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**APRIL 99 PROGRESS REPORT
 TSUNAMI INUNDATION MAPPING**

reported by

Robert Kamphaus and Frank González (NOAA/PMEL/
 TIME), Antonio Baptista (Oregon Graduate Institute),

Roger Hansen (UAFGI), and

Costas Synolakis (University of Southern California)

(from: <http://newport.pmel.noaa.gov/time/reports/apr99stat.html>)

I. Summary of mapping status by location

Oregon:

1. Newport (Yaquina Bay) - Completed December 1997 and published as DOGAMI Report IMS-2 and Open-file report O-97-34.

2. Seaside - Completed July 1998 and published as DOGAMI Report IMS-3.

3. Gold Beach - Model runs completed and reviewed. Final adjustments made and model runs in progress to be completed by 14 May 99. Inundation map will be submitted by 30 June 99.

4. Warrenton-Astoria - Model runs completed in tandem with Washington sites. Inundation maps in progress.

Future work:

5. Coos Bay - OGI has agreed to perform this modeling. A DRAFT contract for FY 99 has been written at DOGAMI. (Note: This contract will include work in Washington also.) In addition, DOGAMI will use the remainder of its funds to develop a Digital Elevation Model (DEM) of the area.

Note: In addition, Oregon Emergency Management (Darienzo) has worked with many coastal communities on preparing pamphlet-size Tsunami Evacuation Maps.

Evacuation maps have been completed for: Bandon (Coquille River), Manzanita, Inchester Bay (Umpqua River), and Cannon Beach. Additional maps are in progress for: Waldport, Yachats, Lincoln City, Florence, and Newport.

Washington

1. Gray's Harbor (Gray's Harbor County) - Model runs completed in tandem with Warrenton / Astoria, OR and Willapa Bay / Long Beach, WA. Inundation maps in progress. Draft maps submitted to county 27 Apr 99.

2. Willapa Bay / Long Beach Peninsula (Pacific County) - Model runs completed in tandem with Warrenton-Astoria, OR and Gray's Harbor, WA. Inundation maps in progress. Draft inundation maps (series of 8 quads) completed and reviewed at OGI. Draft maps will be submitted to county 3 May 99.

Future work:

3. Port Angeles / Port Townsend - OGI has agreed to perform this modeling. A *draft* contract for FY 99 has been written at DOGAMI. (Note: This contract will include work in Oregon also). Recently collected bathymetry data has been requested by TIME for this work.

California

California site identification map

1. San Francisco Area - grids of combined bathymetry and topography were provided to USC for this area. The numerical code has been implemented and uses a nested grid structure, with the finest grid spacing of 3 arc-seconds. Simple hypothetical earthquakes of varying length, width, dip, and strike have been used. A preliminary plot of absolute maximum runup has been produced. Additional scenarios will be proposed by seismologists and new cases will be run.

2. Santa Barbara Area - preliminary grid (500 m spacing) constructed. A total of 45 runs from three different sources of varying slip angle and dip have been completed. Finer resolution grid construction in progress. Additional earthquake sources will be discussed by seismologists.

Three other priority areas were identified for modeling, time and resources permitting.

3. San Diego Area - bathymetry and topography data are being located and collected at TIME. Combined grid of bathymetry and topography in progress.

4. Eureka and Crescent City - (comparison of finite element and finite difference modeling techniques).

5. Los Angeles area.

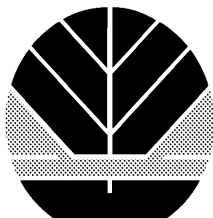
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Participants in the TsuInfo program can request copies of reports listed in this issue from:

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WASHINGTON STATE DEPARTMENT OF
Natural Resources
Jennifer M. Belcher - Commissioner of Public Lands

(continued from p. 1)

Alaska

Alaska site identification map: The UAFGI has implemented the numerical simulation code on the Cray supercomputer. The code is capable of simulating the generation of tsunami by an earthquake and transoceanic propagation of the wave. A north Pacific ocean (0-65N, 120E-140W) 6 min grid and a finer 2 min grid for the Gulf of Alaska (52-62N, 60-140W) have been constructed. These grids are interactively connected. The next finer resolution grid will be constructed and implemented in the model as soon as the next bathymetric data set is supplied by TIME.

