TsuInfo Alert

prepared by the Washington State Department of Natural Resources on behalf of the

National Tsunami Hazard Mitigation Program

a state/federal partnership funded through the National Oceanic and Atmospheric Administration (NOAA)

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"LESSONS LEARNED—WHEN ?"

by Henry W. Fischer III
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Have you noticed that every time a major disaster occurs in the USA "lessons learned" quickly appear as a part of a title in a book, articles, papers, reports and so forth? This could be encouraging *if* the lessons were new each time and *if* we embraced them by putting them into action. Okay, sometimes we do, but all too often….

When James Lee Witt was FEMA Director, we had Project Impact which applied lessons learned to actually trying to mitigate their repetition. When JLW left office, the appointment of FEMA Directors returned to the tradition of seeking those with a portfolio lacking disaster management experience[1]. Our non-USA members have to wonder about this tradition and the thinking (or lack there of) behind it. September 11, 2001 resulted in putting FEMA within the new mega department of Homeland Security and the accompanying decline of FEMA morale, early retirements, and so forth. Then Hurricane Katrina found a FEMA and DHS wanting.

Is it possible that disaster management experience is a pre-requisite for a FEMA Director? Is it possible that the best way to enhance planning and response is to *not* destroy their budget, bury them in another department, and destroy their morale? The tired expression is, I think, "it isn't rocket science, man!"

Now that the executive branch of the USA federal government has had its chance to modify FEMA, the legislative branch is holding hearings into what went wrong in the response to Hurricane Katrina. This *could* be another chance to take those lessons learned and apply them for a good outcome. However, in all likelihood they will also take a political road. The Senate Committee will probably cherry pick some of the same old lessons, yet blame a limping FEMA (a victim itself) for what the executive and legislative branches did to it to contribute to creating the Katrina outcome. Politicians to the rescue once again!

Research, education, knowledge, training, planning, and practice do work if these are permitted to be operative. Of course if you believe in thinking with your gut rather than your brain…. The latter may lead to knowledgeable leadership articulated clearly while the former may result in the product of another, physically closer, orifice. ♦

1 Is this man qualified to be the next FEMA Director? Some say, Yes, but only if he makes large campaign contributions and lacks emergency management experience."
From:. Unscheduled Events, v. 25, no. 1, p. 11

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Natural Resources
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The cluster leadership approach—Coordinating the external response to disasters

The humanitarian world is changing rapidly. Disaster managers throughout Latin America and the Caribbean must be aware of new international mechanisms such as the cluster approach and what it will mean when the next disaster strikes

Coordinating external assistance following large-scale disasters is the responsibility of the government of an affected country. In an ideal world, the national disaster management authority (the Civil Protection system, the national emergency commission or some other institution) or a Ministry (Foreign Affairs or Health, for example) would be well prepared to take charge of major disasters that result in a massive influx of assistance from outside. But in the real world, are they in charge?

In the last five years, Latin American and Caribbean countries have been spared the truly catastrophic disaster that moves the entire world to respond generously. But the overwhelming response to the tsunami in south Asia and the earthquake in Pakistan demonstrates how rapidly the humanitarian world is changing around us. Unfortunately, many national disaster coordinators in this region may have scarcely noticed these changes, as they are so busy preparing for and responding to seasonal but traditionally moderate disasters.

Asia's recent emergencies unleashed hundreds of jealously-independent external actors (UN, Red Cross societies, NGOs, bilateral agencies and foreign militaries). Consequently, coordination became extremely difficult and challenges, such as assessing needs, formulating priorities and minimizing gaps and duplications were poorly met. If the response to the Hurricane Mitch was regarded as somewhat chaotic, it was a model of coordination compared to the tsunami response.

The growing sense of solidarity with disaster victims—well orchestrated by both the media and humanitarian agencies—inevitably leads to not only generous contributions, but also to an uncoordinated rush of actors: an excess of field hospitals that arrive too late; psychosocial assistance groups with little experience; agencies tending to congregate around the most accessible sites and focusing on the most visible needs; and of course, the usual flood of unsolicited and inappropriate supplies. The litany of examples of mismanagement has been documented as far back as the milestone article by Alfred Sommer and Henry Mosley published in the Lancet, "The East Bengal Cyclone of November 1970: Epidemiological Approach to Disaster Assessment." Some things still have not changed.

What has changed, however, is the perceived risk that the very process designed to strengthen the humanitarian community ("the world's largest unregulated industry," according to the Red Cross World Disasters Report 2004) could have the unintended consequence of marginalizing national institutions and by extension, the national disaster coordinators.

In the last two decades, the UN General Assembly has paid considerable attention to international mechanisms for ensuring a better coordinated response to emergency situations. Countries in and outside the Americas should be aware of the Inter-Agency Standing Committee (IASC), established in June 1992 in response to UN General Assembly Resolution 46/182 on strengthening humanitarian assistance. The IASC is a forum for coordination, policy development and decision making involving the key UN and non-UN humanitarian partners. One of the IASC's important initiatives is the "Cluster Leadership Approach," which is now being implemented.

The IASC has identified nine areas of humanitarian activity (logistics, emergency telecommunications, emergency shelter, health, nutrition, water/hygiene/sanitation, early recovery, protection and camp management) in need of strengthening. For each area, responsibility has been assigned to an IASC principal or full member.

Accountability is what's new

The cluster approach itself is not new. It is akin to the sectoral approach that PAHO/WHO and others have implemented for some time. In Colombia, for example, "thematic groups" are responsible for the coordination of issues related to the displacement of more than 2 million Colombians. PAHO/WHO coordinates the health thematic group. What is new, however, is the leadership concept and, more importantly, the formal operational accountability that the lead agencies must assume. Lead agencies are *"accountable for ensuring, to the extent possible, the establishment of adequate coordination mechanisms… as well as adequate strategic planning and operational response."* Not only is the lead agency accountable for coordination of the cluster, it is also expected to be the provider of last resort when critical needs are not being met.

What is a provider of last resort?

As cluster leads, agencies work with relevant humanitarian actors that have expertise and

capacity in a specific area. In a country facing an emergency situation or a disaster, the clusters provide support to the Humanitarian Coordinator. They do not necessarily carry out all of the activeties them-selves, but are responsible for ensuring that they are implemented. In this sense, if all else fails, the lead agency must step in to do the job itself. The concept of provider of last resort is the bottom line in accountability. However, the financial implications of this responsibility for cluster lead agencies require further examination and clarification.

Who are the cluster lead agencies?

Globally, the World Health Organization is the cluster lead for health, while UNICEF has been assigned the lead in nutrition and water/hygiene/sanitation. This is a departure from PAHO's traditional practice of grouping these two areas together under the banner of health. However, the designation of cluster lead agency is an operational humanitarian responsibility that does not take away from WHO/PAHO's normative and scientific leadership on all health matters, health being defined in the broadest sense.

Future impact on the Americas

What will the external response to the next major disaster look like to countries in Latin America and the Caribbean? Cluster approach or not, the marked tendency toward increased "internationalization" of disasters is unlikely to reverse itself. On the positive side, the international humanitarian community—donors, the UN and NGOs alike—feel directly accountable to the disaster-stricken population. However, imposing the cluster approach on a country without considering its level of sophistication and experience in disaster management may be perceived as arrogant. Worse yet, it may negatively impact local capacity building efforts, as pointed out in evaluation reports on the tsunami. It will be up to the countries of Latin America and the Caribbean to assess current changes in the global humanitarian sector and prepare themselves to assume a leadership role in response operations.

From: http://www.disaster-info.net/newsletter/103/cluster.htm

Disasters-Preparedness and Mitigation in the Americas, issue 103, p. 1, 7 ♦

California

Grand Jury report: SD county cities not prepared for tsunami

10News.com, San Diego, California
POSTED: 10:04 pm PDT May 31, 2006
http://www.10news.com/print/9302710/detail.html
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A grand jury has a warning for cities throughout San Diego County -- get prepared for a tsunami. The grand jury focused on preparations for a tsunami and also took a look at earthquakes and a potential nuclear disaster.

The tsunami in Indonesia and Hurricane Katrina brought to the forefront whether or not enough is being done to protect us. "Sometimes sitting on the beach, I think if a tsunami came, what would happen," said Del Mar resident Allan Dorsey.

Carlsbad resident Deb Beddoe said, "I bet most cities across the U.S. are not prepared for emergencies as we saw with Katrina. We're all thinking about it now."

A grand jury report investigating the preparedness of cities across the county agreed, specifically along the coast. The jury stated, "A tsunami is going to occur along most of the western coast of the U.S. sooner rather than later."

The report took a look at warning sirens, noting that with the exception of Coronado, no other city in the county had them.

The report said warning sirens could save lives during a disaster. The grand jury report recommends escape route signs, funding for warning sirens, and county-wide compatible communication systems. Communication problems were exposed during the Cedar fire, but 10News was told this recommendation had already been resolved.

Del Mar was one of the many cities investigated in the report. "We do need to always be looking for how can we do things better," said Del Mar Mayor Crystal Crawford.

Crawford reviewed the recommendations and concluded that not all of them may be practical. "We do have a system in place as all cities do, but the evacuation route depends on the particular issue or disaster that you're trying to flee from," said Crawford.

As for the likelihood of a tsunami in the county, experts said it is unlikely and would be nothing like what occurred in Indonesia. However, experts still recommend citizens prepare.

"You should have it plugged into your mind if you're at the beach and the grand starts shaking, don't wait to see if a tsunami is going to come," said San Diego State University geologist Dr. Pat Abbott.
The city of San Diego's public safety chief agreed it is true that there are no adequate plans for a tsunami, and that it is something that will be evaluated.

All of the cities named in the report and the sheriff's department will have to respond to the grand jury's findings by the end of August. ♦

California

June 14, 2005 tsunami alert

With the devastation caused by the December 26, 2004 magnitude 9.0 (M9) earthquake and ensuing tsunami that struck Sumatra and the Southeast Asia area still fresh in people's minds, the M7.2 earthquake 90 miles west of the City of Eureka in northern California demonstrated a flawed warning system for California's coastline. The West Coast & Alaska Tsunami Warning Center (National Weather Service) in Palmer, Alaska issued a tsunami warning immediately after the 7:50 p.m. quake. At the time, the movement direction of the quake was not known; however, if there had been a tsunami it would have reached the California coastline in about 10 minutes. Fortunately, the quake was caused by a major strike-slip movement northwest of the Mendocino Triple Junction of the North American, Pacific, and Juan de Fuca plates. Had the fault movement been vertical, a dangerous tsunami may have been generated. A second quake of M6.7 occurred two days later approximately 120 miles offshore.

What became apparent was that the California tsunami alert system did not perform as well as intended. There were several factors that contributed to this, but the result is that California is reviewing, upgrading, and reorganizing its tsunami warning system. The CGS is involved in this process through its coastal mapping programs and with consideration given to revised mapping of potential inundation zones. ♦

Submitted by John G. Parrish, Ph.D., State Geologist, California Geological Survey.

From: EQ Earthquake Quarterly, Fall 2005, p. 8

Oregon

Coastal airport sites vulnerable

By Lori Tobias
The Oregonian ,June 14, 2006
Sunrise ed., Section: Regional News, Page B07
http://www.oregonlive.com/printer/printer.ssf?/base/news/115025196669150.xml&coll=7

SUMMARY: Earthquake rescue bases could be wiped out or damaged too badly for disaster relief flights

If a major earthquake strikes off the Oregon coast, don't count on coastal airports to be of use in rescue efforts, says Oregon State University earthquake expert Chris Goldfinger.

"Most of the airports in Western Oregon are at sea level so they are going to be underwater or damaged by the earthquake or both," said Goldfinger, who studied 14 airports from Astoria to Brookings.

The U.S. Coast Guard stations in Astoria and North Bend are at sea level and would probably be underwater. "Each of those facilities has the only life-saving air assets on the coast," he said.

Goldfinger, an associate professor of marine geology who is also a pilot, said he decided to do the study after attending a legislative subcommittee meeting on emergency preparedness and realizing that many state officials don't understand how inaccessible the coast might be.

At 10 to 15 feet elevation, Astoria's runways might survive a tsunami, but the material underneath the runways is so soft that it would probably liquefy, putting the airport out of commission. In North Bend, the airport, which is the only one on the coast with commercial flights, is right on the bay front, making it particularly vulnerable to earthquake and tsunami damage. Seaside's airport sits just a short distance from a salt water inlet.

Not all the coastal airports are so vulnerable. Newport's, for example, is built on a bluff so tsunami damage isn't an issue, and Goldfinger said he expects the rock formation it sits on to be fairly earthquake-resistant.

"It would be a good one to consider as a central point (for rescue efforts)," he said. "It has reasonably good survivability and already has a global positioning system. It's got a head start over the others."

