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To: Announcement@noaa.gov

Sent: Friday, January 28, 2005 1:30 PM

Subject: Message from the Under Secretary -- NOAA Tsunami Update

MEMORANDUM TO: **NOAA Employees & Team
Members**



FROM: **Conrad C. Lautenbacher, Jr.
Vice Admiral, U.S. Navy (Ret.)
Under Secretary of Commerce for Oceans and Atmosphere and NOAA
Administrator**

SUBJECT: **NOAA Tsunami Update**

I was pleased to take part in a January 14 press conference at which the Administration announced a plan to expand U.S. tsunami detection and warning capabilities as part of the Global Earth Observation System of Systems (GEOSS), the international effort to develop a comprehensive, sustained and integrated Earth observation system. The plan commits \$37.5 million over the next two years. It will enable enhanced monitoring, detection, warning and communications designed to protect lives and property in the U.S. and a significant part of the world.

With this new investment, NOAA will deploy 32 new advanced technology Deep-ocean Assessment and Reporting of Tsunami (DART) buoys for a fully operational tsunami warning system by mid-2007. The new system will provide the United States with nearly 100 percent detection capability for a U.S. coastal tsunami, allowing response within minutes. The new system will also expand monitoring capabilities throughout the entire Pacific and Caribbean basins, providing tsunami warning for regions bordering half of the world's oceans.

The U.S. has led the GEOSS effort since 2003 when the G-8 called for establishing a global observation system. GEOSS now has 54 participating nations, including India, Indonesia and Thailand.

Also on January 14, I participated in an "Ask the White House" web chat about tsunamis. Below are excerpts that might answer questions you or your families may also have:

Please give me the background details of the warning system the US had before and the new improvements now.

The current system consists of six deep-sea DART (Deep Ocean Assessment and Reporting of Tsunamis) buoys and other sensors in the Pacific Ocean and two warning centers in Alaska and Hawaii that monitor the system. The new system outlined today will see the installation of new observing systems in the Pacific, Caribbean/Atlantic to improve detection of tsunami events. NOAA will also expand its operational capability to provide accurate and timely warnings of tsunami events to the U.S. public and international partners. There will be expanded local and international efforts to improve preparedness and planning for tsunami events. NOAA will also invest in new research to improve understanding of tsunamis and research new observing technologies.

The upgrade system will include 32 new DART tsunami buoys and 38 new sea level monitoring/tide gauge stations. There will be 24/7 warning coverage at the Pacific and Alaska Tsunami Centers as well as upgrades to 20 seismometers used to monitor seismic events in tsunami prone areas. NOAA will also expand the Tsunami Ready program to improve community preparedness and begin Tsunami

Inundation Mapping in the Caribbean/Atlantic/Gulf of Mexico and expand the current Pacific program.

Does NOAA track tsunamis? If so how was this one not caught?

The NOAA Tsunami Warning Program provides tsunami warnings for the West Coast of the U.S., Alaska, Hawaii, Guam, American Samoa, Insular States of Micronesia, and countries in the Pacific Basin. NOAA's Pacific Tsunami Warning Center in Hawaii is the operational center for the International Tsunami Warning System of the Pacific, comprised of 26 Member States around the Pacific Rim. The Center issues tsunami warnings for Pacific Basin teletsunamis (tsunamis that can cause damage far away from their source). If a seismic event occurs off the coast of Japan, Japan issues a local tsunami warning. It is the Pacific Center's responsibility to warn all participating Nations in the Pacific Basin if the Japanese tsunami will cause damage far away from its source.

The Indian Ocean is one of the areas without a warning system. Southeast Asia, the southwest Pacific, Central and South America, the Mediterranean, and the Caribbean have no regional tsunami warning centers. The United Nations Educational, Scientific and Cultural Organization (UNESCO)/Intergovernmental Oceanographic Commission has recognized these gaps and has a number of initiatives to address this hazard. These include recommendations to establish Regional Tsunami Warning Systems for those areas. This one was not caught because it happened in one of the areas lacking a warning system.