1. Kodiak City - topography digitized; additional bathymetry data required for area around Kodiak Island. Previous study reviewed.

2. USCG Base - topography digitized; available bathymetry is being located.

3. Women's Bay - topography digitized; available bathymetry is being located.

Future work:

ADES (Gary Brown) will convene a meeting / teleconference including ADES personnel and the scientific community in Alaska to refine the 'short list' of communities for future work.

Future work will be supported by the Alaska Science and Technology Foundation (ASTF)

Hawaii

Hawaii has begun the process of finding a contractor for their tsunami modeling. Two 'Scope of work' solicitations have been developed: one for the local tsunami threat, and one for the distant threat. The deadline for submission of contractor qualifications is 31 May 99. All work will be contracted to be completed by 30 Sep 2000

II. Additional information from submitted progress reports

Oregon / Washington -- OGI Report (Ed Myers and António Baptista)

The Ph.D. thesis of Ed Myers, "Physical and Numerical Analysis of Long Wave Modeling for Tsunamis and Tides" was successfully defended in October 1998. This thesis describes the scientific and modeling basis for the simulations performed for all Oregon and Washington sites and discusses limitations thereof. Four papers based on the thesis have been submitted to peer-reviewed journals, one of which is in press:

-- Myers, E.P. ; Baptista, A.M.; Priest, G. R Priest, "Finite element modeling of potential Cascadia subduction zone tsunamis," Science of Tsunami Hazards (in press).

-- Myers, E.P.; Baptista, A.M., "Numerical considerations in finite element simulations of tsunamis" (submitted to International Journal for Numerical Methods in Fluids, 11/98).

-- Myers, E.P.; Baptista, A.M., "Inversion for tides in the eastern north Pacific Ocean" (submitted to Advances in Water Resources, 11/98).

-- Myers, E.P.; Baptista, A.M., "Modeling of past tsunamis-- One model's lessons from the 1993 Hakkaido Nisei-Oki and 1964 Alaska tsunamis" (submitted to Natural Hazards, 11/98).

California -- USC Report (Costas Synolakis and Jose Borrero)

Consulted Southern California Earthquake Center (SCEC) for current offshore seismic information. Four potential tsunamigenic faults for Santa Barbara identified.

Meeting of seismologists with expertise in the southern California area to be scheduled.

Will identify potential tsunamigenic faults system, and source parameters.

PNG event raised possibility of coseismic submarine landslides. Currently investigating submarine landslide hazards in California.

Alaska -- UAF GI Report (Roger Hansen and Elena Troshina)

Several hypothetical earthquake scenarios have been computed.

ADGGS is currently preparing base maps (georeferenced USGS 1:25,000 topo images) for the Kodiak project. Inundation limits and evacuation routes will be plotted on them once the modeling is completed.

Troshina is now full time on this project.

* * * *

Infrequently Asked Questions

compiled by Lee Walkling

How Are Emergency Management Programs like Insurance Policies?

"The Emergency Management Program is like an insurance policy. Policyholders (Elected Officials) pay their premiums (support the EMA) and talk to their Agent (Coordinator) periodically to make sure their coverage (Plan) is adequate. But, in the back of their mind, they hope and pray that they never have to collect on that Policy (implement the Emergency Operations Plan).

Emergency Management Personnel at all levels are training and exercising in preparation for disasters. They inform the public of what they need to do in case a disaster does strike. However, they would be all too happy if they never mobilized to respond to a disaster. Yet, they all know that disaster can strike at any time and they are constantly prepared to react."

(from: Parko, Larry, 1992, County emergency management services. In Majumdar, S. K.; Forbes, G. S.; and others, editors, Natural and technological disasters: causes, effects and preventive measures: Pennsylvania Academy of Science, p. 424.)