Goldfinger would like to see other airports install GPS equipment, which would allow pilots to land if ground navigation aids were damaged in the earthquake. Strengthening the Coast Guard hangars to better withstand quakes might also offer some protection, he said.

But short of moving the airports, protecting the runways from tsunamis is nearly impossible, though raised pads could allow helicopters to land even when runways are unusable, he said. ♦

British Columbia

Shoreline mapping to aid in tsunami emergency

By Pirjo Raits
Sooke News Mirror, Jun 07 2006
http://www.sookenewsmirror.com/portals-code/list.cgi?paper=32&cat=23&id=664172&more
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If a tsunami were to hit Sooke, many might think they are in danger when they may not be. A detailed survey of Sooke's coastline is being mapped with the help of the University of Victoria's department of geography. Larry Dawe, the District of Sooke's

Emergency Programme Coordinator, is collaborating with Professor Olaf Neimann to get a very detailed topographical survey of the shore through an airborne Light Detection and Ranging (LIDAR) survey.

"The reason this is necessary is that most of the detailed surveys have too many approximations to enable them to be used for reliable tsunami run-up calculations," said Dawe. He said the LIDAR is similar to a very accurate radar but uses light

The Provincial Emergency Program (PEP) has published several figures as the "safe" height above the normal tidal high-water mark in case of a tsunami. The most common figures are 20-metres and 10-metres.

"These predictions do not take into account either the large variations in shore topography or the widely differing exposures of various places near to the open ocean where there is gradually shelving underwater bottom structure," said Dawe. Basically, the farther a place is from the open ocean and the wider the beach is and the steeper the underwater bottom structure, the safer places (homes) on land are from tsunamis. PEP's policy is that if you are above 20 metres, then you are safe.

"Unfortunately," said Dawe, "waterfront properties are in most cases much closer to sea level than that; after all that is what waterfront property is for."

On the Institute of Ocean Sciences website you can run a model demonstrating the effect of a local tsunami. It's clear from this model, said Dawe, that Sooke is pretty safe. The model has a key weakness: it assumes the shoreline is 30-metres vertical. Consequently it gives no indication of run-up and with a vertical coastline it has much more "sloshing around" (seiche waves), action than is realistic for the actual beach.

The reason is that the model does not contain detail topographical data required to make the required estimates. That's where the flights come in.

The survey of the Sooke coastline will be added on to existing Uvic projects in the same general area. The costs of the flights and the post-flight analysis will be paid for out of the provincial government tsunami grant secured by the District of Sooke.

The resulting detailed survey will be used in the PGC model for accurate tsunami run-up modeling. This will predict, with great realism and certainty, which places in Sooke are vulnerable to tsunami run-up and by how much on a property by property basis. ♦

SurfAid International's Tsunami Relief Documentary Earns Coveted EMMY® Award!
Transworld Surf, posted 22 June 2006
Reprinted with permission

San Diego, CA --- The Pacific Southwest Region of the National Academy of Television Arts & Sciences, this past weekend awarded an EMMY® to "The Next Wave, a tsunami relief story" for Best Topical Documentary. Produced through the combined efforts of SurfAid International, FUEL TV and RoughCuts Productions, 'The Next Wave' aired as a one-hour program in June 2005 on FUEL TV, the only network dedicated to the lifestyle of action sports and now is available in DVD.

"The Next Wave," a follow-up to the FUEL TV/SurfAid International special "Wave of Compassion," chronicles the journey of surfers Tom Carroll, Dave Rastovich and Kate Skarratt as Dr. Sohrab Gollogly of SurfAid takes them into the heart of the tsunami zone in Indonesia, giving them a first hand view of the damage and the surfing industry's effort to assist in the disaster relief. Produced by FUEL TV, directed, written and filmed by Justin Krumb with Cyrus Sutton, this unique documentary had the support of the entire surf community behind it. Filmmaker Justin Krumb was on hand to accept the EMMY® and offer a taste of SurfAid's message to a packed house of industry peers.

The documentary is available as a two DVD set entitled "Wave of Compassion" and can be purchased from www.surfaidinternational.org. All royalties from DVD sales go directly to SurfAid and their battle to improve health in this region. ♦

From:
http://www.transworldsurf.com/surf/pressrelease/article/0,19929,1206957,00.html

REFERENCE CARD FOR WEB SITES
NWS TsunamiReady:
http://wcatwc.arh.noaa.gov/tsunamiready/tready.htm
NWS StormReady: http://www.stormready.noaa.gov
Alaska DES: http://www.ak-prepared.com/
British Columbia EM:
http://www.pep.bc.ca/Emerg_Mgmt_BC/Emerg_Mgmt_BC.html
Washington EMD: http://emd.wa.gov/
Oregon OEM: http://www.oregon.gov/OOHS/OEM/
California OES:
http://www.oes.ca.gov/Operational/OESHome.nsf/1?OpenForm
National Weather Service: http://www.nws.noaa.gov/
PMEL: http://www.pmel.noaa.gov/
FEMA: http://www.fema.gov/
NTHMP: http://nthmp history.pmel.noaa.gov/index.html

NEWS

Belated congratulations to the California Geological Survey

In 2005 the California Geological Survey (CGS) proudly celebrated 125 years of continuous service to the people of the State of California

From: EQ Earthquake Quarterly, Fall 2005, p. 7

Tsunami early warning system moves ahead at UN workshop

4 June 2006 – More than 130 experts from over 20 countries opened a United Nations-sponsored workshop in Bangkok to push ahead with a tsunami early warning system for the Indian Ocean that could save scores of thousands of lives in a reoccurrence of the catastrophe which killed more than 200,000 people in a dozen countries in 2004.

"The Indian Ocean Tsunami was probably the loudest wake up call in the recent history about the need to strengthen early warning capabilities and to reduce risk and vulnerability globally," UN Assistant Secretary-General for Humanitarian Affairs Margareta Wahlström told the opening session of the three-day meeting.

She called on participants "not to rest until every coastal community in the Indian Ocean region, both in Africa and Asia has ready access to early warnings of tsunami."

Ever since the 2004 tsunami struck, the UN has been at the forefront of efforts to set up early warning systems, not only in the Indian Ocean but in many other vulnerable regions as well. At the time such a system based on quake and tidal sensors, fast communications, alarm networks ranging from radio to cell phones, and disaster preparedness training existed only for Pacific Rim countries.

Had one operated in the Indian Ocean, it would have given hundreds of thousands of people several hours between the time the quake spawned the tsunami off the Indonesian island of Sumatra and its landfall in places like Sri Lanka to flee to higher ground.

"The Indian Ocean Tsunami of 2004 killed over 200,000 people," UN Economic and Social Commission for Asia and the Pacific (ESCAP) Executive Secretary Kim Hak-Su said.

"Out of the pain of that period, we have launched a dynamic programme of UN inter-agency programs, with good progress under the guidance of the IOC Intergovernmental coordination group," he added, referring to the UN Educational, Scientific and Cultural Organization/Intergovernmental Oceanographic Commission (UNESCO/IOC) which set up the group last year.

The workshop, organized by the UN International Strategy of Disaster Reduction (ISDR), UNESCO/IOC, ESCAP and other regional partners, expects to share experiences of good practices and lessons learned from different countries in their efforts to integrate early warning systems with clear guidance on prevention strategies for governments and a concrete agreement on how to coordinate action in the region.

From: UN News Service, http://www.un.org/apps/news/printnews.asp?nid=18850
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Alaska's earthquake and tsunami outreach

Alaska's Division of Homeland Security and Emergency Management distributed over 10,000 copies of the Division's earthquake and tsunami preparedness booklet *Are you Prepared for the Next Big Earthquake in Alaska?* through several private, public and governmental agencies, as well as inserting them in six rural newspapers.

The State's tsunami partnership led to significant mitigation program results. The group conducted remote community assistance visits bringing Earthquake Preparedness, TsunamiReady, StormReady, the State's Tsunami Sign Program Awareness, and Disaster Preparedness information to Whittier, Unalaska in the Aleutians, and Ketchikan and Metlakatla, located in the southeast Alaska panhandle.

From: EQ Earthquake Quarterly, Fall 2005, p. 6

California Governor's Office of Emergency Services (OES) tsunami program activities

The 2004 Sumatran earthquake and tsunami intensified both interest and action by local governments to the tsunami threat. A month prior to the tsunami, OES presented a "tool kit" workshop to emergency managers from the 15 coastal counties. That workshop and the tsunami created demand for the presentation of individual county (Operational Area) planning and exercise workshops during the spring in San Diego, Ventura, San Mateo, San Francisco, and Orange Operational Areas. Staff responded to inquiries from both congressional and state legislative committees and members for information about the program and needs for more robust preparedness, alert and warning, and mitigation. Tsunami Task Forces were established in Los Angeles, Ventura and Orange Operational Areas and supported by staff from the Earthquake Program and Southern Region.

OES staff participated in the State's response to the June 14, 2005 tsunami warning. "After Action" assessments were documented and presented to legislative hearings and to the media. In July, program

staff convened in San Francisco a "tsunami summit" of the 15 coastal counties to assess their response to the warning and to develop proposals for enhancing state and county level program activities.

On October 11 and 12, 2005, the California Geological Survey hosted a workshop on potential tsunami sources in California's coastal waters. The Governor's Office of Emergency Services and the National Tsunami Hazard Mitigation Program, of which both CGS and OES are members, funded the workshop. The purpose of the workshop was to examine the state of understanding of tsunami sources, both earthquakes and submarine landslides, and to consider probabilistic approaches to evaluating the tsunami run-up hazard. Participants included experts in California offshore tectonics and landslide mapping and in tsunami modeling.

Participants identified areas where there is insufficient seal-floor mapping to identify landslide hazards. Participants also noted that the earthquake hazard, in particular from earthquakes that could have large vertical movements and generate tsunamis, is not well understood due to the blind nature of many thrust faults in California. CGS staff is compiling the results of the workshop and will publish them in 2006.

Tsunami training and exercises were included in the Annual Meeting of the California Emergency Services Association. James Goltz organized the workshop with the National Weather Service and CSTI, to include issues of tsunami planning, education and evacuation procedures. More than 50 conference attendees participated.

James Goltz developed and presented a three day tsunami planning and exercise course for CSTI I April. Thirty-five local government and utility agency staff participated in the training that culminated in a response exercise. The course will be offered annually by CSTI as justified by demand.

Tsunami evacuation planning maps.

Evacuation planning maps were produced by OES Coastal Region GIS staff and distributed to Operational Areas and approved recipients in response to multiple requests (especially since the December 2004 Indian Ocean event). In the year 2005 requests for tsunami maps from both local and state government agencies as well as private industry and the public increased.

Coastal evacuation areas have been analyzed, mapped and field verified in the following counties: San Francisco (mapped 1998), San Mateo (mapped 1998/1999), Santa Cruz (mapped 2003), Monterey (mapped 2003), Ventura (mapped 2004), Los Angeles (mapped 1997), Orange (mapped 2004), San Diego (mapped 1997), Santa Barbara (mapped 1997).

The entire California coast will be mapped on an approved funding schedule from National Oceanic and Atmospheric Administration (NOAA). Outreach, planning and collaboration among OES Emergency Services Coordinators, OES-GIS Unit, the scientific community, County Operational Areas and local jurisdictions are also ongoing.

Data have been received and are being processed for portions of the following areas: Marin-Pt. Reyes north and south; Mendocino; Humboldt-Humboldt Bay, Orick; Del Norte-Crescent City area; and San Luis Obispo-Morro Bay, Port San Luis.

From: EQ Earthquake Quarterly, Fall 2005, p. 9-10.

[Oregon] April 23, 2006 tsunami summit by Lincoln County students

The feature of the summit was the premiere of television public service announcements (PSAs) and other film projects written, produced and directed by students involved in the Lincoln County Tsunami Awareness Project (TAP). TAP is an innovative creation of Lincoln County and the Northwest Film Center, combining education with the art of filmmaking. The project coordinators are Assistant County Counsel Rob Bovette and Ben Hensley and Peter Vince from Lincoln County School District. Dr. George Priest from the Department of Geology and Mineral Industries (DOGAMI) provided advice and education about tsunamis.

The program is intended to increase youth and adult awareness of the tsunami danger and basic responses to it. It was sponsored by Pacific West Ambulance, the Lincoln County Sheriff's Office, Congresswoman Darlene Hooley, and the County Counsel's Office.

From: http://www.newportnewstimes.com/articles/2006/04/14/news/news07.txt

[Oregon] Tsunami program

Following the Indian Ocean earthquake and tsunami in 2004, OEM and DOGAMI provided testimony to U.S. House Science Committee on Oregon's tsunami preparedness. Both agencies have continued to work with Congressional staff in support of proposed tsunami legislation from the U.S. Senate (SB 50) and House of Representatives (HR 1674).

