

# Summary Report of the Tsunami Hazard Mitigation Steering Group Meeting

May 16-17, 2001  
Portland, Oregon

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## Attendees

### Steering Group

Eddie Bernard - NOAA	Lori Dengler - State of California
Richard Hagemeyer - NOAA	Brian Yanagi - State of Hawaii
Chris Jonientz-Trisler - FEMA	Laura Kong - State of Hawaii
Michael Hornick - FEMA	Mark Darienzo - State of Oregon
Craig Weaver - USGS	George Priest - State of Oregon
Scott Simmons - State of Alaska	George Crawford - State of Washington
Roger Hansen - State of Alaska	Tim Walsh - State of Washington
Richard Eisner - State of California	

### Guests

Frank González - NOAA

Ed Myers - OSU

Tom Sokolowski - WC/ATWC

Charles McCreery - PTWC

Lt Alan Yelvington - USCG

David Oppenheimer - USGS

Jim Kennard - OR DLCD

Ed Henry USDOT Region IX

Aurelio Mercado - U of Puerto  
Rico

Solomon Yim - OSU

Curt Peterson - PSU

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## **OLD BUSINESS:**

### **Review of action items from the previous meeting:**

**1. ACTION ITEM:** There was considerable discussion on how to confirm the availability of resources after a disastrous event. The group formed an ad hoc subcommittee to formalize the next steps. The subcommittee consists of: Richard Przywarty, Frank González, Eddie Bernard, George Priest, and Costas Synolakis. Three new members were added to the subcommittee: Mike Hornick, Chris Jonientz-Trisler, and Richard Eisner. There was a discussion of what role the National Tsunami Hazard Mitigation Program Steering Group would have in tsunami disaster response. NOAA currently has no input in times of disaster. The current National Post-Storm Data Acquisition Plan provides only for data collection. Mike Hornick, FEMA Region IX proposed a 2-step action plan: 1) The Federal Response Plan needs a tsunami action plan. Mike Hornick and Chris Jonientz-Trisler and FEMA HQ need to develop this plan, and 2) the States need defined data collection activities. The subcommittee will review the NOAA Response Plan document and how it interacts with the states and report at the next meeting.

**ACTION:** Subcommittee members named

**STATUS:** ONGOING

**2. ACTION ITEM:** Chris Jonientz-Trisler will rerun and expand the 1994 baseline survey to measure performance. The results of this survey will be compared to the 1994 baseline survey and the results presented at the August 2001 review of the program.

**ACTION:** Chris Jonientz-Trisler

**STATUS:** Survey has been conducted and data is being compiled and analyzed for the report

**3. ACTION ITEM: The Subcommittee Activities Matrix and Program Gaps were discussed as well as the FY 01 budget. The budget discussion was incomplete. The Subcommittee Coordinator indicated the budget discussion would be finalized during a conference call with all subcommittee members as soon as possible.**

**ACTION:** All Mitigation Subcommittee members

**STATUS:** CLOSED Conference call was held and matrix updated

**4. ACTION ITEM: Steering Group members were asked to send any final comments on the Local Tsunami Warning Systems and Procedures: Guidance for Local Officials document to him not later than January 1, 2001.**

**ACTION:** Each Steering Group Member

**STATUS:** CLOSED

**5. ACTION ITEM: Final Local Tsunami Warning Systems and Procedures: Guidance for Local Officials document to be placed on the Oregon web site prior to the May 14-15, 2001 Workshop and Steering Group meeting.**

**ACTION:** Mark Darienzo

**STATUS:** OPEN

**6. ACTION ITEM: All Steering Group members are to send comments on the proposed May Workshop agenda to Mark Darienzo. Mark Darienzo will contact state emergency managers for names of people to invite to the workshop and will arrange for the meeting sites for the workshop and Steering Group meeting.**

**ACTION:** All Steering Group Members, Mark Darienzo

**STATUS:** CLOSED workshop was held May 14-15

**7. ACTION ITEM: Continue to refine the draft Tsunami Ready Community Program proposal.**

**ACTION:** R. Przywarty, T. Sokolowski, L. Dengler

**STATUS:** CLOSED IMPLEMENTING

**8. ACTION ITEM: Each State is to recommend one pilot community for the Tsunami Ready Community Program by January 1, 2001.**

**ACTION:** Each State

**STATUS:** CLOSED Tsunami Ready Communities have been named in California, Washington, Oregon, and Alaska

**9. ACTION ITEM: In preparation for the review in August 2001 and keeping in mind the original Tsunami Hazard Mitigation Plan, each Steering Group member should prepare a presentation of their program review of the past 5 years for the May 2001 Steering Group Meeting that focuses on 1) what did you promise to do? 2) what did you do? and 3) what impact did it have?**

**ACTION:** Each Steering Group Member

**STATUS:** OPEN IN PROGRESS Mitigation and Mapping are in draft form, others are complete

**10. ACTION ITEM: Each Steering Group member is to prepare a summary of their expectations and budgets for the next 5 years. (In other words, where do you want to be at the end of the next 5 years?)**

**ACTION:** Each Steering Group Member

**STATUS:** CLOSED

**11. ACTION ITEM: For FY 2001, \$2.3 million has been appropriated for the Program. There is an add-on of \$1 million for the Tsunami Warning and Environmental Observatory for Alaska (TWEAK), a letter of intent by Ray Highsmith at the University of Alaska. It was suggested that Ray Highsmith include Roger Hansen and Zygmunt Kowalik in writing the proposal for TWEAK.**

**ACTION:** Ray Highsmith, Roger Hansen, and Zygmunt Kowalik to write a proposal for TWEAK.

**STATUS:** OPEN Proposal has been written and distributed to Steering Group members. Discussion was held via conference call with Ray Highsmith on May 17. Steering Group members are to review proposal and meet via conference call on May 30 at 2 p.m. PDT.