LOCAL EMERGENCY PLANNING EFFORTS

Oregon

Benton County, Oregon, through the leadership of a concerned citizen, Diane Merten of Corvallis, has organized an emergency management council which brings people in emergency services, law enforcement, and fire protection together with civic and school leaders to plan for a disaster. Public involvement raises the priority for disaster preparedness among local officials. A website address (<http://osu.orst.edu/groups/bcemc/>) is provided for additional information on setting up similar councils elsewhere in the Pacific Northwest.

(**from:** *Living with Earthquakes in the Pacific Northwest*, by Robert S. Yeats, p. 276)

The Benton County Emergency Management Council Web Site homepage has links to the "Vision Statement," written by the Council's original members, the Linn-Benton Neighborhood Emergency Training (LB NET) which offers help with organizing other neighborhoods, and *Tsunami! for Inlanders*, as well as links to other hazard pages and Council meeting minutes. The Council seems to meet its goal "to facilitate efficient, expeditious, and cost-effective communications between participants in support of community, regional and state disaster mitigation, planning, response and recovery." (**from:** website, 7-26-99).

California: The San Francisco Disaster Registry Program

The San Francisco Disaster Registry Program (DRP) for Seniors and Persons with Disabilities is part of a comprehensive regional strategy to provide disaster health services to vulnerable populations. The DRP, under the direction of the San Francisco Department of Public Health, does not depend upon traditional response agencies, such as police, fire, and paramedics. Rather, it uses "emergent" volunteers--people who come forward after a disaster and ask what they can do to help. Since traditional response agencies can be overwhelmed in a disaster, the DRP response model represents a practical solution that taps previously under-used resources. Experience from the Loma Prieta earthquake and similar events has shown that large numbers of such volunteers will be available and that they need to be included in any organized response effort.

In keeping with newer disaster planning models, the DRP addresses disaster-related needs of vulnerable populations throughout mitigation, preparation, response, and recovery. As a collaboration among local, community-based organizations and government, the DRP coordinates a number of activities to minimize disaster vulnerability, while at the same time maximizing effective response to the targeted populations. Some of these activities include:

*Developing training programs for residents of senior residential facilities, clients of community-based

organizations (CBOs) and government agencies that serve the target populations, staff members of these organizations and agencies, and Neighborhood Emergency Response Team (NERT) graduates who elect to receive supplemental training on special needs populations;

*Conducting broad community outreach to get the word out to isolated individuals--those who may need the DRP the most--about how they can become more "disaster resilient."

*Supporting broad collaboration in response planning and field exercises among those who are or will be involved in disaster response to seniors and persons with disabilities.

For further information about the Program, contact Ron Lopez, Emergency Medical Services Section, San Francisco Department of Public Health, 1540 Market Street, Suite 220, San Francisco, CA 94102; (415) 554-9976; fax, (415) 241-0519; email ron_lopez@dph.sf.ca.us

(**from** *The Natural Hazards Observer*, July 1999)

Editorial comments:

The San Francisco Disaster Registry Program was specifically designed to bring disaster health services to vulnerable citizens by using emergent volunteers. While it was designed for a large city, this program, particularly the Neighborhood Emergency Response Team idea, could be applied to other emergency response situations.

Persons with special needs can be forgotten in emergencies--in both urban and rural areas. A registry could help emergency responders prioritize their work load, coordinate volunteer efforts, and provide much-needed services to people who might be unable to communicate their needs.

Because transportation, communication, utilities, and health facilities can be out of service for the first few days after a disaster, neighborhoods must become organized and self-sufficient during that time. The Neighborhood Emergency Response Team model could provide such local help during that critical time.

* * * *

Tsunami Factoid

The National Geophysical Data Center estimates that 51,000 lives have been lost this century due to tsunamis.

(**from:** Curtis, G. D., Tsunamis--Seismic waves. *In* Majumdar, S. K.; Forbes, G. S.; and others, editors, *Natural and technological disasters: causes, effects and preventive measures*: Pennsylvania Academy of Science, p. 109.)