Do you think another tsunami will hit again soon?

When discussing tsunamis the question is not if one will occur, but when. We know what causes them and we know a great deal about how to track them and forecast their path. While we may not be able to control when mother earth decides to flex her incredible power, we can control our ability to warn citizens and keep them out of harms way and today we are answering that call.

The Tsunami Monitoring System we are proposing calls for the deployment of new deep-sea DART buoys and other sensors. It also calls for improved availability of seismic sensor data and a robust research component to improve forecasting.

This is truly a multi-national effort with multi-national benefits. We have had a fantastic relationship with our partners in the Pacific for many years. We are looking forward to working with our friends along the Atlantic and the Caribbean as well and are excited about the prospect of being able to monitor half the world's oceans with this system.

The Tsunami Monitoring System is the perfect example of the power of integrated observations working together to make people safer.

If a tsunami were to hit the US, which coast would it most likely hit? How should we prepare?

Twenty-four tsunamis have caused damage in the United States and its territories during the last 204 years. Just since 1946, six tsunamis have killed more than 350 people and caused a half billion dollars of property damage in Hawaii, Alaska, and the West Coast. As a tsunami nears the coastline, it may rise to several feet or, in rare cases, tens of feet, and can cause great loss of life and property damage when it comes ashore. Tsunamis can travel upstream in coastal estuaries and rivers, with damaging waves extending farther inland than the immediate coast. A tsunami can occur during any season of the year and at any time, day or night.

You can learn whether tsunamis have occurred in your area by contacting your local emergency management office, National Weather Service office, or the American Red Cross. If you are in a tsunami risk area, learn how to protect yourself, your family, and your property.

The Pacific Ocean has the highest possibility of a tsunami, the Caribbean less so, and an Atlantic tsunami would be a very rare occurrence. All tsunamis are potentially dangerous, even though they may not damage every coastline they strike. Damaging tsunamis are very rare. Our coastlines are vulnerable, but tsunamis are infrequent. Understand the hazard and learn how to protect yourself, but don't let the threat of tsunamis ruin your enjoyment of the beach.

How is it possible to detect a tsunami? Underwater sensors? Even if we could detect it, how much good would it do?

We now have the capability to predict with certainty if a tsunami has been created and where it's headed and when it will hit. The relatively new technology developed by NOAA, the Deep Ocean Assessment and Reporting of Tsunamis buoys are the key, to this effort. They provide the critical data that allows us to read whether a tsunami has been generated by an earthquake and where it's headed.

We rely on a variety remote sensing devices including underwater sensors, floating data buoys and we are now discovering that radar data from orbiting environmental satellites may be able to provide information that could be useful for tsunami research.

As far as the future is concerned we need the following:

- Additional DART buoys and other sensors to provide more accurate/earlier detection along more of the US coast; monitor the Pacific, Atlantic, Caribbean and Gulf of Mexico.
- Improved availability of real-time seismic sensor data and upgraded infrastructure for better earthquake detection and warning including instrumentation in the Caribbean.
- Expanded research on seismic, tsunami processes to improve forecasting.
- Improved response capacity with enhanced emergency warning systems, community response plans and public education.

As with any natural hazard warning system, the more informed the public is the better are the chances for survival. Consequently public education will be a significant component of an effective warning system.

Is the United States working with other countries to help strengthen the warning system for the future occurrence of tsunamis?

Yes we are - in fact the United States is providing leadership in the Global Earth Observation System of Systems (GEOSS), the international effort of 56 participating nations, including India, Indonesia and Thailand, to develop a comprehensive, sustained and integrated Earth observation system.

In parallel and like the U.S. Strategic Plan, the GEOSS plan focuses around important societal benefit areas, including reduction of disaster, loss of life and property, and the protection and monitoring of the ocean resources.