**12. ACTION ITEM: A discussion of the question of how to report the mapping effort pointed out the difficulties of this issue and a method agreeable to all must be developed. Frank González and the States were asked to discuss and agree on the**

**method of reporting the inundation mapping effort no later than March 2001.**

**ACTION:** Frank González and States

**STATUS:** IN PROGRESS

**13. ACTION ITEM:** States and TIME are to decide on division of mapping projects funding for FY 01 so that Frank González can provide the mapping budget by December 1, 2000.

**ACTION:** States and TIME

**STATUS:** CLOSED

**14. ACTION ITEM:** Hal Mofjeld (PMEL) to provide a short tutorial on tsunami wave forms to tsuhaz prior to the May 2001 Tsunami Workshop in Portland, Oregon.

**ACTION:** Hal Mofjeld

**STATUS:** CLOSED Tutorial was completed. There are two main categories: Hawaiian type where the first wave is the highest with little tide effect--less concern for flooding in successive waves, and the Crescent City type with a long wave train and danger lasting many hours due to later waves being higher than the first wave and strong tidal effects. Hal Mofjeld will be happy to advise. States need to develop and put in place their warning strategies. Warning centers have the algorithms to use as tools in determining warnings.

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## **NEW BUSINESS**

### **[Develop NOAA/State Coordination and Technical Support](#)**

Richard Hagemeyer reported that the tsunami database has been completed and is available to all on his ftp site. He will send messages to all tsuhaz members when the database is upgraded.

EMWIN worked very well in the Nisqually earthquake in Washington in February 2001. Warning centers had their data out in about 2 minutes using EMWIN.

**ACTION ITEM 1.** Find out what information customers want on earthquakes to NWS and USGS Regional Networks so the MOU can be updated in light of new technology so there will be a clarification of procedures and better coordination of warnings. Dick Hagemeyer suggested the following 4 steps: 1) find out what the customers want, 2) agree to a standard format, 3) obtain headquarters approval to place on NOAA Weather Radio and EMWIN, and 4) determine how to get the information to those will put the messages on NOAA Weather Radio and EMWIN. **ACTION:** Oppenheimer, Hagemeyer, Hansen

## Improve Seismic Networks

Thirty to forty broadband seismic sites should be installed by August 7. Sites are done except for final equipment installation. Communications: All links are up and continue to function.

## Deploy Tsunami Detection Buoys

In June 2001, the NOAA ship Ronald H. Brown is scheduled to service the 4 DART buoys that are operational in the North Pacific Ocean. The surface buoys at D171, D165, D157, and D130 will each be inspected, serviced, and subsequently re-deployed for another year of service. A new DART site, D128, will be occupied off of the U.S Washington coast at approximately 128.5 degrees North latitude, 47 degrees West longitude. The sixth buoy is scheduled for deployment in the Equatorial Pacific in August.

D157 unexpectedly failed to return to normal tide reporting mode following the January 10 event trigger and continued to report 1-minute data for real-time transmission via the GOES satellite during the 3 months that followed. As a result, the surface buoy power supply has been depleted and is no longer relaying BPR data to ground stations. The PMEL Engineering Development Division has successfully reproduced a possible cause of the failure in D157.

**ACTION ITEM 2:** Update WC/ATWC, PTWC, and PMEL web sites showing buoy locations for better indication of events. **ACTION:** WC/ATWC, PTWC, PMEL

**ACTION ITEM 3:** Frank González to check on DART web site vulnerability to too many hits at one time. **ACTION:** Frank González

## Produce Inundation Maps

The Puget Sound Tsunami/Landslide Workshop was held January 23-24, 2001, in Seattle at the NOAA Sand Point campus (Bldg. 9). The Workshop, a partnership of NOAA/PMEL, USGS, and Washington State Emergency Management, whose goal is to develop an action plan to generate tsunami inundation maps and other tsunami/landslide mitigation products for Puget Sound communities. The workshop arose from discussions at the May 2000 Steering Group

Meeting. A Summary Report of the workshop has been published and distributed to all attendees.

Frank González gave a brief review of the various funding sources for inundation mapping and gave the highlights of the his [mapping status report](#).

Based on the discussion at the Hilo Meeting last year, a comparison of 1-D and 2-D models was done. FACTS was developed as a tool to do 1-D runup estimates, however, the 1-D approach is limited.

**ACTION ITEM 4:** Each state is to plan their mapping strategy using either coarse grid or fine grid. The TIME Center is available to help with this process. **ACTION:** George Priest, Frank González to determine the grid issue

## Mitigation

The Tsunami Warning Workshop was held in Portland, Oregon, on May 14 and 15. The workshop was organized by Mark Darienzo and generated fruitful discussions on many issues related to tsunami evacuation notification systems including telephones, NOAA Weather Radio, EMWIN, sirens, etc.