OEM and DOGAMI provided dozens of presentations on similarities and implications of Sumatran subduction zone with Cascadia subduction zone, including to the following audiences: Oregon Seismic Safety Policy Advisory Commission, Oregon Senate President Peter Courtney, U.S. Senators Gordon Smith (staff) and Ron Wyden, American Institute

of Architects, as well as numerous town hall and local official meetings along the Oregon coast.

Both agencies collaborated with other state agencies to hold a Tsunami Workshop in Salem and Tsunami Summit at Oregon State Capitol. Over 90 representatives from the Oregon coast attended the workshop and the Summit was attended by the Governor and other elected officials.

The City of Seaside completed a nine-month Tsunami Outreach Pilot Project funded by the National Tsunami Hazard Mitigation Program (NTHMP). The project, which included a tsunami outreach coordinator position, conducted a before-and-after public opinion survey on tsunami safety and a tsunami outreach with an objective to provide one-on-one contact with every person in Seaside. The City received a WSSPC Excellence for Outreach to the General Public Award.

OEM prepared an After Action Report for the June 14,2005 tsunami warning that is estimated to have caused 10,000 people on the Oregon coast to evacuate. The report reviews the timeline of notification, emergency operations and presents ten findings and recommendations.

Work has proceeded with tsunami inundation mapping for the City of Florence and is underway for Cannon Beach. A tsunami evacuation brochure is under development for South Beach State Park as a pilot for other Oregon State Park brochures.

Nineteen existing tsunami evacuation brochures were reprinted (approximately 10,000 copies each), with funding from the NTHMP, to support the requirements for Oregon Senate Bill 557 (2005) to provide tsunami information to transient lodging and tourist-based locations.

A Native American historical marker depicting the 1700 A.D. Cascadia earthquake and tsunami was installed and dedicated in November 2005.

Submitted by Yumei Wang, Director of Geohazards Program, Oregon Department of Geology and Mineral Industries, and Jay Wilson, Earthquake and Tsunami Program Coordinator, Oregon Emergency Management.

From;. EQ Earthquake Quarterly, Fall 2005, p. 13-14.

Hawaii State Civil Defense (SCD)

The State of Hawaii Hazard Mitigation Forum provided technical assistance to the County of Hawaii for the completion of their multihazard mitigation plan which included earthquake and tsunami. In co-operation with private partners, the Forum actively supported legislation (Hawaii Senate Bill 960, *Disaster Emergency Preparedness Act of 2005*, which passed unanimously) to allocate funding for mitigation initiatives, i.e. upgrading the tsunami maps, public awareness and education, lowering the emergency shelter deficit, upgrading the statewide siren warning system, and initiating a mitigation grant program for "safe rooms." The Forum initiated a working group to develop new emergency shelter criteria and participated in the 2005 Building Industry Association "Build-It-Right Expo"' promoting preparedness and prevention. Demonstrating its resolve to view mitigation from an all-hazard approach, the Forum additionally sup-ported a county-level initiative (City and County of Honolulu) to conduct a wind speed-up study. The study will provide the necessary data to migrate to a higher building code.

Tsunami

April was again proclaimed by the Governor as Tsunami Awareness Month. During April a plethora of events were planned including a successful media awareness campaign focused on Urgent Locally Generated Tsunami issues and information on tsunami mitigation for boat owners and small boat harbors.

In 2005 State Civil Defense conducted two statewide tsunami exercises. On April 1, an exercise for a Distant Tsunami was conducted that included the Pacific Tsunami Warning Center (PTWC); all of the counties and an internal staff exercise at State Civil Defense. On October 3, an Urgent Local Tsunami exercise was conducted utilizing a scenario depicting a locally generated tsunami originating off the west (Kona) coast of the Island of Hawaii. This exercise was coordinated with the monthly testing of the warning sirens. The participants included Pacific Tsunami Warning Center, Hawaii County Civil Defense Agency, Maui County Civil Defense Agency, Kauai County Civil Defense Agency, Oahu Civil Defense Agency, the State and County Warning Points, and National Weather Service concurrent with an internal staff exercise at the State Civil Defense.

Tsunami mapping continues through an effort coordinated by State Civil Defense with the University of Hawaii to upgrade existing one-dimensional tsunami evacuation maps. Currently two-dimensional inundation maps are being generated. These inundation maps will be used to draw new evacuation maps which will replace the current one-dimensional evacuation maps in the telephone books. These maps will be published in digital form on the Internet.

Submitted by Jeanne Branch Johnston, Earthquake and Tsunami Program Planner, Hawaii State Civil Defense

From:. EG Earthquake Quarterly, Fall 2005, p. 11-12.

All tsunami signs point to Hawai'i

By Jan TenBruggencate, Advertiser Science Writer

While the five most severe tsunamis to hit here in the past 60 years have come from three areas — Chile, Russia's Kamchatka region, Alaska and the Aleutian Islands — Hawai'i is at risk from almost every point of the compass.

Emergency preparedness officials maintain that no Hawaiian shoreline is safe from a tsunami. And just because a tsunami hasn't hit Waikiki or Wai'anae in a century or more is no reason to feel secure there.

"If it's a sheer cliff at least 50 feet high and you've got your house up there, you're probably all right," said Daniel A. Walker, retired University of Hawai'i seismologist and O'ahu Civil Defense tsunami adviser.

Otherwise, you should have a tsunami evacuation plan. The Dec. 26, 2004, Indian Ocean tsunami, that killed or left missing more than 220,000 people in 11 countries, underscored that.

"It was a wake-up call. It rattled our cage," Walker said.

Hawai'i's disaster-management experts are now taking a fresh look at quake zones in areas that have not traditionally generated Pacific-wide events.

"The issue of a large event in the southwest Pacific or the western Pacific is something we are ad-dressing as we speak," Walker said.

Charles "Chip" McCreery, director of the Pacific Tsunami Warning Center, said those regions include the area around Japan and the region from Tonga to the Solomon Islands and Papua New Guinea. He said he also is keeping an eye on the West Coast from Northern California to British Columbia.

"Every 300 to 500 years, there's a major earthquake there (along the West Coast). The next time that pops off, it will be a big problem for those areas, but the tsunami will hit Hawai'i," he said. With seismically active zones rimming the Pacific Ocean, McCreery said, "We're probably at risk from any-place."

Tsunamis that have caused damage in the Islands in recent generations have come from the Aleutians (1946 and 1957), Kamchatka (1952), Chile (1960) and Alaska (1964), and from an earthquake near Kalapana on the Big Island (1975). A 1994 earth-quake in Japan's Kuril Islands prompted a statewide coastal evacuation in Hawai'i, but the wave measured only a few inches locally.

Hawai'i's tsunami experts meet regularly at O'ahu Civil Defense offices, where they're working to anticipate the next tsunami by studying seismic scenarios. They're also reviewing problems that hampered the response to the Indian Ocean tsunami, the Civil Defense response to Hurricane Katrina and a confusing tsunami warning last June in California.

On June 14 last year, a quake of about 7.4 magnitude shook at 7:51 a.m. off Northern California. Within minutes, the Alaska-based West Coast/Alaska Tsunami Warning Center issued a tsunami warning for the region. The Hawai'i-based Pacific Tsunami Warning Center, meanwhile, issued a notice that there was no Pacific-wide tsunami. Consequently, emergency agencies issued conflicting reports — some beach areas were evacuated while others were told there was no threat. In addition, some emergency communications equipment was found to be inoperative.

In the end, the tsunami turned out to be too small to cause damage. But confusion surrounding the incident alarmed Hawai'i Civil Defense officials, although they point out that Hawai'i's own warning system is different.

"Part of the problem is that they haven't practiced any of that, and we do," said Jeanne Johnston, earthquake and tsunami program manager for state Civil Defense in Hawai'i.

Hawai'i emergency officials take their tsunami information from just one source: the Pacific Tsunami Warning Center. Communication lines between state and county emergency centers are tested regularly, and personnel train in disaster scenarios frequently, Johnston said.

In terms of providing warnings, Hawai'i is in better shape than it's ever been, largely because of an infusion of cash in response to the Indian Ocean disaster. McCreery's staff is now increasing from eight members to 15, which will permit 24-hour staffing of warning-center offices. And there also is an increase in detection equipment already in place or soon to be installed on land and in the oceans around the Islands, he said.

One of the key pieces of equipment is a buoy attached to a seafloor sensor that detects the strength of a passing tsunami. Before the Indian Ocean tsunami, there were six buoys, known as Deep-ocean Assessment and Reporting of Tsunami or DART buoys. There are now 10 and there will be a total of 32 in two years — covering the ocean floor from all directions that pose threats to Hawai'i.

"They'll be out there to cover all the major seismic zones in the Pacific," McCreery said. The biggest tsunami response issue in Hawai'i, several emergency officials said, is the readiness of the civilian population.

Kaua'i Civil Defense coordinator Mark Marshall said he is sure the emergency system will be able to inform the population of a pending disaster but is not sure the public will respond appropriately.

Tsunami evacuation maps are in the front of Hawai'i phone books, along with recommendations for contents of emergency kits and other disaster response information. Still, emergency preparedness officials worry that residents may not use information at their fingertips.

Marshall said that in a 2003 Japan tsunami, de-spite a robust emergency response mechanism and comparatively frequent emergencies, a large proportion of the population failed to evacuate after being warned.

Johnston said, "People are waiting for the government to protect them, but they need to be responsible for their own families."

From: Honolulu Advertiser; posted on March 7, 2006

Reprinted with permission

DHS joins with animal groups to encourage preparedness for pets

The U.S. Department of Homeland Security has joined with the American Kennel Club, the American Society for the Prevention of Cruelty to Animals, the American Veterinary Medical Association, and the Humane Society of the United States to encourage pet owners to prepare for emergencies. In conjunction with DHS' Ready campaign, the partners developed a new brochure that highlights the key steps pet owners should take to prepare themselves and their animals. The brochure suggests making a pet emergency supply kit including food, water, medicines and medical records, collar with ID tag, a leash or harness, and a picture of the pet with its owner. It also recommends having an emergency plan and learning which shelters will allow pets in the event of an emergency. For a copy of the emergency preparedness for pet owners' brochure, visit www.ready.gov/america/pets.html or call (800) 237-3239.

From: Natural Hazards Observer, v. 30, no. 6, p. 8.

Tsunami monitoring now on all U.S. Coasts

In April, the National Oceanic and Atmospheric Administration (NOAA) announced that five of seven planned Deep-Ocean Assessment and Reporting of Tsunami (DART) buoy stations had been installed in the Atlantic and the Caribbean as part of the expansion of the U.S. tsunami warning system. The newly installed stations are a more robust DART II that are equipped with advanced two-way satellite communication. NOAA expects the network to total 39 DART II stations by the end of March 2008 (32 in the Pacific and 7 in the Atlantic). With the addition of the new stations off New Orleans, Louisiana; Charleston, South Carolina; Miami, Florida; and San Juan, Puerto Rico (two), NOAA's tsunami warning centers can now provide tsunami watches and warnings to the entire U.S. Atlantic Coast, Gulf of Mexico, Puerto Rico, the U.S. Virgin Islands, and eastern Canada. Visit the DART Web site for background, technical information, and real-time data at http://nctr.pmel.noaa.gov/Dart/.

From: Natural Hazards Observer, v. 30, no. 6, p. 8-9.

New Ready Business Mentoring Initiative

Designed as a call-to-action for business leaders, the U.S. Department of Homeland Security (DHS) has launched a Ready Business Mentoring Initiative. The initiative includes the Ready Business mentoring guides (mentor and user versions), which are designed to teach business owners and managers about affordable ways to better protect their businesses. DHS collaborated with the Education Disaster Extension Net-work to create presentation materials to support the guides and help business and community leaders host and deliver business preparedness workshops and training sessions. Download the guides and the presentation materials at www.ready.gov/business/mentor/.

From: Natural Hazards Observer, v. 30, no. 6, p. 10.

Tanzania, Kenya and Somalia chosen as tsunami warning centers

A Chinese online newspaper, quoting the Dar es Salaam-based French embassy, said Tanzania, Kenya, and Somalia have been selected to become tsunami warning centers. The three East African cities, Dar es Salaam, Mombassa, and Tamatave, will be provided equipment by French Meteo.

Washington EMD develops new web-based EAS system

Under the auspices of a U.S. Department of Homeland Security (DHS) pilot project, Washington Emergency Management Division (EMD) has developed a new system for originating and disseminating Emergency Alert System (EAS) messages.

The new system will utilize a web-based system that will generate a fully compatible EAS message in the new international Common Alerting Protocol format. The CAP format will allow all types of receiving devices, such as television, radios, pages, sirens, and cell phones, to receive EAS messages.

Don Miller, supervisor of EMD's telecommunications section, said the new system utilizes a text-to-speech generator that will eliminate past EAS audio problems and allow for the scrolling of the actual alert text on television screens.