New Tsunami Mitigation Materials

Added to the Division of Geology and Earth Resources Library, July, 1999

compiled by

Connie J. Manson

Note: Free reprints of these materials are available. (See page 2 for ordering information)

General Works about Natural Hazards and Tsunami Hazard Mitigation

Blackford, M. E., 1998, International responses to Pacific tsunami warnings and watches. *In* Raufaste, N. J., editor, Proceedings of the 30th joint meeting of the U.S.-Japan Cooperative Program in Natural Resources Panel on Wind and Seismic Effects: U.S. National Institute of Standards and Technology NIST SP 391, p. 33-37 (downloaded 5/17/99 from <http://fire.nist.gov/bfrlpubs/build98/PDF/b98080.pdf>).

Examines reactions to the 13 tsunami warnings issued by the Pacific Tsunami Warning Center from July, 1993 through December, 1997. The results indicated that more regional tsunami warning systems are needed, that more feedback is needed between the local officials and the PTWC, and that the PTWC needs more local seismic and water level data in the affected areas.

Highly recommended for local government officials and emergency managers.

Jervis, Michael, 1990, Tsunami warning!: Emergency Preparedness Digest, v. 17, no. 1, p. 14-16.

Good overview of tsunami hazards and warning systems on the Pacific coast, focussing on British Columbia.

Although a bit dated, this is recommended for local government officials and emergency managers.

Schwab, Jim; and others, 1998, Planning for post-disaster recovery and reconstruction: American Planning Association Planning Advisory Service Report 483/484, 346 p.

Excellent guide to recovering from disasters. (See reviews in *Tsunami Alert*, v. 1, no. 7, p. 3)./

Highly recommended for local government officials and emergency managers.

Hazard Insurance

Ganz, Steven; Traynor, Theresa; James, Andrea, compilers, 1998, Earthquake insurance--Public policy perspectives from the Western United States Earthquake Insurance Summit: Western States Seismic Policy Council; Council of State Governments-West, 254 p.

Earthquakes insurance-- along with structural and non-structural mitigation, building codes, and land-use planning-- is part of the earthquake mitigation toolkit. This volume presents 33 papers about the public and private sectors' roles in earthquake insurance, earthquake risk management, and other policy issues.

Highly recommended for local government officials and emergency managers and for the insurance industry.

Regional Studies - Alaska

Selkregg, L. L.; Ender, R. L.; Johnson, S. F.; Kim, J. C. K.; Gorski, S. E.; Preuss, Jane; Kelso, Duncan, 1994, Earthquake hazard mitigation--Planning and policy implementation, the Alaska case: University of Alaska, 332 p.

The National Academy of Sciences (NAS) published an 8-volume report about the effects of the 1964 Great Alaska Earthquake. This study found that few of the NAS recommendations were in place 30 years later, and that, because of increased development in coastal areas, that those communities were at risk of even greater damage from a similar event.

Highly recommended for local government officials and emergency managers.

Technical Research

Hutchinson, Ian; Clague, J. J.; Mathewes, R. W., 1997, Reconstructing the tsunami record on an emerging coast--A case study of Kanim Lake, Vancouver Island, British Columbia, Canada: *Journal of Coastal Research*, v. 13, no. 2, p. 545-553.

Gonzalez, F. I.; Satake, Kenji; Boss, E. F.; Mofjeld, H. O., 1999, Edge wave and non-trapped modes of the 25 April 1992 Cape Mendocino tsunami: U.S. National Oceanic and Atmospheric Administration [downloaded 5/10/1999 from <http://www.pmel.noaa.gov/tsunami/gonzalez1995.html>].

Johnson, S. Y.; Dadisman, S. V.; Childs, J. R.; Stanley, W. D., 1999, Active tectonics of the Seattle fault and central Puget Sound, Washington--Implications for earthquake hazards: *Geological Society of America Bulletin*, v. 111, no. 7, p. 1042-1053, 1 plate.