Chris Jonientz-Trisler reported the highlights from the Mitigation Subcommittee discussions yesterday. Lori Dengler said that the fifth tsunami awareness survey was recently completed in Humboldt County. Results of the survey showed a steady progression in positive responses to the main questions.

During Subcommittee discussions on mapping, particularly for Alaska, the need for bathymetry surveys was raised. Some support for bathymetric surveys might be available from the National Ocean Service.

**ACTION ITEM 5:** The Subcommittee suggested that a dialog with NOS on bathymetry/coastal zone managements issues was needed. **ACTION:** Eddie Bernard will contact the Acting Assistant Administrator for Ocean Services and Coastal Zone Management and initiate a dialog on this issue.

## Preparation for August Program Review

Eddie Bernard asked all Steering Group members to submit their review papers if not already submitted. The plan for the Program Review is to conduct the technical part of the review from 8 a.m. to 3 p.m. The review will consist of reports from each of the state and Federal partners on their accomplishments of the past 5 years as well as a presentation of plans for the next 5

years. Beginning at 3 p.m. there will be a public forum beginning with a 1-hour powerpoint overview of the program and followed by a poster session and reception. Members of Congress as well as state and local emergency planners have been invited to the public forum and the poster session/reception. International tsunami scientists attending the IUGG Tsunami Commission [ITS 2001](#) being held on August 8-10 have also been invited to attend the August 7 review and reception.

The media plan is to provide a b-roll and press package.

**ACTION ITEM 6:** States were asked for video and photos of the National Tsunami Hazard Mitigation Program in action including captions or explanations, as needed. **ACTION:** states to send video and photos to Eddie Bernard NLT May 30, 2001. (Oregon to provide video clip on school evacuation)

For the Poster session/reception States, Warning Centers, USGS, FEMA will have separate tables and poster display boards. Posters will be grouped by state, etc. Individuals will ship materials for their displays to PMEL and will pick up the items on August 6 following a dry run of all technical presentations. On the morning of August 7, Individuals will bring their display materials to the Walker Ames Room in Kane Hall on the University campus. Individuals will set up their displays by noon on August 7. (No overnight storage is available at Kane Hall)

**ACTION ITEM 7:** States requested use of large monitors with their laptops for the poster session. **ACTION:** PMEL to check with their Computer Services Division on availability of monitors for use at the review.

**ACTION ITEM 8:** States, Warning Centers, USGS, and FEMA were asked for logistical requests for tables, TV/VCR's, power, etc. for use at the poster session/reception. **ACTION:** States Warning Centers, USGS, FEMA to send their requests to Eddie Bernard via e-mail NLT May 25.

**ACTION ITEM 9:** PMEL will check on availability of logistical items for booths for poster session. **ACTION:** PMEL will check on availability of items requested and fill as many requests as possible.

## **Tsunami Warning and Environmental Observatory for Alaska (TWEAK)**

The TWEAK proposal was discussed during a conference call with Dr. Ray Highsmith, School of Fisheries and Ocean Sciences, University of Alaska Fairbanks. A TWEAK Review Panel was named to review and comment on the proposal

**ACTION ITEM 10:** Chris Jonientz-Trisler, Laura Kong, Frank González, Scott Simmons, David Oppenheimer, Richard Hagemeyer, Eddie Bernard, and Mike Hornick were named as the TWEAK Review Panel to review the proposal. **ACTION:** TWEAK Review Panel to send their comments via e-mail to Eddie Bernard NLT May 25. A conference call with all Panel members is planned for 2 p.m. on May 30.

## The Next 5 Years (Phase II)

Eddie Bernard led the group in a discussion of the Program's funding history over the past 5 years. Special attention was given to the matching funds section. It was determined that the matching funds section should be further divided into mapping and mitigation categories. A discussion was held on why the original 5-year budget request was too low: the great number of unknowns and uncertainties at the time the original budget was developed.

**ACTION ITEM 11:** Develop defensible matching funds divided into two categories: mapping and mitigation. **ACTION:** States are to E-mail their figures to Eddie Bernard, Frank González, and Chris Jonientz-Trisler NLT May 25, 2001.

Eddie Bernard announced that the Program has been included in the NOAA portion of the FY 2002 Presidential Budget Request. If this line item is not dropped in the later stages of the budgeting process, we would be in the FY 2002 NOAA budget for \$2.3 million.

Budget requests for the next 5 years (based on recommendations found in the review papers submitted) were discussed. Requests in some areas, especially mapping, DART buoys, and seismic greatly exceed the anticipated level-funding amount of \$2.3 million per year. Eddie Bernard said the best approach to increase the budget is to get constituents to write NOAA. Using lessons learned during the first 5 years, the group agreed to present a budget that represents what is needed for the Program knowing that, in reality, not all of the request will be funded. Bathymetry survey costs and mapping costs will be separate line items in the new budget. A strawman for distribution of funds with some minor changes was presented. The group agreed to start with last year's budget allocations as a starting point for determining future allocations. The next 5 years calls for keeping the operational parts of the program plus working toward more mapping and mitigation efforts.