The system will permit the public to sign up for EAS alerts by ZIP code or county.

Because it is compatible with the National Oceanic and Atmospheric Administration's Hazcollect project, the new system will enable alerts to be transmitted over the National Weather Service's weather radio network.

Miller said DHS will field the new EAS system in 12 East Coast states before the start of this year's hurricane season. Washington will be in line for the system by the end of the summer, he said.

Additional information on the system can be found in a PowerPoint program located on the EMD website at www.emd.wa.gov or by calling Don Miller at 253 512-7035; d.miller@emd.wa.gov.

From: Emergency Responder, March-April 2006, p. 6.

Washington tsunami awareness campaign targets media, coastal residents

Washington Emergency Management (EMD) staff embarked on an intensive tsunami awareness campaign for media and coastal residents in April.

George Crawford, manager of EMD's earthquake program, helped lead a series of public meetings in Westport, Aberdeen and Ocean Shores during the first full week in April. The meetings included Tim Walsh, geologic hazards program manager for the state Department of Natural Resources; Brian Atwater, geologist with the U.S. Geological Survey; and Ted Buehner, warning meteorologist for the National Weather Service in Seattle.

Public meetings in Westport, Ocean Shores, and Aberdeen highlighted the nature of tsunamis and the hazard that they pose for the Washington coast.

Walsh described how the Washington coast has a geologic condition that is similar to the Banda Aceh region of Indonesia where the 2004 earthquake and tsunami killed more than 100,000 persons.

He said Washington residents have a better chance of seeing a Cascadia subduction zone earthquake in their lifetime than dying of unnatural causes. The lifetime odds of dying in a car accident are one in 78, while the odds of seeing a Cascadia subduction zone tsunami are one in 6.5 to 7.

Rob Harper, EMD public information officer, and Buehner met individually with Seattle area media on April 20, to distribute new Tsunami Media Kits.

The kit is designed to help media when a tsunami becomes breaking news. The kit includes compact discs of tsunami pictures and video, a list of local subject matter expert contacts, tsunami fact sheets and maps of the coastal areas which could be inundated by possible tsunami waves.

The booklet and media outreach program, which also will be used by coastal county emergency managers, was prepared by the EMD at the direction of the State/Local Tsunami Working Group.

From: Emergency Responder, March-April 2006, p. 6.

Washington Governor Gregoire announces new state emergency management grants

Gov. Chris Gregoire today announced the award of the state's first Emergency Management Prepared-ness Assistance Grants. The grants, which total $1.6 million, are awarded to 30 individual organizations, agencies, and tribes.

"These grants represent state investments in community-based programs that protect our citizens and prepare for emergencies by educating our first-responders and all Washingtonians," said Governor Gregoire.

"We hope citizens and legislators will see the value and importance of these targeted public safety investments when future budget appropriations are considered," said Maj. Gen. Timothy J. Lowenberg, director of the Washington Military Department. "We will provide a summary of the program in an interim report that will be filed early in the 2007 legislative session."

The Fiscal Year 2007 state budget authorized the competitive grant program for high impact, short term projects. Eligible projects included the training of public officials; development of comprehensive emergency management plans; administration of joint exercises; and projects that strengthen emergency response, mitigation, preparedness and coordination.

Grants were available to local governments, tribal governments, regional agencies, regional incident management teams and private organizations. Eighty- nine grant applicants made requests

totaling $8.4 million. Representatives of state agencies, academic institutions and emergency management agencies helped the state Emergency Management Division to review and rank the applications.

These funds are available for one year only, and applicants will have approximately ten months to accomplish projects.

Additional information on the Emergency Management Preparedness Assistance Grants will be available on the EMD website at www.emd.wa.gov. A list of the grant awards can be found in the May-June *Emergency Responder*, p. 2 at http://emd.wa.gov/4-pio/newsletters/nltr-may-jun-06.pdf.

Washington State Military Department Emergency Management Division (EMD) and Washington State Department of Natural Resources, Division of Geology and Earth Resources report (excerpts)

The Tribal legends video *Run to High Ground* received the 2005 WSSPC Award in Excellence for Overall Excellence in Mitigation and Education Outreach to Schools. The video has been released to the twenty-six Indian Ocean countries for their outreach and public education programs.

In partnership with the City of Seattle and NOAA, the State installed three AHAB radio systems on the Seattle waterfront for all-hazard warning purposes. Chemical detectors, a weather station, cameras and seismometers were placed on these systems which allow real-time reporting for all hazards. This was completed in August 2005.

Washington Division of Geology and Earth Resources (WDGER) developed and produced tsunami inundation maps for Anacortes and Whidbey Island. The maps will be used to develop tsunami evacuation brochures for the affected areas and to develop an earthquake/tsunami risk communications program for citizens and visitors. WDGER also completed the tsunami evacuation maps for 10 coastal communities in Grays Harbor and Pacific Counties [http://www.emd.wa.gov/5-prog/prgms/eq-tsunami/tsunami-idx.htm]; published the NEHRP site class maps and liquefaction maps for 39 counties [http://www.dnr.wa.gov/geology/hazards/hmgp.htm]; and created source/scenario for the Tacoma modeling.

Submitted by George Crawford, Earthquake Program Manager, EMD

From: EQ Earthquake Quarterly, Fall 2005, p. 14-15.

Northwest Pacific Tsunami Advisory Center inaugurated and service expands

On 1 February 2006, the Northwest Pacific Tsunami Advisory Center (NWPTAC), was formally inaugurated. Under the auspices of the Japan Meteorological Agency (JMA) the NWPTAC began operation on an interim basis on 28 March 2005. The NWPTAC advisory is the product offered, which provides earthquake and possible tsunami information to recipient countries. Issued in conjunction with PTWC bulletins (sent by the Pacific Tsunami Warning Center in Ewa Beach, Hawaii), each advisory contains earthquake information, including analysis of tsunamigenic potential, estimated wave heights, estimated arrival times, and notes any observed tsunami information.

The advisory is available to nations in the region who have designated a 7/24 Tsunami Focal Point for its receipt. A handbook describing the details of the tsunami advisory issued by the NWPTAC was prepared by JMA. The handbook explains the type of earthquake data obtained in the advisories and will be used in training courses. A meeting took place on 14 March in Ewa Beach to coordinate messaging between the new JMA advisory and PTWC bulletins.

To encourage a fuller dialogue on the tsunami and earthquake risks of the South China Sea region and the requirements for a permanent tsunami early warning and mitigation system for this region, the IOC was pleased to announce a regional symposium planned for 27-28 April 2006 in Kuala Lumpur. The roundtable dialogue on earthquakes and tsunamis was organized and hosted by the Malaysia Ministry of Science, Technology & Innovation and took place just prior to the meeting of the ICG/PTWA-XXI in Melbourne, Australia 1-5 May '06.

A communication test of the new messaging service was conducted on 22 March 2006. Firstly, at 2:00UTC a test message went out via fax or GTS. 10 minutes later, at 2:10 UTC, dissemination of the test message was made via e-mail. Each of the organizations listed by country below participated and returned a test evaluation form. [Editor's note: The chart "Results of the first NWPTAC Advisory Communications Test" is available online at the website given below.]

Countries participating: People's Republic of China, Republic of Indonesia, Republic of Korea, Malaysia, Independent State of Papua New Guinea, Republic of the Philippines, Russian Federation, Singapore, Thailand, and Socialist Republic of View Nam.

From: Tsunami Newsletter, v. 38, no. 1, Jan-Apr 2006, p. 4-5

http://ioc3.unesco.org/itic/categories.php?category_no=285

WEBSITES

http://www.gcn.com/online/vol1_no1/41113-1.html

A new open IT standard, capable of facilitating data sharing across local, regional, national and international governments and organizations, has been ratified by the Organization for the Advancement of Structured Information Standards.

http://ioc3.unesco.org/ptws/working_groups_other_tsunami_meetings.htm

The full report of the ICG/PTWS seismic working group meeting, Honolulu, Hawaii, USA, 15-16 March 2006, by the Seismic Measurements, Data Collection and Exchange Working Group One builds upon the recommendations made in Chile and evaluates the strengths, weaknesses, and improvements to the seismic monitoring and evaluation capabilities of the Pacific Tsunami Warning and Mitigation System (PTWS).

From: Tsunami Newsletter, v. 38, no. 1, p. 6-7.

www.unisdr.org/asiapacific/asiapacific-index.htm

This new site from the United Nations International Strategy for Disaster Reduction provides information related to regional activities, events, and publications for the Asia and Pacific region and highlights achievements and progress made.

From: Natural Hazards Observer, v. 30, no. 6, p. 18.

www.washington.edu/admin/business/oem/special_needs_resources/

The *University of Washington Seattle Campus Report on Emergency Preparedness for Special Needs Populations* is available here along with other information about special needs emergency preparedness.

From: Natural Hazards Observer, v. 30, no. 6, p. 18.

www.empower-women.com/pages/1/

Emergency Management Professional Organization for Women's Enrichment (EMPOWER) was established to provide a forum to strengthen the presence and excellence of women in emergency management. This Web site was created to bring professionals together to share experiences, build skills, to expand & deepen industry knowledge.

From: Natural Hazards Observer, v. 30, no. 6, p. 19.

www.nap.edu/catalog/11619.html

This report summarizes the June 21, 2005, National Academies' Disasters Roundtable: The Indian Ocean Tsunami Disaster: Implications for U.S. and Global Disaster Reduction and Preparedness. Participants considered implications of the disaster for implementing effective tsunami mitigation, detection, warning, and emergency response systems and multihazard mitigation and preparedness as well as U.S. initiatives and how they are expected to tie into regional and global efforts.

From: Natural Hazards Observer, v. 30, no. 6, p. 21.

www.rms.com/Publications/IndianOceanTsunamiReport.pdf

Managing Tsunami Risk in the Aftermath of the 2004 Indian Ocean Earthquake and Tsunami by Risk Management Solutions provides an in-depth analysis of the global tsunami hazard and mitigating coastal risk.

From: Natural Hazards Observer, v. 30, no. 6, p. 21.

http://pubs.usgs.gov/fs/2006/3012/

Improving Earthquake and Tsunami Warnings for the Caribbean Sea, the Gulf of Mexico, and the Atlantic Coast, a 4-page U.S. Geological Survey/ NOAA fact sheet is now available online.

From: Natural Hazards Observer, v. 30, no. 6, p. 21.

www.law.berkeley.edu/library/disasters.html

Disasters and the Law: Katrina and Beyond is a new site from the Law Library at the University of California, Berkeley, featuring information related to the law's role in natural hazards mitigation and disaster preparedness, response, and recovery.

From: Natural Hazards Observer, v. 30, no. 6, p. 18.

www.heritage.org/Research/HomelandDefense/bg1923.cfm

This Heritage Foundation report, *Learning from Disaster: The Role of Federalism and the Importance of Grassroots Response* by James Jay Carafano and Richard Weitz, discusses the role of the federal government and the role that nongovernmental organizations, private sector initiatives, and individual civic deeds play during extreme emergencies.

From: Natural Hazards Observer, v. 30, no. 6, p. 18.

www.heritage.org/Research/HomelandDefense/SR06.cfm

Empowering America: A Proposal for Enhancing Regional Preparedness , a report from The Heritage Foundation, focuses on the importance of regional preparedness to building a national response system that allows local communities, states, and the federal government to work together during a catastrophic disaster.

From: Natural Hazards Observer, v. 30, no. 6, p. 18.

www.tisp.org/news/newsdetails.cfm?&newsID=727

The Infrastructure Security Project's *Guide for an Action Plan to Develop Regional Disaster Resilience* provides a framework for governments, service providers, and other involved organizations. The focus is on multihazards, with the goal of sensibly and cost-effectively securing interdependent cyber and physical critical infrastructures.

From: Natural Hazards Observer, v. 30, no. 6, p. 18.

PUBLICATIONS

Planning for a sustainable future—The link between hazard mitigation and livability

Resistance to disasters is a critical characteristic of a livable and sustainable community. This booklet illustrates how communities, whether in planning for hazard mitigation before disaster strikes or in initiating recovery planning after one occurs, can integrate the concepts and principles of sustainable development into each phase of mitigation planning. The booklet also shows how disaster resistance can be a catalyst to help communities in-corporate sustainable development practices into their day-to-day planning and development functions. Finally, the booklet gives real-life examples of communities that have successfully implemented sustainable development practices in their community and describes how citizens and local officials can become advocates for disaster resistance as a part of sustainable development and livability in their communities.

Introduction (1.41MB PDF)

A Vision of Sustainable Communities (445KB PDF)

Disaster Prevention: A Catalyst for Change (720KB PDF)

Building Blocks for a Multi-Hazard Approach to Mitigation (415KB PDF)

The Planning Process: The Foundation of Disaster Resistance (391KB PDF)

Disaster Recovery: A Window of Opportunity (388KB PDF)

Economic Sustainability: An Essential Component of Successful Recovery and Looking to the Future (277KB PDF)

Resources (including Websites, Federal Technical Assistance and Funding, and References) (1.82MB PDF)

This document is also available from the FEMA Publications Warehouse at no charge by calling 1-800-480-2520 and requesting FEMA 364.