Nagai, Toshihiko; Sugahara, Kazuteru; Watanabe, Hiroshi; Kawaguchi, Koji; Mihara, Masahiro; Takashima, Katsumi, 1998, Tsunami and storm surge characteristics based on long-term tide observations. *In* Raufaste, N. J., editor, Proceedings of the 30th joint meeting of the U.S.-Japan Cooperative Program in Natural Resources Panel on Wind and Seismic Effects: U.S. National Institute of Standards and Technology NIST SP 391, p. 33-37 (downloaded 5/17/99 from <http://fire.nist.gov/bfrlpubs/build98/PDF/b98080.pdf>).

Oleskevich, D. A.; Hyndman, R. D.; Wang, Kelin, 1999, The updip and downdip limits to great subduction earthquakes--Thermal and structural models of Cascadia, south Alaska, SW Japan, and Chile: *Journal of Geophysical Research*, v. 104, no. B7, p.14,965-14,991.

Kulikov, E. A.; Rabinovich, A. B.; Fine, I. V.; Bornhold, B. D.; Thomson, R. E., 1998, Landslide tsunami generation on the Pacific Coast of North America and effect of tides: *Okeanologiya*, v. 38, no. 3, p. 361-367. (In Russian)

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<http://www.pep.bc.ca>

BOOK REVIEWS

by
Lee Walkling

TWO NEW FEMA REPORTS

(reviews reprinted from: *Natural Hazards Observer*, July 1999)

Federal Response Plan, revised. U.S. Federal Emergency Management Agency, 304 p. **free.**

"An updated plan for mobilizing federal resources when communities and states are overwhelmed by natural and human-caused disasters was recently released by FEMA. The Federal Response Plan, which serves as the principal organizational guide for 26 federal agencies and the American Red Cross, details the roles and responsibilities of each agency activated to deliver emergency aid during a major crisis.

"The revised plan incorporates a new Recovery Function Annex, which describes the structure and coordination activities that directly assist individuals, families, businesses, and state and local governments in recovering from disaster. It was created to integrate recovery and mitigation functions into the plan and incorporates recovery concepts that address floodplain management, flood insurance, environmental protection, historic preservation, mitigation, and risk management."

Report and Commentary on Pre-Disaster Mitigation, volume 2. U.S. Federal Emergency Management Agency, 1999, 129 p. **free**

"In 1997, Congress provided \$30 million for predisaster mitigation, but at the same time, called for a formal needs-based analysis and cost/benefit study of various mitigation alternatives, with the results to be incorporated into a comprehensive, long-term National Pre-Disaster Mitigation Plan. Congress wanted this analysis to be independently reviewed and submitted to the House Committee on Appropriations, and that report was recently made available by FEMA (see the *Observer*, Vol. XXIII, No. 2, p. 11). This second volume offers supplementary materials that provide an in-depth understanding of the panel's review process. It is divided into three sections that contain documents from each of the three meetings held by the panel. These materials are followed by a bibliography of other materials reviewed by panel members, including supplementary readings mailed to members prior to meeting, handout materials made available by and or panel members at each meeting, and materials included in participant folders for use at the meetings."

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Natural Hazards Observer

This spirited newsletter is invaluable ("...of an excellence or worth beyond measure."). Indeed it is priceless; **and it's free.** If you're not subscribing, you're missing out on a treasure chest of varied and important information, pulled together in one publication. The layout is friendly; there are cartoons; it isn't pretentious. It is helpful! My only complaint is that the *Observer* isn't monthly.

Every issue is full of announcements of new reports and publications; hazard articles, a Washington update (new rules and regulations and studies); new websites of interest, arranged by hazard type; a list of conferences and training; a list of contracts and grants awarded; book reviews; and sidebars filled with miscellaneous tidbits. Being involved in public education, I particularly approve of the small announcement concerning their material: "Reproduction with acknowledgment is permitted and encouraged."