The group held a multifaceted discussion on how the data from the DART buoys can be combined with the other data coming into the Warning Centers to formulate tsunami warnings given that the end-to-end warning system is not yet complete. Currently, there is a web site that can be used by the Warning Centers to model various scenarios for various areas based on data previously collected. Following the discussion, it was decided that procedures for use of buoy data by the Warning Centers needed to be developed.

**ACTION ITEM 12:** Develop procedures for use of buoy data by warning centers by July 1,

2001. **ACTION:** Tom Sokolowski, Frank González, Eddie Bernard, PTWC/Chip McCreery

**ACTION ITEM 13:** Produce isocrons prototype with elevations for likely events by July 1, 2001.

**ACTION:** Tom Sokolowski

## **Presentations**

Professor Aurelio Mercado from the University of Puerto Rico briefed the Steering Group on the tsunami program in Puerto Rico. He said that Puerto Rico received \$900,000 to do a Lidar survey of the island, \$100,000 to start a bathymetry survey, and \$500,000 over 2 years for a Puerto Rican Warning and Tsunami Program. The Program is tasked with flood mapping, education and outreach, seismic signal analysis, establishing protocols for communication with other Caribbean islands, creating a tsunami database, and attending the National Tsunami Hazard Mitigation Program Steering Group meetings.

Dr. Solomon Yim, Oregon State University, gave a presentation on the NEES OSU Tsunami Basin Project. OSU has received a \$4.8 million grant to develop this project. The goals of the project are: 1) Develop a facility for tsunami/coastal community by leveraging the existing facility and expanding its capacity to do tsunami waves and 3-D bathymetry, and 2) enhance the effectiveness of tsunami researchers by reducing the requirement for on-site presence (future vision is to host a web-based forum on research with real-time interaction of researchers with the research community during model tests), facilitating re-use of previous experience, and supporting integration of simulation and experimentation. Some examples of experiments that could be run using the new facility which should be operational in October 2004 are scale effects in tsunami runup and velocity, macro-roughness of effects on tsunami behavior, and tsunami wave forces on structures. A suggestion was made that the Steering Group hold their 2004 meeting in Corvallis in order to see the new wave facility.

Dr. Curt Peterson, Portland State University, discussed the projects his graduate students have been working on. He described the mapped coastal inundation plan in detail.

## **Public Affairs Report**

Ann Thomason distributed the PAWG report of activities and media attention since the last Steering Group meeting.

## **Remaining Meeting Dates and Locations for 2001**

August 7-10 International Tsunami Symposium, University of Washington, Seattle, Washington

## November 6-8 Steering Group Meeting, PMEL, Seattle, Washington

Eddie Bernard proposed a new meeting schedule that would begin next year: only one face-to-face meeting per year to be held at PMEL. The meeting would allow travel on Monday and Friday with the Mitigation Subcommittee meeting for 1/2 day and Mapping meeting 1/2 day on Tuesday. The Steering Group would meet for two full days on Wednesday and Thursday. All budget and other proposals would be prepared in advance and brought to the meeting for discussion. Additional conference calls, small group meetings, or e-mails would be used during the rest of the year to transact any business necessary. The majority of the group endorsed this plan.

# Summary Report of the Tsunami Hazard Mitigation Steering Group Meeting

November 6-8, 2001  
Seattle Washington

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## Attendees

### Steering Group

Eddie Bernard - NOAA	James Godfrey (Alt) - State of California
Frank González - NOAA	Lori Dengler - State of California
James Weyman - NOAA	Brian Yanagi - State of Hawaii
Chris Jonient-Trisler - FEMA	Brian Yanagi - State of Hawaii
David Oppenheimer - USGS	Gerard Fryer (Alt) - State of Hawaii
Craig Weaver - USGS	Mark Darienzo - State of Oregon
Scott Simmons - State of Alaska	George Priest - State of Oregon
Taunnie Boothby - State of Alaska	George Crawford - State of Washington
Roger Hansen - State of Alaska	Tim Walsh - State of Washington

### Guests

Tom Sokolowski - WC/ATWC

Vasily Titov - NOAA

## **OLD BUSINESS:**

### **Review of action items**

#### **Action items open prior to the May 17 meeting:**

**1. ACTION ITEM: Final Local Tsunami Warning Systems and Procedures: Guidance for Local Officials document to be placed on the Oregon web site prior to the May 14-15, 2001 Workshop and Steering Group meeting.**

**ACTION:** Mark Darienzo

**STATUS:** Document is being refined and will go up on the web. **OPEN**

**2. ACTION ITEM: For FY 2001, \$2.3 million has been appropriated for the Program. There is an add-on of \$1 million for the Tsunami Warning and Environmental Observatory for Alaska (TWEAK), a letter of intent by Ray Highsmith at the University of Alaska. It was suggested that Ray Highsmith include Roger Hansen and Zygmunt Kowalik in writing the proposal for TWEAK.**

**ACTION:** Ray Highsmith, Roger Hansen, and Zygmunt Kowalik to write a proposal for TWEAK.

**STATUS:** Proposal has been written and reviewed by Steering Group members. Proposal was funded with the money going to the University of Alaska Fairbanks. Some bathymetry studies were done and a physicist was hired to help with modeling. **CLOSED**

#### **Action items from the May 17, 2001 meeting:**

**1. ACTION ITEM: Find out what information customers want on earthquakes to NWS and USGS Regional Networks so the MOU can be updated in light of new technology so there will be a clarification of procedures and better coordination of warnings. Dick Hagemeyer suggested the following four steps: 1) find out what the customers want 2) agree to a standard format, 3) obtain headquarters approval to place on NOAA Weather**

Radio and EMWIN, and 4) determine how to get the information to those will put the messages on NOAA Weather Radio and EMWIN.