Online:
http://www.fema.gov/plan/mitplanning/linkmitliv.shtm

Getting Ready for Disaster—One Family's Experience

This is a citizen preparedness DVD from the Federal Emergency Management Agency (FEMA), released to help people prepare for disasters. The DVD guides viewers through important disaster preparedness steps, addressing seven critical issues: Getting Informed, Making a Plan, Assembling a Disaster Supplies Kit, Food and Water in an Emergency, Helping Children Cope with Disaster, Disability and Special Needs Populations, and Getting Involved—Citizen Corps. The DVD was designed to be used with *Are You Ready? An In-depth Guide to Citizen Preparedness* & the accompanying manual for teaching preparedness principles.

Free copies of the DVD (FEMA 500) and the *Are You Ready* guides (IS-22 and IS-22FG) are available through the FEMA Distribution Center at (800) 480-2520. Requests are currently limited to one DVD per caller. In the coming months, the DVD will be translated into Spanish and will be available in both languages on a single DVD. Video files, a transcript, and the guide can also be downloaded from www.fema.gov/areyouready/.

From: Natural Hazards Observer, v. 30, no. 6, p. 7-8.

Improving earthquake and tsunami warnings for the Caribbean Sea, the Gulf of Mexico, and the Atlantic Coast

"The magnitude-9 Sumatra-Andaman Islands earthquake of December 26, 2004, increased awareness in the United States of the destructive hazard posed by earthquakes and tsunamis. The U.S. Government, working with international partners, is responding with a real-time system that will significantly improve global earthquake and tsunami monitoring. This fact sheet describes a project to improve earthquake and tsunami monitoring along a major portion of our vulnerable coastal regions, the Caribbean Sea, the Gulf of Mexico, and the Atlantic Ocean. The project is a result of collaboration between the U.S. Geological Survey (USGS) and the National Oceanic and Atmospheric Administration (NOAA)."

From: U.S. Geological Survey Fact Sheet 2006-3012, available online:
http://pubs.usgs.gov/fs/2006/3012

Service assessment—West Coast tsunami warning, June 14, 2005

"On June 14, 2005, an earthquake measuring magnitude 7.2 occurred approximately 90 miles off

the northern California coast, prompting NOAA's West Coast and Alaska Tsunami Warning Center to issue a tsunami warning for the West Coast of the United States.

While no tsunami was generated by the earthquake, the event did prove to be, as one emergency manager put it, "*an excellent test*." Processes and procedures were exercised, and in some cases, problems within the system were noted and are being addressed.

This assessment evaluates the performance of the National Weather Service (NWS) during the event and provides recommendations to improve services in the future. It takes into consideration the affected audiences in the emergency management community as well as the public."

Excerpted from the Preface, by David L. Johnson, Assistant Administrator for Weather Services, November 2005.

The full report is available: http://www.weather.gov/os/assessments/pdfs/WestCoastTsunamiFinal.pdf

U.S. tsunami preparedness—Federal and state partners collaborate to help communities reduce potential impacts, but significant challenges remain

Early June, the U.S. Government Accountability Office issued a report to Congressional committees and Senator Dianne Feinstein, *U.S. tsunami preparedness—Federal and state partners collaborate to help communities reduce potential impacts, but significant challenges remain*.

"GAO recommends, among other things, that NOAA take steps to develop software for tsunami loss estimation, conduct periodic end-to-end warning system tests, increase high-risk community participation in its tsunami preparedness program and pre-pare risk-based strategic plans for its efforts."

The report is available: http://www.gao.gov/cgi-bin/getrpt?GAO-06-519.

White Paper on the SDR Grand Challenges for Disaster Reduction

In the process of articulating its expanded multi-hazard vision, MCEER's Executive Committee developed a White Paper volunteering perspectives that should be considered in the formulation of a national research strategy for disaster loss reduction. The white paper is a commentary on the Grand Challenges for Disaster Reduction report, published by the Subcommittee on Disaster Reduction (SDR) of the National Science and Technology Council Committee on Environment and Natural Resources.

MCEER advocated that a critical part of this research effort should focus on the mitigation of, and response to, the impact of extreme events on critical facilities and lifelines. The failure of these key infrastructure systems is the cause of most of the disruption during and following disasters. In this context, national needs require that solutions be integrated across various hazards. However, the objective to achieve a synergy of solutions across the continuum of hazards is something that has just barely begun to be exploited or even investigated. The White Paper develops in detail a series of recommended research initiatives that should be undertaken in a multi-hazard perspective. It is available from the Publication section of the MCEER website at http:..mceer.buffalo.edu/publications/white_papers/05-SP09/default.asp

From: MCEER Bulletin, v. 20, no. 2, p. 14.

A Legal Guide to Homeland Security and Emergency Management for State and Local Governments

Ernest B. Abbott and Otto J. Hetzel, editors. ISBN 1-59031-593-6. 2005. 300 pp. $94.95. Available from the American Bar Association, Publication Orders, PO Box 10892, Chicago, IL 60610-0892; (800) 285-2221; e-mail: orders@abanet.org; www.ababooks.org/.

Homeland security and emergency management is now such an important responsibility of state and local governments that their attorneys must understand and comply with the changing requirements and new issues to respond to threats of terrorism and natural disasters. This guide covers both the basic structure of the homeland security and emergency management system and presents detailed analysis of specific areas (e.g., applying for federal preparedness funds, negotiating intergovernmental agreements, applying for disaster assistance, and managing the impact of catastrophic events).

From: Natural Hazards Observer, v. 30, no. 6, p. 24.

National Incident Management System: Principles and Practice

Donald W. Walsh, Hank T. Christen, Geoffrey T. Miller, Christian E. Callsen Jr., Frank J. Cilluffo, and Paul M. Maniscalco. ISBN 0-7637-3079-3. 2005. 244 pp. $24.95. Available from Jones and Bartlett Publishers, 40 Tall Pine Drive, Sudbury, MA 01776; (978) 443-5000, (800) 832-0034; e-mail: info@jbpub.com; www.jbpub.com/.

Designed for all emergency response departments, including fire, law enforcement, emergency

medical service, hospitals, public works, and private-sector response organizations, this book translates the goals of the original National Incident Management System (NIMS) from concepts into capabilities and provides responders with a step-by-step process to understanding and implementing NIMS. It uses case studies to help readers understand how to effectively incorporate NIMS into their departments or jurisdictions and provides checklists to assist with implementation.

From: Natural Hazards Observer, v. 30, no. 6, p. 24.

Crisis & Emergency Risk Communication: By Leaders for Leaders

57 pp. Available free online from the Centers for Disease Control; www.cdc.gov/communication/emergency/leaders.pdf

This resource gives leaders tools to help them speak to the public, media, partners, and stakeholders during an intense public-safety emergency. Topics include the psychology of communicating in a crisis, the leader's role as a spokesperson, working with media during a crisis, and public health and media law.

From: Natural Hazards Observer, v. 30, no. 6, p. 24.

Emergency Response Planning for Corporate and Municipal Managers

Paul A. Erickson. Second edition. ISBN 0-12-370503-7. 2006. 432 pp. $69.95. Available from Elsevier, Order Fulfillment, 11830 Westline Industrial Drive, St. Louis, MO 63146; (800) 545-2522; e-mail: usbkinfo@elsevier.com; http://books.elsevier.com/.

The primary market for this book is students of emergency planning, management, and response; security, disaster recovery, loss prevention, and business continuity professionals and consultants; municipal managers involved in emergency planning and response; and corporate risk management/hazards professionals. The book outlines comprehensive emergency planning and discusses the major elements of an emergency response plan. It also examines types of hazards and risks, discussing issues that must be given special attention in the development and implementation of any emergency response plan.

From: Natural Hazards Observer, v. 30, no. 6, p. 24.

Principles for Temporary Communities

John K. McIlwain, Alexa Bach, Mary Beth Corrigan, Richard Haughey, Prema Katari, George J. Kelly, and Michael Pawlukiewicz. ISBN 0-87420-957-0. 2006. 30 pp. $10.00. Available free online from the Urban Land Institute, 1025 Thomas Jefferson Street NW, Suite 500 West, Washington, DC 20007; (202) 624-7000; e-mail: customerservice@uli.org; www.uli.org/.

The purpose of this booklet is to apply community-building expertise and experience to the planning and management of temporary communities for disaster victims. It argues that a temporary community should meet the full range of its residents' needs—not only for shelter, but for safety, social services, employment, education, recreation, and a sense of place, ownership, and community. Features include how to plan in advance for temporary shelter, minimize disruption to surrounding neighborhoods, make temporary communities safer and more attractive, provide transportation options, offer housing that meets a variety of needs, create a sense of community responsibility, and devise a strategy for closing the community.

From: Natural Hazards Observer, v. 30, no. 6, p. 24-25.

Management of Dead Bodies after Disasters: A Field Manual for First Responders

Oliver Morgan, Morris Tidball-Binz, and Dana Van Alphen, editors. ISBN 92-75-12630-5. 2006. 58 pp. Free. Available from the Pan American Health Organization (PAHO), Area on Emergency Preparedness and Disaster Relief, 525 23rd Street NW, Washington, DC 20037; e-mail: disaster-publications@paho.org; www.paho.org/English/DD/PED/DeadBodiesFieldManual.htm.

This peer-reviewed field manual for first responders offers recommendations for nonspecialists to manage the recovery, basic identification, storage, and disposal of dead bodies following disasters. It also makes suggestions about providing support to family members and communicating with the public and the media. The principles outlined in the manual are being implemented and promoted by a variety of organizations, including PAHO, the World Health Organization, the International Committee of the Red Cross, and the International Federation of Red Cross and Red Crescent Societies.

From: Natural Hazards Observer, v. 30, no. 6, p. 25.

CLASSES/WORKSHOPS

New NIMS Resource Management Course

The latest addition to the Federal Emergency Management Agency's (FEMA) arsenal of independent study National Incident Management System (NIMS) courses is NIMS Resource Management, IS-703. This interactive computer-based

course provides the principles, tools, processes, and systems used in NIMS that incident managers need for effective resource management in times of disaster. Primary tasks addressed are establishing systems for describing, inventorying, requesting, and tracking resources; activating these systems; dispatching resources; and de-activating or recalling resources. Find out more, or take the class, at http://training.fema.gov/emiweb/is/is703.asp.

From: Natural Hazards Observer, v. 30, no. 6, p. 9.

CONFERENCES

July 23-29, 2006

The World Congress of Sociology, Durban, South Africa. Included in the program for the International Research Committee on Disasters are sessions entitled Disaster research: Guiding light or lost in the shadows of the 9/11 world; Impact of culture on emergency planning and response; Handling the tsunami dead; and other topics.

A joint session of RC 24 and RC 39 will discuss disasters and the environment:

"Disasters have been referred to as 'the monitor of development', as 'unpaid bills', and as an externalized 'debt of development.' They are symptomatic of the adaptive fitness of society's relationship to its environment. Sustainability and disaster are inversely related, especially when one recognizes that disasters are not always sudden and can also be slow-onset. The intensified activities of industrialization have exacerbated vulnerability and will likely increase the frequency and cost of disasters in the 21st century. Cultural expectations of safety and invulnerability can lead to disastrous consequences by encouraging social constructions that re incompatible with nature's constructions. Environmental problems act as catalysts of disaster and disasters can exacerbate environmental problems. Environmental sociology consists of the investigation of potential disasters involving the material environment. Disasters give a preview of what could happen if environmental problems are not solved. Findings of 'failures of prophecy', 'incubation of disaster', 'catastrophic mistakes', 'normal accidents', 'man-made disasters', 'repeat disasters', 'disasters by design', and 'unnatural disasters' have an ominous ring for environmental sociologists who seek to learn more not only about the social construction of environmental perceptions, discourse and practices but also about their material consequences."

From: Unscheduled Events, v. 25, no. 1, 2006, p. 8. http://www.sls.wau.nl/enp/ISA-RC24/RC24%20sessions%20Durban.doc (no. 14)

September 7-9, 2006

Disaster Mental Health Conference**.** Organizer: Disaster Mental Health Institute at the University of South Dakota. Rapid City, South Dakota**.** "Innovations in Disaster Psychology 2006: Culturally Responsive Disaster Mental Health" is the theme for this conference intended for disaster mental health professionals and health and mental health professionals. The overall objective is for participants to learn more about cultural responsiveness and sensitivity in disaster psychology. To learn more, contact the Disaster Mental Health Institute, University of South Dakota, SDU 114, 414 East Clark Street, Vermillion, SD 57069; (605) 677-6575; e-mail: dmhi@usd.edu; www.usd.edu/dmhi/conference.cfm.