The United States will work with its GEOSS partners and other international bodies to develop a global tsunami warning system. For more information on the U.S. involvement with GEOSS please visit <http://www.noaa.gov> and see Global

Earth Observations.

I have heard that the current tsunami detection system can warn of an approaching storm around 15 minutes in advance. I live near the California coast so I was wondering what steps would be taken when a warning is received, given the limited time frame.

Part of the answer to this is to follow a series of common sense actions outlined by emergency management organizations like FEMA.

Find out if your home is in a danger area. Know the height of your street above sea level and the distance of your street from the coast. Evacuation orders may be based on these numbers.

Be familiar with the tsunami warning signs. Because tsunamis can be caused by an underwater disturbance or an earthquake, people living along the coast should consider an earthquake or a sizable ground rumbling as a warning signal. A noticeable rapid rise or fall in coastal waters is also a sign that a tsunami is approaching. Make sure all family members know how to respond to a tsunami.

Make evacuation plans. Pick an inland location that is elevated. After an earthquake or other natural disaster, roads in and out of the vicinity may be blocked, so pick more than one evacuation route.

Develop an emergency communication plan. In case family members are separated from one another during a tsunami (a real possibility during the day when adults are at work and children are at school), have a plan for getting back together.

Ask an out-of-state relative or friend to serve as the "family contact." After a disaster, often it's easier to call long distance. Make sure everyone knows the name, address, and phone number of the contact person.

Contact your local emergency management office or American Red Cross chapter for more information on tsunamis.

Listen to a radio or television to get the latest emergency information, and be ready to evacuate if asked to do so.

If you hear an official tsunami warning or detect signs of a tsunami, evacuate at once. Climb to higher ground. A tsunami warning is issued when authorities are certain that a tsunami threat exists.

Stay away from the beach. Never go down to the beach to watch a tsunami come in. Return home only after authorities advise it is safe to do so.

A tsunami is a series of waves. Do not assume that one wave means that the danger is over. The next wave may be larger than the first one so stay out of the area.

The NOAA National Weather Service operates a Tsunami Ready Community Program. It's an initiative that promotes tsunami hazard preparedness as an active collaboration among Federal, state and local emergency management agencies, the public, and the NOAA tsunami warning system.

This collaboration supports better and more consistent tsunami awareness and mitigation efforts among communities at risk. The main goal is improvement of public safety during tsunami emergencies.

The contact for information on becoming a Tsunami Ready for communities in California, Oregon, Washington, British Columbia, and Alaska is the NOAA West Coast & Alaska Tsunami Warning Center in Palmer, Alaska.

<http://www.prh.noaa.gov/ptwc>

You can also contact your local NOAA National Weather Forecast office.

I've heard satellites can help detect bad weather patterns like tsunamis. Is this true? Even if they can, would they have been able to detect the earthquake that caused the last one?

Satellites are used in a limited way to gauge the level of the ocean, but tsunami's are waves that move at the floor of the ocean, along the sea bottom. The best observation system available today is the deep-sea DART (Deep Ocean Assessment and Reporting of Tsunamis) buoys developed by NOAA. This technology has only been operational for a few years and it's being upgraded and improved to provide more precise and faster detection and warning. Earthquake detection really relies on data provided from a global and national network of seismic stations operated by the U.S. Geological Survey, National Science Foundation, NOAA and a score of academic and international organizations. This information is used with that gathered by DART buoys to predict when a tsunami is triggered and where it may travel.

Recently after reviewing data from four Earth-orbiting radar satellites, NOAA scientists discovered they were able to measure the height of the devastating tsunami that erupted in the Indian Ocean. At this time we are not able to use this data in real time to supplement the forecasts of tsunamis, however, the ability to make depth surveys from space may lead to improvements in the models that forecast the hazardous effects of tsunamis.

This message was generated for the Under Secretary of Commerce for Oceans and Atmosphere by the NOAA Information Technology Center/Financial and Administrative Computing Division