**ACTION:** Oppenheimer, Weyman, Hansen

**STATUS:** The feed from the University of Washington needs to be expanded. Reviewed text messages are to go onto EMWIN. The USGS is ready but needs a NOAA contact to proceed. Software needs to be developed. D. Oppenheimer will provide background to J. Weyman before proceeding. **OPEN**

**2. ACTION ITEM: Update WC/ATWC, PTWC, and PMEL web sites showing buoy locations for better indication of events. ACTION: WC/ATWC, PTWC, PMEL**

**ACTION:** WC/ATWC, PTWC, PMEL

**STATUS:** Completed. **CLOSED**

**3. ACTION ITEM: Frank González to check on DART web site vulnerability to too many hits at one time. Cross reference with November 2001 Action Item number 6.**

**ACTION:** Frank González

**STATUS:** A mirror or duplicate site needs to be established. J. Weyman and E. Bernard to work out an arrangement between NWS and NOAA. This item will be carried forward as November 2001 Action Item number 6. **OPEN**

**4. ACTION ITEM: Each state is to plan their mapping strategy using either coarse grid or fine grid. The TIME Center is available to help with this process. Cross reference with November 2001 Action Item number 8.**

**ACTION:** George Priest, Frank González to determine the grid issue

**STATUS:**

Technical issues related to the coarse grid modeling are twofold:

- Bathymetric and topographic data quality. The density of raw bathymetric and topographic data determines the details of the shoreline and numerical grids for the area of the inundation mapping project. Small-scale structures such as jetties, offshore reefs, even beach-breaks can affect tsunami inundation. If those features are not present in the raw data, an inundation model may produce inaccurate results, no matter how dense the

numerical grid used.

- Numerical model requirements. Any numerical model of tsunami inundation requires a certain amount of nodes per wavelength to produce accurate results. This problem has been the subject of many scientific studies. These results show that model inundation estimates compare well with observations if at least 100m grid size is used nearshore. A more coarse grid does not provide enough details of tsunami behavior near the shoreline, therefore can be used only to estimate offshore wave characteristics. The studies also suggest that it is essential to model tsunami inundation beyond the shoreline with moving boundaries--fixed boundaries yield substantially different results.

#### TIME Center Recommendations:

- inundation computations (moving, not solid boundaries) are essential for producing the inundation maps
- at least 150-100m cell size is required for inundation computations to produce useful guidance (regardless of bathy-topo data density)
- models with 50-30m cell size seem to capture most of the important local inundation features
- use the best resolution bathy-topo data available

F. González will chair a working group to prepare a draft of mapping certification procedures. Working group named includes: Rich Eisner, Tim Walsh, Gerard Fryer, Doug Luther, George Priest, Lori Dengler, Vasily Titov, Costas Synolakis, Elena Suleimani, and Antonio Baptista. This item will be carried forward as November 2001 Action Item number 8. **OPEN**

#### **5. ACTION ITEM: The Subcommittee suggested that a dialog with NOS on bathymetry/coastal zone managements issues was needed.**

**ACTION:** Eddie Bernard will contact the Acting Assistant Administrator for Ocean Services and Coastal Zone Management and initiate a dialog on this issue.

**STATUS:** Eddie Bernard contacted NOS and instituted a dialog. **CLOSED**

#### **6. ACTION ITEM: States were asked for video and photos of the National Tsunami Hazard Mitigation Program in action including captions or explanations, as needed.**

**ACTION:** states to send video and photos to Eddie Bernard NLT May 30, 2001. (Oregon to provide video clip on school evacuation)

**STATUS:** Videos and photos were sent for use at the August Review. **CLOSED**

7-9 ACTION ITEMS: were logistics for the August 7 Review.

**ACTION:** PMEL

**STATUS:** Completed. **CLOSED**

**10. ACTION ITEM:** Chris Jonientz-Trisler, Laura Kong, Frank González, Scott Simmons, David Oppenheimer, Richard Hagemeyer, Eddie Bernard, and Mike Hornick were named as the TWEAK Review Panel to review the proposal.

**ACTION:** TWEAK Review Panel to send their comments via e-mail to Eddie Bernard NLT May 25. A conference call with all Panel members is planned for 2 p.m. on May 30.

**STATUS:** The panel met and reviewed the TWEAK proposal. **CLOSED**

**11. ACTION ITEM:** Develop defensible matching funds divided into two categories: mapping and mitigation.

**ACTION:** States are to E-mail their figures to Eddie Bernard, Frank González, and Chris Jonientz-Trisler NLT May 25, 2001.

