local tsunami planning meeting and is under review.
- **Los Angeles / Long Beach Area** - Final model runs made, draft map completed. Final runs for this area were also made on a 500 meter grid with a supplemental 250 meter grid for the Santa Monica Bay and the Palos Verdes Peninsula. Both seismic and landslide sources placed inside Santa Monica Bay were used in simulations. Again, landslide sources produced the largest runups (well over 10 meters). The draft map, based on a 12 meter runup, was presented at a local tsunami planning meeting and is currently under review.
- **San Diego Area** - Additional runs in progress. A 100 meter grid for the target shoreline and 300 meter grid elsewhere has been completed and used to run several simulations of PNG sized landslides sources. Final runs will be made using a 30 km by 15 km seismic source. Preliminary maximum runup values are about 10 meters.

FUTURE WORK:

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II. EVACUATION MAP STATUS

III. ADDITIONAL INFORMATION

USC Report (Jose Borrero)

HAWAII

I. SUMMARY OF INUNDATION MAPPING STATUS

HI STATUS MAP

Initial one-dimensional inundation modeling and mapping was performed in 1989-1991 using state funds; evacuation maps were published in 1991. Some maps in Oahu were updated in 1997 using federal funds; entry into the county GIS system was initiated in 1997. Additional modeling will update and refine the published inundation maps.

Hawaii issued two contracts for tsunami modeling in late 1999 --one for distant tsunami modeling and one for local tsunami modeling. Work on both contracts is underway and moving well.

- **Distant Tsunami Modeling** -- Contract awarded to University of Hawaii at Manoa (UH) team led by Dr. Kwok Fai Cheung.

    1. The Cornell Mulitgrid Coupled Tsunami Model (Liu) is used to compute a database of synthetic tsunami waveforms at tide gauges. Tide gauges in restricted waterways and harbors are not used in the analysis. Two computational models have been developed: one covers the Aleutian-Alaska and Japan-Kuril-Kamchatka source region, and the other covers the Peru-Chile source region.
    2. The final product will be a FORTRAN program with a built-in database of unit synthetic waveforms. The input will be recorded waveforms at tide gauges near the tsunami source and the output will be expected tsunami waveforms and confidence intervals near the Hawaiian Islands.
    3. The completion date of the contract is Fall 2000.

- **Local Tsunami Modeling** -- Contract awarded to University of Hawaii at Manoa, Principal Investigator is Dr. Gerard Fryer.

    1. The modeling code TSUNAMI-2 (Imamura's code) has been implemented and used on a 9-arc second bathymetric grid to model tsunami propogation in Hawaii.
    2. Significant work in locating and incorporating multibeam bathymetry data and newly

acquired AVIRIS data into the modeling database has been accomplished.
3. The Kalapana tsunami of 1975 has been approximately modeled. It will be refined to obtain better constraints on tsunamigenic sources in Hawaii.
4. Preliminary modeling for a magnitude 7.5 earthquake in South Kona has been completed.
5. The completion date of this contract is also Fall 2000.

II. EVACUATION MAP STATUS BY LOCATION

III. ADDITIONAL INFORMATION

- **LOCAL** U of H at Manoa (Gerard Fryer)
- **DISTANT** U of H at Manoa (K. F. Cheung)

OREGON

I. SUMMARY OF MAPPING STATUS

OR STATUS MAP

1. **Siletz Bay** - Completed in 1995 by Priest et al. and published as **GMS-99** by DOGAMI. Note that this work was done pre-NTHMP support; it is included in this list simply for completeness.
2. **Newport** (Yaquina Bay) - Completed December 1997 and published as DOGAMI Report **IMS-2** and Open-file report **O-97-34**.
3. **Seaside** - Completed July 1998 and published as DOGAMI Report **IMS-3**.
4. **Astoria** - Completed October 1999 and published as DOGAMI Report **IMS-11**.
5. **Warrenton**- Completed October 1999 and published as DOGAMI Report **IMS-12**.
6. **Gold Beach** - Model runs completed and reviewed. Draft inundation map submitted and reviewed by local officials. Final product delayed by numerical problems in the Hunter Creek area. Additional model comparisons to resolve these problems in progress. MOST model results show similar inundation, but less extensive flooding in the Hunter Creek area.
7. **Coos Bay** - OGI has been awarded the modeling contract (5 May 99) for this area. The contract duration is approximately one year. [NOTE: This contract includes work in Washington also.] Digital elevation and bathymetry data gathered into GIS database. Target completion date is 31 Aug 2000.