"The Natural Hazards Research and Applications Information Center was founded to strengthen communications among researchers and the individuals and organizations concerned with mitigating natural disasters. The center is funded by the National Science Foundation, Federal Emergency Management Agency, National Weather Service, U. S. Geological Survey, U.S. Army Corps of Engineers, U. S. Environmental Protection Agency, U.S. Department of Transportation, National Aeronautics and Space Administration, the Institute for Business and Home Safety, and the Public Entity Risk Institute." Emergency managers don't have the time to scan all the publications from all these agencies to glean the useful data. The *Natural Hazards Observer* does it for you.

For your free U.S. subscription, **write to:** Natural Hazards Research and Applications Information Center, Institute of Behavioral Science #6, University of Colorado at Boulder, Campus Box 482, Boulder, CO 80309-0482.

Copies of the *Observer* and the Hazard Center's electronic newsletter, *Disaster Research*, are also available from the Natural Hazards Center's website: <http://www.colorado.edu/hazards>.

In July, the Hazard Center began another newsletter, *The Natural Hazards Informer*, funded by FEMA. It will automatically be sent to subscribers of the *Natural Hazards Observer*, or you can subscribe at the address above. The *Natural Hazards Informer* will be published irregularly and will provide concise, peer-reviewed syntheses of state-of-the-art research on specific hazard issues. Its purpose is to provide natural hazards practitioners and emergency management specialists knowledge they can use to better prepare for, respond to, recover from, and mitigate the effects of natural disasters."

Glossary of Coastal Terminology, by Brian Voigt.
Washington Department of Ecology Publication 98-105.
1998. 89 p.

As stated succinctly in the preface, "This coastal glossary includes terminology used in coastal science, engineering, geology, management, nearshore oceanography and the technologies that characterize, measure, describe or quantify the physical properties, processes and changes of the coastal zone."

The glossary has a simple alphabetically listing. Words within a definition that have their own, additional entries are capitalized. Appendix A includes 14 charts and diagrams that visually explain concepts such as longshore drift, shore zones, and seasonal beach cycles.

Copies of this useful glossary can be obtained from the author at: Washington Department of Ecology, 300 Desmond Drive, MS 47600, Lacey, WA 98504-7600, or by calling (360) 407-6568.

* * * *

Happy Birthday, EIIP!

The Emergency Information Infrastructure Partnership will celebrate its second birthday on August 18, 1999. Founded in 1997, the organization strives to be "THE Virtual Forum for dynamic exchange of emergency management information. (see Criteria for EIIP Partnership at <http://www.emforum.org/partners/criteria.htm>).

EIIP hosts weekly interactive sessions called the EIIP Virtual Forum at <http://www.emforum.org>. The goal is to stimulate discussion of emergency management/disaster response topics with all sectors of the community: government, business, academia and citizens/volunteers. The EIIP mission statement says, "The Emergency Information Infrastructure Partnership...was founded on the

belief that the Internet and World Wide Web (WWW) could be global tools to unify and benefit the entire emergency professional community by sharing and pursuing information in a united and coordinated manner."

The current month's list of events is posted at the Virtual Forum home page <http://www.emforum.org/events.htm>

Regular sessions

The regular sessions start at 12 noon Eastern Standard Time on Wednesdays. These are live, one- hour-long online discussions:

August 4: Virtual Library--Communication between Researchers and Practitioners

August 11: Virtual Classroom--Managing Bomb Threat Critical Incidents

August 18: Virtual Forum--Second Annual Birthday Bash!

August 25: Tech Arena--Database Applications for Persons with Special Needs.

Round Tables

These discussion groups start at 12 noon Eastern Standard Time, on Tuesdays:

August 3: State and Local Emergency Management Data Users Group (SALEMDUG)

August 10: FEMA Community & Family Preparedness (CFP)

August 17: Congressional Fire Service Institute (CFSI)

August 24: International Association of Emergency Managers (IAEM)

August 31: Central United State Earthquake Consortium (CUSEC)

Edited and unedited versions of sessions are archived, in case you miss a topic of interest.



WASHINGTON STATE DEPARTMENT OF
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