From: Natural Hazards Observer, v. 30, no. 6, p. 15.

September 8-9, 2006

International Conference on Earthquake Engineering. Sponsor: University of Engineering and Technology Department of Civil Engineering, Lahore, Pakistan. This conference will unite civil engineers, architects, and geoscientists to discuss developments in earthquake engineering and to incorporate new construction technologies for the mitigation of hazards. Topics will include engineering seismology, low-cost earthquake-resistant houses, challenges in design and construction of multistory buildings, rehabilitation and retrofitting of structures, codes of practice and construction standards, and temporary shelters for those made homeless by disasters. To learn more, e-mail icee@uet.edu.pk; www.uet.edu.pk/icee/.

From: Natural Hazards Observer, v. 30, no. 6, p. 15.

September 18-22, 2006

NEMA 2006 Annual Conference**.** Organizer: National Emergency Management Association (NEMA). Orange Beach, Alabama. This conference provides an opportunity for emergency managers to meet to discuss the many challenges that face the community today, share solutions, grow professionally, and network with peers. Attendees will hear from those involved in shaping the future of homeland security and emergency management, strengthen relationships with partner organizations, and discuss NEMA's views on all-hazards emergency preparedness with the leadership in Wash-

ington. To learn more, visit www.nemaweb.org/?1590.

From: Natural Hazards Observer, v. 30, no. 6, p. 15.

September 26-27, 2006

6th Emergency Management Conference: Transport and Emergencies**.** Organizer: Emergency Services Foundation. Melbourne, Australia. This annual conference unites emergency management professionals from emergency services organizations; local, state, and federal governments; community groups; and industry. This year's focus will be on the impact of emergencies on transport services and infrastructure and the impact that transportation can have upon emergencies. To learn more, contact High Profile Exhibitions, PO Box 40, Hampton VIC 3188; +(03) 9533 1000; e-mail: info@hpe.com.au; www.hpe.com.au/emergservices/introduction.html.

From: Natural Hazards Observer, v. 30, no. 6, p. 16.

October 11-13, 2006

Third Annual Symposium of the Canadian Risk and Hazards Network**.** Montreal, Quebec**.** The theme for this event is "A Dynamic Risk Management Partnership: Lead by Example." The main objective of the symposium is to share experiences and best practices in emergency management. Researchers and practitioners in social sciences and physical sciences are invited to attend. To learn more, e-mail crhnet2006@uqam.ca; www.geo.uqam.ca/crhnet2006/crhnet2006en.htm.

From: Natural Hazards Observer, v. 30, no. 6, p. 16.

October 11-13, 2006

6th International Disaster and Emergency Resilience (IDER) Conference and Exhibition. Sponsors: International Association of Emergency Managers, the Institute of Civil Defence and Disaster Studies, and European Training and Simulation Association. Host: Italian Fire Service College. Rome, Italy. A goal of IDER is to identify and implement best practices for readiness, response, and recovery for disasters and major emergencies. To learn more, contact Andrich International, 51 Market Place, Warminster BA12 9AZ, UK; +44 1985 846181; e-mail: ider@andrich.com; www.iderweb.org/.

From: Natural Hazards Observer, v. 30, no. 6, p. 16.

November 7-10, 2006

Asian Seismological Commission (ASC) VI General Assembly**.** Bangkok, Thailand. The 2006 symposium is titled "Earthquake and Tsunami Disaster Preparedness and Mitigation." It will focus on increasing understanding of the physical processes of the 2004 Indian Ocean earthquake and tsunami, exchanging information on new research and technology, strengthening multidisciplinary cooperation in earthquake and tsunami disaster preparedness and mitigation, and enhancing the observation networks and data exchanges in the Asia Pacific and Indian Ocean regions. E-mail asc2006_loc@yahoo.co.th; http://asc1996.netfirms.com/asc2006/.

From: Natural Hazards Observer, v. 30, no. 6, p. 17.

November 8-11, 2006

2006 Disaster Mental Health Conference. Presenter: Rocky Mountain Region Disaster Mental Health Institute. Casper, Wyoming. The general theme of this conference is "Taking Charge in Troubled Times: Response, Resilience, Recovery, and Follow-up." Topics will include cultural issues, ethnicity, political concerns, religious considerations, children, and mitigation, among others. To learn more, contact the Rocky Mountain Region Disaster Mental Health Institute, PO Box 786, Laramie, WY 82073-0786; (307) 399-4818; e-mail: rockymountain@mail2emergency.com; www.rmrinstitute.org/.

From: Natural Hazards Observer, v. 30, no. 6, p. 17. ♦

Earth Science Week
October 8-14, 2006

The American Geological Institute (AGI) announced the theme for 2006, "Be a Citizen Scientist!" This year's Earth Science Week (ESW), October 8-14,will engage students and the public in conducting real "citizen science" research and help to spread science literacy.

Earth Science Week 2006 marks the ninth year AGI has sponsored this international event. Each year local groups, educators, and interested individuals organize activities to discover the Earth sciences and promote responsible stewardship of the Earth. ESW is supported by the U.S. Geological Survey and other geoscience organizations. Learn more at http://www.earthsciweek.org.

Order ESW Toolkits at http://www.earthsciweek.org/materials/index.html

Added to the NTHMP Library

July-August 2006

Note: These, and all our tsunami materials, are included in the online (searchable) catalog at http://www.dnr.wa.gov/geology/washbib.htm. Type 'tsunamis' in the Subject field to get a full listing of all the tsunami reports and maps in the collection.

Baba, Toshitaka, 2005, Highly resolved kinematic fault models of two Nankai Trough earthquakes derived from tsunami waveforms [abstract]: Eos (American Geophysical Union Transactions), v. 86, no. 52, p. F1770.

Baptista, M. A.; Miranda, J. M.; Luis, J. F., 2006, In search of the 31 March 1761 earthquake and tsunami source: Bulletin of the Seismological Society of America, v. 96, no. 2, p. 713-721.

Betzler, Christian; Reicherter, Klaus; Huebscher, Christian Peter; Becker-Heidmann, Peter, 2005, First evidence for an earthquake-induced tsunami and tsunamites in the western Mediterranean--The 1522 Almera earthquake [abstract]: Eos (American Geophysical Union Transactions), v. 86, no. 52, p. F1441.

Borrero, Jose C., 2005, Field survey of northern Sumatra and Banda Aceh, Indonesia after the tsunami and earthquake of 26 December 2004: Seismological Research Letters, v. 76, no. 3, p. 312-320.

Bruneau, Michael; Filiatrault, Andre; Lee, George; O'Rourke, Thomas; Reinhorn, Andrei; Shinozuka, Masanobu; Tierney, Kathleen, 2005, White paper on the SDR grand challenge for disaster reduction: MCEER, [33 p.].

Burbidge, David; Cummins, Phil R., 2005, Preliminary investigation of the hazard faced by Western Australia from tsunami generated along the Sunda arc [abstract]: Eos (American Geophysical Union Transactions), v. 86, no. 52, p. F1441.

Fryer, Gerard J.; Tryon, Michael D., 2005, Great earthquakes, gigantic landslides, and the continuing enigma of the April Fool's tsunami of 1946 [abstract]: Eos (American Geophysical Union Transactions), v. 86, no. 52, p.F1654-F1655.

Fujiwara, Osamu; Kamataki, Takanobu; Hirakawa, Kazuomi; Irizuki, Toshiaki; Uchida, Junichi; Abe, Kohei; Hasegawa, Shiro, 2005, Tsunami waveform of the AD1703 Kanto earthquake reconstructed from the deposit [abstract]: Eos (American Geophysical Union Transactions), v. 86, no. 52, p. F1654.

Gutscher, Marc-Andre, 2005, Destruction of Atlantis by a great earthquake and tsunami?—A geological analysis of the Spartel Bank hypothesis: Geology, v. 33, no. 8, p. 685-688.

Haraguchi, Tsuyoshi; Fujiwara, Osamu; Shimazaki, Kunihiko, 2005, Subaqueous tsunami deposits from Ohtsuchi Bay of Sanriku coast, north eastern Japan [abstract]: Eos (American Geophysical Union Transactions), v. 86, no. 52, p. F1653-F1654.

Higman, Bretwood; Jaffe, Bruce, 2005, A comparison of grading in deposits from five tsunamis—Does tsunami wave duration affect grading patterns? [abstract]: Eos (American Geophysical Union Transactions), v. 86, no. 52, p. F1656.

International Tsunami Information Center, 1991, Tsunami glossary--A glossary of terms and acronyms used in the tsunami literature: UNESCO, Intergovernmental Oceanographic Commission technical series 37, 136 p.

Kaneda, Yoshiyuki; Hori, Takane; Asakawa, Kennichi; Kinoshita, Masataka; Araki, Eiichiro, 2005, The proposal of "Precise real-time observatory and simulating phenomena of earthquakes carrying tsunamis (PROSPECT)" [abstract]: Eos (American Geophysical Union Transactions), v. 86, no. 52, p. F1440-F1441.

Komatsubara, Junko; Fujiwara, Osamu; Kamataki, Takanobu, 2005, Map of tsunami deposits along Nankai and Sagami troughs, Japan [abstract]: Eos (American Geophysical Union Transactions), v. 86, no. 52, p. F1654.

Lincoln County Schools, 2006, Tsunami Awareness Project--Public service announcements and other short films: Lincoln County, 1 DVD.

Liu, Ying-Chun Spring; Zhang, Huai; Yuen, David A.; Wang, Mark, 2005, High-performance computing and visualization of tsunamis and wind-driven waves [abstract]:Eos (American Geophysical Union Transactions), v. 86, no. 52, p. F1440.

MacInnes, Breanyn T.; Bourgeois, Joanne; Pinegina, Tatiana; Martin, Maria Elizabeth; Kravchunovskaya, Ekaterina, 2005, Geomorphic effects of tsunamis in Asacha and Mutnaya Bays, southern Kamchatka Peninsula, Russia [abstract]: Eos (American Geo-physical Union Transactions), v. 86, no. 52, p. F1656.

McCloskey, John; Antonioli, Andrea; Piantenesi, Alessio; Steacy, Sandy; Nalbant, Suleyman; Cianetti, Spina; Giunchi, Carlo; Cocco, Massimo; Sieh, Kerry, 2005, Potential tsunamigenesis from the threatened Mentawai Islands earthquake [abstract]: Eos (American Geophysical Union Transactions), v. 86, no. 52, p. F1441.

McNamara, Dan; McCarthy, Jill; Benz, Harley, 2006, Improving earthquake and tsunami warnings for the Caribbean Sea, the Gulf of Mexico, and the Atlantic Coast: U.S. Geological Survey Fact Sheet 2006-3012, 4 p.

Mereu, Robert; Mooney, Walter, 2005, The seismicity and tsunamis of Canada--1663-2005 [abstract]: Eos (American Geophysical Union Transactions), v. 86, no. 52, p. F1441.

Miller, Don J., 1960, The Alaska earthquake of July 10, 1958--Giant wave in Lituya Bay: Bulletin of the Seismological Society of America, v. 50, no. 2, p. 253-266.

National Weather Service Assessment Team, 2005, Service assessment--West Coast tsunami warning, June 14, 2005: National Weather Service, [20 p.].

Nelson, Alan R.; Kelsey, Harvey M.; Witten, Robert C., 2005, Great earthquakes of variable magnitude at the Cascadia subduction zone [abstract]: Eos (American Geophysical Union Transactions), v. 86, no. 52, p. F1655.

Okamura, Yukinobu; Tsujino, Takumi; Arai, Kohsaku; Satake, Kenji; Sasaki, Tomoyuki; Ikehara, Ken; Noda, Atsushi, 2005, What controls the earthquake and tsunami sources in subduction zone?--MCS profiles across the Tokachi-oki earthquake sources along the Kuril Trench [abstract]: Eos (American Geophysical Union Transactions), v. 86, no. 52, p. F1653.

Rhodes, B.; Tuttle, M.; Horton, B.; Doner, L.; Kelsey, H.; Nelson, A.; Cisternas, M., 2006, Paleotsunami research: Eos (American Geophysical Union Transactions), v. 87, no. 21, p. 205, 209.

Salzberg, David H.; Mikhalevsky, Peter N., 2005, Hydroacoustic identification of tsunamogenic events based on the shape of the T-phase spectrum [abstract]: Eos (American Geophysical Union Transactions), v. 86, no. 52, p. F1441-F1442.

Scanlon, Joseph, 2006, Dealing with the tsunami dead--Unprecedented international cooperation: Australian Journal of Emergency Management, v. 21, no. 2, p. 57-61.