FUTURE WORK:

- **Priority Communities** - Oregon has ranked additional communities for future inundation mapping:

1. Waldport (Alsea Bay)
2. Rockaway
3. Florence
4. Pacific City
5. Bandon
6. Winchester Bay - Reedsport
7. Brookings

II. EVACUATION MAP STATUS

1. Oregon Emergency Management (Darienzo) has worked with many coastal communities on preparing pamphlet-size **Tsunami Evacuation Maps**. In communities where detailed inundation mapping has not been completed, Priest's 1995 Tsunami Hazard Maps were used to contruct the evacuation maps.
2. Evacuation maps have been completed for:

[1] **Bandon** (Coquille River)	[9] **Seaside**
[2] **Manzanita**	[10] **Gearhart**
[3] **Salmon Cove** (Umpqua River)	[11] **Arch Cape**
[4] **Cannon Beach.**	[12] **Warrenton**
[5] **Waldport**	[13] **Astoria**
[6] **Yachats**	[14] **Reedsport**
[7] **Lincoln City**	[15] **Gardiner**
[8] **Florence**	[16] **Winchester Bay**

3. Additional maps are being developed for:

[1] **Newport**	[3] **Curry County**
[2] **Depoe Bay**	[4] **Nestucca Fire District**

III. ADDITIONAL INFORMATION

OGI Report (Antonio Baptista)

WASHINGTON

I. SUMMARY OF MAPPING STATUS

WA STATUS MAP

- **Gray's Harbor** (Gray's Harbor County) - 1:24,000 scale inundation maps completed in October 1999 and supplied to the county. The maps cover the outer coast from **Moclips** to the county line south of **Grayland** and the inner harbor around the cities of **Aberdeen** and **Hoquiam**. They are the ***7-1/2 minutes quadrangles*** named: Moclips, Copalis Beach, Copalis Crossing, Westport,

Hoquiam, Aberdeen, Point Brown, and Grayland.

A 1:100,000 scale map was completed in November 1999 and released at a series of community meetings. A final report describing the modeling techniques and the maps is in progress with Walsh as lead author.

- **Willapa Bay / Long Beach Peninsula** (Pacific County) - 1:24,000 scale inundation maps completed in October 1999 and supplied to the county. The maps cover the outer coast from the county line south of **Grayland** to **Ilwaco** and the inner harbor around the cities of **Raymond** and **South Bend**. They are the ***7-1/2 minutes quadrangles*** named: Grayland, North Cove, Bay Center, South Bend, Raymond, Oysterville, Ocean Park, and Cape Disappointment.

  A 1:100,000 scale map was completed in November 1999 and released at a series of community meetings. A final report describing the modeling techniques and the maps is in progress with Walsh as lead author.
- **Port Angeles / Port Townsend** - OGI has been awarded the modeling contract (5 May 99) for this area. The contract duration is approximately one year. [NOTE: This contract includes work in Oregon also.] Good bathymetry data is available for the Port Angeles area. The data for the Port Townsend area is older and poorer quality. Additional bathymetry data may need to be located. Target completion date is 31 Aug 2000.

  FUTURE WORK:

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II. EVACUATION MAP STATUS

1. Washington DNR (Walsh) and Washington Emergency Management (Crawford) have worked with the coastal counties on preparing pamphlet-size **Tsunami Evacuation Maps and Flyers**.
2. Evacuation maps have been completed for: [1] **Grays Harbor County** and [2] **Pacific County**.

III. ADDITIONAL INFORMATION

OGI Report (Antonio Baptista)