**STATUS:** Figures were sent and the items used at the August Review. **CLOSED**

**12. ACTION ITEM:** Develop procedures for use of buoy data by warning centers by July 1, 2001.

**ACTION:** Tom Sokolowski, Frank González, Eddie Bernard, PTWC/Chip McCreery

**STATUS:** Procedures have been developed. The FACTS DART interpretive aid prototype is being refined for use on the FACTS web site. SIFT is working on automated interactive algorithms for inversion modeling. **ONGOING**

**13. ACTION ITEM:** Produce isocrons prototype with elevations for likely events by July 1, 2001.

**ACTION:** Tom Sokolowski

**STATUS:** Isocrons have been created. **CLOSED**

**Ongoing Items:**

1. **ACTION ITEM:** There was considerable discussion on how to confirm the availability of resources after a disastrous event. The group formed an ad hoc subcommittee to formalize the next steps. The subcommittee consists of: Richard Przywarty, Frank González, Eddie Bernard, George Priest, and Costas Synolakis. Three new members were added to the subcommittee: Mike Hornick, Chris Jonientz-Trisler, and Richard Eisner. There was a discussion of what role the National Tsunami Hazard Mitigation Program Steering Group would have in tsunami disaster response. NOAA currently has no input in times of disaster. The current National Post-Storm Data Acquisition Plan provides only for data collection. Mike Hornick, FEMA Region IX proposed a 2-step action plan: 1) The Federal Response Plan needs a tsunami action plan. Mike Hornick and Chris Jonientz-Trisler and FEMA HQ need to develop this plan, and 2) the States need defined data collection activities. The subcommittee will review the NOAA Response Plan document and how it interacts with the states and report at the next meeting. Cross reference with November 2001 Action Item number 9.

**ACTION:** Subcommittee members named at the May 2001 meeting.

**STATUS:** As of the November 2001 meeting no interface with the Federal Response Plan plan had been drafted. Chris Jonientz-Trisler was tasked with writing the draft interface plan. This item will be carried forward as November 2001 Action Item number 9. **OPEN**

2. **ACTION ITEM:** A discussion of the question of how to report the mapping effort pointed out the difficulties of this issue and a method agreeable to all must be developed. Frank González and the States were asked to discuss and agree on the method of reporting the inundation mapping effort no later than March 2001. Cross reference with November 2001 Action Item number 7.

**ACTION:** Frank González and States

**STATUS:** Mapping reports should include inundation and evacuation, the number of map efforts, the number of communities mapped, and the population at risk. In addition: each map, brochure, etc., created must be provided in both electronic and hard copy to the TIME Center for the Mapping Archives. This item will be carried forward as November 2001 Action Item number 7. **OPEN**

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## Status Report of Program Elements

### Develop NOAA/State Coordination and Technical Support

Chip McCreery reported the IOC/ITSU Eighteenth Session of the International Coordiantion Group for the Tsunami Warning System in the Pacific meeting was held in October in Cartagena, Colombia. The session focused on improvement of procedures and criteria for issuing warnings, watches, and cancellations. He reported that both the Historical Tsunami Database and the National Geophysical Data Center tsunami databases contain errors and omissions. An effort is underway to have the regional coordinator obtain missing information and to correct incorrect entries. One report at the IOC meeting showed that uniform signage and symbols are very important tools and the IOC has adopted the National Tsunami Hazard Mitigation Program (NTHMP) signs.

Dr. Bernard reported briefly on TROIKA, a proposal to expand the scope of the NTHMP approach globally.

The U.S. and Chile agree that there is a need to expand the tide gauge network along the western Chilean and Peruvian coasts. In some cases gauges are in place but the U.S. does not have access to this data.

## **Improve Seismic Networks**

There are now 43 of the 56 CREST stations installed. Over the past 6 months the participants of the CREST project installed 20 new seismic stations. The 13 stations that remain to be installed should be completed in early 2002 as weather and schedules permit. Three Alaska seismic stations will be installed in early 2002 and should be fully operational by summer 2002.

## **Deploy Tsunami Detection Buoys**

The surface buoys at D171, D165, D157, were each be inspected, serviced, and subsequently re-deployed for another year of service. The sixth buoy was deployed in the Equatorial Pacific in August. The new generation of buoys is very robust, returning 99% of data.

A transfer of the DART buoys to the National Data Buoy Center is underway. This process is expected to take approximately 2 years.

## **Produce Inundation Maps**

Frank González reported on the status of mapping.

## **Mitigation**

Discussions from the Mitigation meeting were brought forward. The major topics of discussion were actions to address Reviewer's comments and recommendations as well as plans for the next 5 years. See the [Mitigation Meeting report](#).

Alaska is planning a statewide earthquake/tsunami symposium for Alaska emergency managers in Anchorage in April 2002. Tentative dates are April 15-19. Steering Group members were cordially invited to attend.

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## **NEW BUSINESS**

### **Establishment of the Richard H. Hagemeyer Tsunami Mitigation Memorial Award**

Dick Hagemeyer, who passed away on October 25, was a member of the National Tsunami Hazard Mitigation Program (NTHMP) Steering Committee from its inception and we all deeply feel his loss. His staunch support for tsunami mitigation was a major force in the development and success of the program. He embraced this state/federal partnership and made it stronger by instilling a sense of public service to the program. He single-handedly managed one of the five elements of the program—Improve Coordination—with no budget! He managed this by working with Warning Centers and enlisting his cadre of Warning Center Meteorologists to include tsunamis in their duties. One of his most lasting legacies was compilation and dissemination of the Historical Tsunami Data Base, making global historic tsunami information readily available to U.S. coastal emergency managers.