Suleimani, Elena; Hansen, Roger; Combellick, Rod, 2005, Tsunami inundation mapping and hazard risk assessment for Alaska coastal communities [abstract]: Eos (American Geophysical Union Transactions), v. 86, no. 52, p. F1441. ♦

STATE EMERGENCY MANAGEMENT OFFICES
updated 3-31-2006

Alaska Dept of Military & Veteran Affairs
Division of Homeland Security & Emergency Mgmt.
PO Box 5750
Fort Richardson, AK 99505-5750
(907) 428-7000; toll-free 800-478-2337
Fax (907) 428-7009
http://www.ak-prepared.com/

California Office of Emergency Services
3650 Schriever Ave.
Mather, CA 95655
(916) 845-8510; Fax (916) 845-8910
http://www.oes.ca.gov/

Hawaii State Civil Defense, Dept. of Defense
3949 Diamond Head Road
Honolulu, HI 96816-4495
(808) 733-4300; Fax (808) 733-4287
http://www.scd.state.hi.us

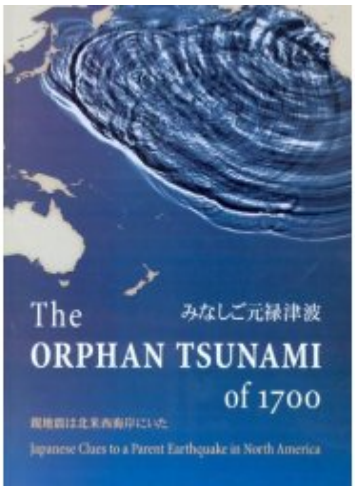
Oregon Division of Emergency Management
PO Box 14370
Salem, OR 97309-50620
(503) 378-2911; Fax (503) 373-7833
http://www.oregon.gov/OOHS/OEM/

Washington State Military Dept.
Emergency Management Division
Camp Murray, WA 98430-5122
(253) 512-7067; Fax (253) 512-7207
http://emd.wa.gov

Provincial Emergency Program
455 Boleskin Road
Victoria, BC V8Z 1E7 Canada
(250) 952-4913; Fax (250) 952-4888
http://www.pep.bc.ca/

COMING IN THE OCTOBER ISSUE:

WSSPC Awards in Excellence



The Orphan Tsunami of 1700

By Brian F. Atwater, Musumi-Rokkaku Satoko, Satake Kenji, Tsuji Yoshinobu, Ueda Kazue, and David K. Yamaguchi, 2006, U.S. Geological Survey and University of Washington Press

Review

By George Priest, geologist, Oregon Dept. of Geology and Mineral Industries

The book "The Orphan Tsunami of 1700" is generally well written, easily comprehended and quite detailed in its explanations, even though it is intended for a general audience.

The book is valuable for the serious scientist interested in details about the historical underpinnings of the AD 1700 Japanese record while still remaining an interesting read for the general public. This book also provides a useful reference for emergency managers at the state and federal level. The reference on page 102 of an at-risk population of 150,000 year-round residents on the US mainland and graphic on page 104 of numbers of tall buildings before and after code changes are particularly useful for state and national strategic planning. The reference to ~1-1.5 m tsunami flow depth being the threshold for destruction of buildings in the old Japanese villages also provides useful guidance to officials looking at similar wood frame structures in their cities. These kinds of observations are hard to find in the literature but are brought together in this excellent reference.

The comprehensive bibliography is invaluable for those wishing to delve deeper into the many topics covered, while the excellent illustrations offer great guidance for those designing talks for the public.◆

Recommended online reviews

By George Pararas-Carayannis
http://sthjournal.org/241/orphan.pdf

By Michael Upchurch
Seattle Times book critic
http://seattletimes.nwsource.com/html/books/2002642902_tsunami25.html?syndication=rss

By John Driscoll,
Eureka Times Standard
http://www.times-standard.com/portlet/article/html/fragments/print_article.jsp?article=3383126

David Yamaguchi's blog: Reviews of "The Orphan Tsunami of 1700"
http://orphantsunami1700reviews.blogspot.com/
links to online reviews in English and Japanese

Example: HistoryLink.org, "Featured book of the week,"
"This beautifully designed, profusely illustrated, bilingual book gathers together Japanese texts, Native American traditions, and all the earth science that researchers have brought to bear on the case. On nearly every page the relevance of this history to our present-day situation is underscored. This book about the "big one" of long ago should be of special interest to all of us right now." --Priscilla Long ♦

WSSPC Policy Recommendation 05-1:
Improving Tsunami Warning, Preparedness, and Mitigation Procedures for Distant and Local Sources

[At the 1996 WSSPC Annual meeting, the Board of Directors approved the formation of a WSSPC Tsunami Hazard Mitigation Committee. Member states are Hawaii, Alaska, British Columbia, Washington, Oregon, California, and Guam. The Committee has proposed the following policy recommendations which have been adopted by the WSSPC membership.]

Tsunami Outreach

WSSPC supports the preeminent need to reduce loss of life from tsunamis through concentrated public education. Public education components must be institutionalized and consist of continuous instructional programs reinforced by exercises and training and subsequently measured using social science surveys to determine programmatic effectiveness. Buoys, sirens, and loudspeakers, etc., are meaningless if the general public does not know what to do in the immediate aftermath of an earthquake resulting in the potential for a tsunami.

Distant tsunamis

WSSPC supports the efforts of the U.S. Geological Survey (USGS) and National Oceanic and Atmospheric Administration (NOAA) to continue deployment, maintenance, and improvement of the nation's seismic monitoring system and deep-ocean tsunami detection system for the purposes of rapidly and accurately detecting distant tsunamis and reducing warnings and watches leading to unnecessary evacuations. WSSPC further supports NOAA's effort to develop tsunami forecasting tools for coastal communities.

Local tsunamis

WSSPC supports expanding the ongoing efforts of NOAA, USGS, and coastal members of WSSPC through the National Tsunami Hazard Mitigation Program (NTHMP) in mapping the tsunami inundation zone, developing tsunami evacuation maps, conducting research aimed at developing rapid warnings, and maintaining a continuous public education program about local tsunamis and the need to evacuate immediately after strong or sustained ground shaking stops.

Background

Tsunamis can be the most destructive aspect of an earthquake, not only to the nearby coastal areas but also to those areas distant from the source. The 1946 and 1964 Alaskan earthquakes produced tsunamis that caused damage and/or loss of life in Hawaii, American Samoa and along the coasts of British Columbia, Washington, Oregon and California. The Pacific and Alaska Tsunami Warning Centers were established as a result of these destructive tsunamis and the need to warn coastal populations of tsunamis from distant sources.

Alarms triggered by nondestructive tsunamis have always been a major problem associated with warnings. Unnecessary evacuations not only create financial burdens on communities along the coast, but may also cause people to ignore the real threat if too many false warnings are given. Additionally, unnecessary evacuations may be risky to public safety. Programs to reduce unnecessary evacuations have been developed and implemented through the NTHMP. These programs will insure that the messages from the tsunami centers are more accurate and timely and that they significantly reduce the number of unnecessary evacuations along the coast.

However, Pacific Rim States must plan for local coastal earthquakes that will allow little to no time to issue a warning of a destructive tsunami.

Subduction zone earthquakes, like the December 2004 Sumatra earthquake and tsunami, can cause the largest loss of life in tsunami at-risk coastal communities. Therefore, it is vitally important to educate the coastal residents, businesses, and visitors about the importance of immediate evacuation to high ground once the ground shaking stops. In areas where no high ground is nearby, vertical evacuation in approved man-made structures may be the only option to escape the tsunami. Through the use of scientifically researched and developed tsunami inundation models and maps, community evacuation maps are developed showing evacuation routing and safe zones.

Facilitation and Communication

The WSSPC Board will write letters to NOAA, USGS, and FEMA requesting continued support for increased deployment of deep-ocean tsunami detection systems, the development of a tsunami forecasting model, ongoing maintenance and improvement of seismic monitoring for tsunamigenic earthquakes, and long-term risk reduction efforts.

WSSPC will write letters to key congressional representatives encouraging them to support S.B. 50 and House Bill 1674 that will lead to passing the Tsunami Preparedness Act, and to support expansion of the NTHMP in areas of highest risk. This Act will authorize and strengthen NTHMP's tsunami detection, forecast, warning, and mitigation programs.

(*continued on page 28)*

VIDEO-CD-DVD RESERVATIONS

To reserve tsunami videos, CDs or DVDs, contact *TsuInfo Alert* Video Reservations, Lee Walkling, Division of Geology and Earth Resources Library, 1111 Washington St. SE, MS 47007, Olympia, WA 98504-7007; or e-mail lee.walkling@wadnr.gov

Adventures of Disaster Dudes (14 min.). Preparedness for preteens. American Red Cross.

The Alaska Earthquake, 1964 (20 min.) Includes data on the tsunamis generated by that event.

Business Survival Kit for Earthquakes & Other Disasters; What every business should know before disaster strikes (27 min.). Global Net Productions for the Cascadia Regional Earthquake Workgroup, 2003. With CD disaster planning toolkit & other data.

Cannon Beach Fire District Community Warning System (COWS) (21 min.) Explains why Cannon Beach chose their particular warning system.

Cascadia: The Hidden Fire–An Earthquake Survival Guide (10 min.). Global Net Productions, 2001. A promo for a documentary about the Cascadia subduction zone and the preparedness its existence demands of Alaska, Oregon and Washington states. Includes mention of tsunamis.

Disasters are Preventable (22 min.) Ways to reduce losses from various kinds of disasters through preparedness and prevention.

Disaster Mitigation Campaign (15 min.). American Red Cross; 2000 TV spots. Hurricanes, high winds, floods, earthquakes.

Earthquake…Drop, Cover & Hold (5 min.). Washington Emergency Management Division. 1998.

Forum: Earthquakes & Tsunamis (2 hrs.). CVTV-23, Vancouver, WA (January 24, 2000). 2 lectures: Brian Atwater describes the detective work and sources of information about the Jan. 1700 Cascadia earthquake and tsunami; Walter C. Dudley talks about Hawaiian tsunamis and warning systems.

International Tsunami Information Centre, 2004, Tsunami warning evacuation news clips and video footage, UNESCO /IOC International Tsunami Information Centre, 1 **DVD**, 12 min.

Killer Wave: Power of the Tsunami (60 min.).National Geographic video.

Mitigation: Making Families and Communities Safer (13 min.) American Red Cross.

Not Business as Usual: Emergency Planning for Small Businesses, sponsored by CREW (Cascadia Regional Earthquake Workgroup) (10 min.), 2001. Discusses disaster preparedness and business continuity. Although it was made for Utah, the multi- hazard issues remain valid for everyone. Websites are included at the end of the video for further information and for the source of a manual for emergency preparedness for businesses.

Numerical Model Aonae Tsunami–7-12-93 (animation by Dr. Vasily Titov) and Tsunami Early Warning by Glenn Farley, KING 5 News (The Glenn Farley portion cannot be rebroadcast.)

Ocean Fury--Tsunamis in Alaska (25 min.) VHS and **DVD**. Produced by Moving Images for NOAA Sea Grant College Program, 2004.

The Prediction Problem (58 min.) Episode 3 of the PBS series "Fire on the Rim." Explores earthquakes and tsunamis around the Pacific Rim

Protecting Our Kids from Disasters (15 min.) Gives good instructions to help parents and volunteers make effective but low-cost, non-structural changes to child care facilities, in preparation for natural disasters. Accompanying booklet. Does NOT address problems specifically caused by tsunamis.

The Quake Hunters (45 min.) A good mystery story, explaining how a 300-year old Cascadia earthquake was finally dated by finding records in Japan about a rogue tsunami in January 1700

Raging Planet; Tidal Wave (50 min.) Produced for the Discovery Channel in 1997, this video shows a Japanese city that builds walls against tsunamis, talks with scientists about tsunami prediction, and has incredible survival stories.

Raging Sea: KGMB-TV Tsunami Special. (23.5 min.) Aired 4-17-99, tsunami preparedness in Hawaii.

The Restless Planet (60 min.) An episode of "Savage Earth" series. About earthquakes, with examples from Japan, Mexico, and the 1989 Loma Prieta earthquake.

Run to High Ground (14 min.). Produced by Global Net Productions for Washington Emergency Management Division and Provincial Emergency Program of British Columbia, 2004. Features storyteller Viola Riebe, Hoh Tribe. For K-6 grade levels. Have video and **DVD** versions.

Tsunami and Earthquake Video (60 min.). "Tsunami: How Occur, How Protect," "Learning from Earthquakes," "Computer modeling of alternative source scenarios."

Tsunami: Killer Wave, Born of Fire (10 min.). NOAA/ PMEL. Features tsunami destruction and fires on Okushiri Island, Japan; good graphics, explanations, and safety in-formation. Narrated by Dr. Eddie Bernard, (with Japanese subtitles).

Tsunami: Surviving the Killer Waves (13 min.). 2 versions, one with breaks inserted for discussion time.