In honor of Dick Hagemeyer the Steering Group unanimously agreed to establish a yearly tsunami mitigation award to recognize a particularly outstanding state mitigation activity. A volunteer was solicited to draft the award criteria. Dr. Bernard prepared a letter introducing the award to the NOAA Administrator, with copies to the Assistant Administrator for Oceanic and Atmospheric Research and the Assistant Administrator for Weather Services. Each Steering Group member present at the meeting signed the letter and it was mailed on November 9.

**ACTION ITEM 1:** Lori Dengler volunteered to draft the criteria for the award by December 1, 2001. **OPEN**

### **Introduction of New Member**

James Weyman, Acting Director, NWS Pacific Region, was introduced. He will be replacing Dick Hagemeyer on the Steering Group. Mr. Weyman announced that the Pacific Tsunami Warning Center will be renamed the Richard H. Hagemeyer Tsunami Warning Center. The dedication is tentatively scheduled for December 1.

## **Discussion of August Program Review**

The August 7 Program Review consisted of reports from each of the state and Federal partners on their accomplishments of the past 5 years as well as a presentation of plans for the next 5 years. Members of Congress as well as state and local emergency planners attended the public forum and the poster session/reception. International tsunami scientists who attended the follow-on meeting of the IUGG Tsunami Commission also attended the August 7 review and poster session/reception.

The Steering Group discussed the comments made by the five reviewers and each of their recommendations for the National Tsunami Hazard Mitigation Program. The five Reviewers were Richard J. McCarthy, Executive Director, California Seismic Safety Commission; Dennis S. Mileti, Director, Natural Hazards Research and Applications Information Center, University of Colorado, Boulder; Douglas S. Luther, Professor of Oceanography, University of Hawaii; Philip L.-F. Liu, Professor, School of Civil and Environmental Engineering, Cornell University; and Hiroo Kanamori, Seismological Laboratory, California Institute of Technology, Pasadena, California.

One of the recommendations was to establish a 24-hour manned Tsunami Warning Center. There were differing opinions on this recommendation. Several issues must be addressed before a 24/7 operation could be implemented, including funding and additional manpower. It was pointed out that providing faster information increases the risk of error due to the lack of data and sufficient time to assess it. Even with a 24/7 on-site operation, states may not be able to act on the warnings quickly enough for the 24/7 operation to make a difference over the current manning. In addition, for a local tsunami in Alaska, time of the warning won't matter. The Steering Group's response to this recommendation was that the group feels the recommendation has merit but more data on user requirements is needed to determine if this recommendation is feasible. A draft of the recommendation letter to be sent to NOAA and USGS was prepared which states: "To effectively initiate state and local Emergency Management Plans, the five Pacific coastal states (Alaska, California, Hawaii, Oregon, Washington) of the National Tsunami Hazard Mitigation Program (NTHMP) require that the USGS, NOAA, and state agencies disseminate their automated, reviewed earthquake and tsunami notifications as rapidly as is scientifically and technologically possible. The NTHMP requests the USGS, NOAA, and states review data on response times and consider appropriate staffing and operational support to fulfill this requirement."

**ACTION ITEM 2:** The recommendation letter on Warning Center 24/7 operation drafted above is to be sent to NOAA and USGS in a timely manner.

**ACTION:** Bernard, Weyman, Przywarty **OPEN**

Another recommendation from the review was to request more and support applied research. The response to this recommendation was to establish a Tsunami Research and Advisory Committee (TRAC). This committee is tasked to write a report on coordinating more applied research interests and funding. The committee consists of: Frank González (Chairperson), George Priest, Roger Hansen, Craig Weaver, Chip McCreery, Tom Sokolowski, Tim Walsh, Gerard Fryer, and Lori Dengler.

**ACTION ITEM 3:** Write a report on research interest, ranking priorities and identifying a list of representatives at other agencies. Draft is due by January 2002 to Eric Geist, USGS. Final report due April 2002 for review by the full NTHMP Steering Group.

**ACTION:** Tsunami Research and Advisory Committee (TRAC)

One reviewer commented that the program is out of balance. the program's current emphasis is on detection and risk mapping but does not address the the sociological issues of dealing with the behavior of human beings. Also the program does not include anyone trained in disciplines that study human behavior. The reviewer also noted that more of a team approach is needed not just federal-state or state-local.

**ACTION ITEM 4:** To address this recommendation, the group plans to identify where the social science communtiy can advise the NTHMP on the usefulness of its activities.

**ACTION:** Chris Jonientz-Trisler and each state.

Tsunami data collected by seismic networks and the buoy system should all be provided and archived in one location where it is easily available to the scientific community. The group agreed that there should be a requirement to provide this data to a central source. Collecting post-event data is a function of the International Tsunami Information Center (ITIC).

**ACTION ITEM 5:** Encourage ITIC to be the archive for all tsunami event data. The Steering Group will offer cooperation and some resources.