Tsunami Chasers (52 min.). Costas Synolakis leads a research team to Papua New Guinea to study submarine landslide-induced tsunamis. Beyond Productions for the Discovery Channel.

Tsunami Evacuation PSA (30 sec.). DIS Interactive Technologies for WA Emergency Management Division. 2000.

TsunamiReady Education CD, 2005, American Geological Institute Earth Science Week kit.

Understanding Volcanic Hazards (25 min.). Includes information about volcano-induced tsunamis and landslides.

UNESCO/IOC International Tsunami Information Centre, 2005, U.S. National Tsunami Hazard Mitigation Program public information products—B-roll footage, tsunami science, warnings, and preparedness: UNESCO/IOC International Tsunami Information Centre, 1 **DVD,** 57 min.

The Wave: a Japanese Folktale (9 min.) Animated film to start discussions of tsunami preparedness for children.

Waves of Destruction (60 min.) An episode of the "Savage Earth" series. Tsunamis around the Pacific Rim.

Who Wants to be Disaster Smart? (9 min.). Washington Military Department/Emergency Management Division. 2000. A game show format, along the lines of *Who Wants to be a Millionaire*?, for teens. Questions cover a range of different hazards.

The Wild Sea: Enjoy It...Safely (7 min.) Produced by the Ocean Shores Wash. Interpretive Center, this video deals with beach safety, including tsunamis. ♦

NATIONAL TSUNAMI HAZARD MITIGATION PROGRAM STEERING GROUP

NOAA

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From: http://www.pmel.noaa.gov/tsunami-hazard/tsuhaz.htm

Updated Mar. 31, 2006♦

S

Sea level…..The height of the sea at a given time measured relative to some datum, such as mean sea level.

Sieberg tsunami intensity scale…..A descriptive tsunami intensity scale which was later modified into the Sieberg-Ambraseys tsunami intensity scale:

Modified Sieberg sea-wave intensity scale

1. Very light. Wave so weak as to be perceptible only on tide-gauge records.
2. Light. Wave noticed by those living along the shore and familiar with the sea. On very flat shores generally noticed.
3. Rather strong. Generally noticed. Flooding of gently sloping coasts. Light sailing vessels carried away on shore. Slight damage to light structures situated near the coasts. In estuaries reversal of the river flow some distance upstream.
4. Strong. Flooding of the shore to some depth. Light scouring on man-made ground. Embankments and dikes damaged. Light structures on the coast injured. Big sailing vessels and small ships drifted inland or carried out to sea. Coasts littered with floating debris.
5. Very strong. General flooding of the shore to some depth. Quay-walls and solid structures near the sea damaged. Light structures destroyed. Severe scouring of cultivated land and littering of the coast with floating items and sea animals. With the exception of big ships all other type of vessels carried inland or out to sea. Big bores in estuary rivers. Harbor works damaged. People drowned. Wave accompanied by strong roar.
6. Disastrous. Partial or complete destruction of man-made structures for some distance from the shore. Flooding of coasts to great depths. Big ships severely damaged. Trees uprooted or broken. Many casualties.

Significant wave height…..The average height of the one-third highest waves of a given wave group. Note that the composition of the highest waves depends upon the extent to which the lower waves are considered. In wave record analysis, the average height of the highest one-third of a selected number of waves, this number being determined by dividing the time of record by the significant period. Also characteristic wave height.

Spreading…..When reference is made to tsunami waves, it is the spreading of the wave energy over a wider geographical areas as the waves propagate away from the source region. The reason for this geographical spreading and reduction of wave energy with distance traveled, is the sphericity of the earth. The tsunami energy will begin converging again at a distance of 90 degrees from the source. Of course tsunami waves propagating across a large ocean undergo other changes in energy configuration due to refraction, primarily, but geographical spreading is also very important depending upon the orientation, dimensions and geometry of the tsunami source.

T

Teletsunami or distant tsunami…..A tsunami originating from a distant source, generally more than 1000 km way.

Tidal wave…..1. The wave motion of the tides; 2. In popular usage, any unusually high and therefore destructive water level along a shore.

Tide…..The rhythmic, alternate rise and fall of the surface (or water level) of the ocean, and of bodies of water connected with the ocean such as estuaries and gulfs, occurring twice a day over most of the Earth, and resulting from the gravitational attraction of the moon (and, in lesser degrees, of the sun) acting unequally on different parts of the rotating Earth.

Tide amplitude…..One-half of the difference in height between consecutive high water and low water; hence, half of the tidal range.

Tide gauge…..A device for measuring the height (rise and fall) of the tide. Especially an instrument for automatically making a continuous graphic record of tide height versus time.

Tide station…..A place where tide observations are obtained.

Travel time…..Time required for the first tsunami wave to propagate from its source to a given point on a coastline.

Travel time map…..Map showing isochrones or lines of equal tsunami travel time calculated from the source outwards toward terminal points on distant coastlines.

Tsunami…..A series of traveling waves of extremely long length and period, usually generated by disturbances associated with earthquakes occurring below or near the ocean floor. Also, a series of ocean waves produced by a submarine earthquake, landslide, or volcanic eruption. Tsunamis steepen and increase in height on approaching shallow water, inundating low-lying areas; and where local submarine topography causes extreme steeping, they may break and cause great damage. Tsunamis have no connection with tides; the popular name [tidal waves] is entirely misleading. ♦

Infrequently Asked Questions
Compiled by Lee Walkling

When and where did the Earth's first earthquake, followed by a tsunami, occur, according to the latest information?

According to the Malaysian National News Agency, the oldest quake and tsunami took place in Jharkhand, eastern India, about 1600 million years ago!

This occurrence in sediments deposited between 1,600 and 2,100 million years ago, and this is the among the earliest records of earthquakes known in the Earth's history.

It occurred long before at Gondwanaland split, and now it forms peninsular India, floating north and crashed in the Asian land mass.

An international team of scientists from India, Japan and Poland has reported the discovery in a paper to appear in the forthcoming issue of the journal "Sedimentary Geology," the report quoted as saying.

The scientists analyzed sedimentary rocks deposited in "Chaibasa Formation" in Eastern India, said: "The layers show deformations that have never been described before," Rajat Mazumder, lead author and currently a Humboldt Fellow in University of Munich said.

Mazumder and his team showed that earthquakes caused the deformations "while the sediments were still being deposited and before their consolidation."

The layers containing these deformation structures are termed "seismites" and the scientists could trace the deformed horizons up to a kilometer depth.

According to the scientists, tsunami generated by an earthquake most likely detached a weakly consolidated silt/mud block and lifted and transported it away leaving behind a hole that gradually got filled by laminated sediment observed by them.

From: http://www.bernama.com.my/bernama/v3/news.php?id=188601

What new technique in tsunami detection is being investigated?

Ocean flow is known to generate magnetic fields which reach land and satellite observatories with detectable amplitudes. In principle, ocean flow associated with tsunamis will also generate magnetic fields which may conceivably be used one day in an early-warning system and/or to map the amplitudes and characteristics of a tsunami as it progresses.

From: Geophysical Research Letters, v. 32, no. 9, p. L09608.

Is this a correct usage of the word 'tsunami?'

"At the end of the last Ice Age, some 15,000 years ago, massive floods roared through much of eastern Washington. The floods were produced when ice dams, formed by the glaciers covering the northern half of the region, burst and released walls of water. These land-based tsunamis scoured the Columbia Basin, creating much of the region's unique terrain."

Poetically, the use of tsunami in this quotation is descriptive and apt. Scientifically, the term is incorrectly used, because the "tsunamis" in the quotation weren't produced by submarine earthquakes, volcanoes, or landslides.

What kind of mischief did psychic Eric Julien cause in May 2006?

Eric Julien, psychic and author of *La Science Des Extraterrestres,* psychically received warnings that a tsunami would hit the Atlantic Ocean, caused by fragments of a comet that passed close to the Earth on May 25, 2006. Julien claimed the comet fragments would provoke an eruption of submarine volcanoes. The warnings were posted on his Ufological Research Center website, alerting several countries, including Morocco. He said tsunami waves could reach 200m high along the Atlantic coastlines.

The Moroccan Meteorological office issued denials of the rumors hoping to stop the panic. But many Moroccans fled to the hills or went to other countries. NASA officials explained that the comet would pass Earth at approximately 10 million kilometers, too far away to cause tsunamis.

Eric Julien is the person who, in 2004, claimed he was kidnapped by aliens who taught him to navigate UFOs.

From: Morocco Times; http://www.moroccotimes.com/paper/printArticle.asp?id=14935 ♦

(*continued from page 23*)

Assessment

The effectiveness of the support letters would be measured by the continued financial support of the seismic monitoring system, the open ocean tsunami detection system, inundation mapping and mitigation by the NTHMP, and the adoption of the Tsunami Preparedness Act.

In turn, the effectiveness of the seismic monitoring and tsunami detection systems would be measured by the progress made in reducing the frequency of unnecessary evacuations at specific locations by modeling the threat under various scenarios to determine when warnings need to be issued. The effectiveness would also be measured by the successful and timely identification of a destructive tsunami from a distant source.

The effectiveness of the maps and educational campaigns would be measured in the short term by public awareness polling funded through the National Tsunami Hazard Mitigation Program, and in the long term by the minimal loss of life from a local tsunami, because people responded appropriately by quickly moving to higher and safer ground.

History

First adopted in 1999 as WSSPC Policy Recommendation 99-1.

Reviewed, revised and re-adopted as WSSPC Policy Recommendation 02-1 by unanimous vote of the WSSPC membership at the WSSPC Annual Business Meeting September 18, 2002.

Reviewed, revised and re-adopted as WSSPC Policy Recommendation 05-1 by unanimous vote of the WSSPC membership at the WSSPC Annual Business Meeting 9-14-05.

From: http://www.wsspc.org/PublicPolicy/PolicyRecs/2005/policy051.html ◆

[Abstract]

USGS online short-term hazard maps: Experiences in the first year of implementation, by Matthew C. Gerstenberger and Lucile M. Jones

In May of 2005, following review by the California Earthquake Prediction Evaluation Council, the USGS launched a website [http://pasadena.wr.usgs.gov/step/] that displays the probability of experiencing Modified Mercalli Intensity VI in the next 24 hours. With a forecast based on a relatively simple application of the Gutenberg-Richter relationship and the modified Omori law, the maps are primarily aimed at providing information related to aftershock hazard. Initial response to the system has been mostly positive but has required an effort toward public education. Particularly, it has been difficult to communicate the importance difference between a probabilistic forecast and a binary earthquake "prediction". Even with the familiar use of probabilities in weather maps and recent use of terms such as Modified Mercalli Intensity, these, and other terms, are often misunderstood by the media and public. Additionally, the fact that our methodology is not targeted at large independent events has sometimes been difficult to convey to scientists as well as the public. Initial interest in the webpages has been high with greater than 700,000 individual visits between going live in late May 2005 and the end of June 2005. This accounts for more than 1/3 of the visits to the USGS-Pasadena webpages in that period. Visits have declined through July and August, but individual daily visits average around 3,000/day. ◆

From: EOS (American Geophysical Union Transactions), v. 85, no. 52, p. 1412.

TSUNAMI BULLETIN NUMBER 001
ISSUED BY THE JAPAN METEOROLOGICAL AGENCY (JMA)
ISSUED AT 0846 17 JUL 2006 (UTC)

... A LOCAL TSUNAMI WATCH IS IN EFFECT ...

1.EARTHQUAKE INFORMATION
ORIGIN TIME : 0819 17 JUL 2006 (UTC)
COORDINATES : 9.3 SOUTH 107.3 EAST
LOCATION : SOUTH OF JAWA, INDONESIA
MAGNITUDE : 7.2 [Ed. note: preliminary magnitude]

2.EVALUATION
THERE IS A POSSIBILITY OF A DESTRUCTIVE LOCAL TSUNAMI IN THE INDIAN OCEAN.

3.ESTIMATED TSUNAMI TRAVEL TIME ONE HOUR OR LESS
INDONESIA:
INDIAN OCEAN COAST OF SUMATRA
INDIAN OCEAN COAST OF JAWA
SOUTH COASTS OF LESSER SUNDA ISLANDS
AUSTRALIA:
COCOS ISLANDS

*TSUNAMI TRAVEL TIME IS ESTIMATED ONLY FROM EARTHQUAKE DATA AND INDICATES THE TIME LAPSE BETWEEN ORIGIN TIME AND TSUNAMI ARRIVAL TIME.

*THIS WILL BE THE FINAL INFORMATION UNLESS THERE ARE CHANGES ABOUT THE POTENTIAL OF TSUNAMI GENERATION AND ESTIMATED TSUNAMI TRAVEL TIME BY RE-EVALUATION OF THE EARTHQUAKE OR THERE ARE REPORTS ON TSUNAMI OBSERVATIONS. ◆