**ACTION:** Bernard to write a letter to NWS/Weyman by January 1, 2002.

## **Program Recognition**

The review will help us plan the next 5 years based on program impacts. Linking actions to impacts will keep the momentum going. Recognition awards are a tool to that will help us keep the momentum and funding going. Possibilities for program recognition and possible grants were discussed. Eddie Bernard has written a nomination for the public Service Excellence Awards which is sponsored by the Public Employees Roundtable. The award has been sent to the NOAA Assistant Administrator for OAR to review and submit on our behalf. The California Seismic Safety Commission has nominated NTHMP for the William A. Nierenberg Prize for Science in the Public Interest which carries with it a prize of \$25,000. James Weyman suggested that the Steering Group be nominated for a Department of Commerce Gold or Silver Medal. Eddie offered to nominate or help states with awards submissions.

## **Real-Time Web Site Vulnerability**

This issue was brought forward from the previous open items (#3 above) for further discussion. The possibility of duplicate or mirror real-time web sites was discussed.

**ACTION ITEM 6:** Prepare an arrangement between NWS and OAR on mirror or duplicate real-time web sites.

**ACTION:** Weyman, Bernard

A discussion of the question of how to report the mapping effort pointed out the difficulties of this issue and a method agreeable to all must be developed. At the May 2001 meeting Frank González and the States were asked to discuss and agree on the method of reporting the inundation mapping effort no later than March 2001. The method agreed upon was that mapping reports should include inundation and evacuation, the number of map efforts, the number of communities mapped, and the population at risk. In addition: each map, brochure, etc., created must be provided in both electronic and hard copy to the TIME Center for the Mapping Archives.

**ACTION ITEM 7:** States to include in their Statements of Work a requirement to provide electronic and hard copies of mapping products to TIME.

**ACTION:** States

## **Mapping Quality Control and Certification**

The quality of the mapping products is an important mapping issue that needs to be addressed. Cross reference with previous meeting open item #4.

**ACTION ITEM 8:** A working group needs to develop a draft document on mapping certification procedures by May 2002.

**ACTION:** F. González will chair a working group to prepare a draft of mapping certification procedures. Working group named includes: Rich Eisner, Tim Walsh, Gerard Fryer, Doug Luther, George Priest, Lori Dengler, Vasily Titov, Costas Synolakis, Elena Suleimani, and Antonio Baptista.

## Response and Recovery

There is a new emphasis on promoting response and recovery. The Nisqually earthquake helped FEMA management to know of the NTHMP modeling experience. Chris Jonientz-Trisler and Michael Hornick (FEMA Regions 10 and 9 respectively) gained first-hand experience during the earthquake and response operations. To build infrastructure for Response and Recovery, one of the NTHMP Steering Group members should be an advisor for the Disaster Coordination Advisor. States should have plans in state mitigation in place prior to an event. Examples of these state plans can help build the federal response and recovery plan. Also, the NTHMP should be a clearing house for tsunami information (data collection). A Tsunami Research Institute should be pursued.

**ACTION ITEM 9:** Draft a Strategic Plan on how to interface with the Federal Response Plan in case of an event.

**ACTION:** Chris Jonientz-Trisler to draft Strategic Plan

**ACTION ITEM 10:** Begin interaction with National Science Foundation and NWS to draft a Tsunami Research Institute Plan and find funding sources.

**ACTION:** Bernard, González

## TsunamiReady Update

The documentation and application for TsunamiReady are posted on the [WC/ATWC web site](#). The WC/ATWC brochure has been updated. The WC/ATWC now has a [mirror site](#).

The following communities have been certified as TsunamiReady: Ocean Shores, Washington, and Seward, Alaska. Long Beach, Washington, will be dedicated as TsunamiReady on January 10, 2002.

Communities with pending applications are: Quinault Tribal Nation, Washington; Cannon

Beach, Oregon; and Kodiak, Homer/Seldovia, Sitka, and Whittier Alaska.

## **U.S. Affiliated Pacific Islands (USAPI) Membership Application to join the NTHMP**

Brian Yanagi presented for discussion the membership application of the USAPI. After much discussion about what specific needs the USAPI have and what manpower and infrastructure is already available/in place, the Steering Group decided to query them on their specific needs.

**ACTION ITEM 11:** Draft a letter to USAPI to request a specific needs assessment before membership in the NTHMP.

**ACTION:** Yanagi, Jonientz-Trisler

## **FY 2002 Budget**

Statements of Work and budget requests for each state, mapping, seismic, and mitigation were discussed at length. At the present time, NOAA is under a Continuing Resolution and does not have a budget appropriation. Budgets for FY 2002 were based on the same appropriation as last year as a starting point (\$2.3 million plus a \$1 million TWEAK add-on), there was a surplus of approximately \$120,000. After a good deal of discussion, it was decided to divide this surplus 5 ways among the states and to let the states decide the best use of the additional funds. There was one unfunded activity of a possible Technology Infusion Workshop.

## **FY 2003 Budget**

Using a draft of a budget initiative originally drafted by Dick Hagemeyer, the Steering Group worked through realistic figures to maintain the current five elements of the program as well as expand the scope of NTHMP. The proposed budget drafted for FY 2003 proposed budget needs of \$7.8 million.

**ACTION ITEM 12:** Bernard to e-mail to all Steering Group members the spreadsheet with FY 03 budget numbers as discussed during the meeting. Yanagi to send letters to Congressional members in Hawaii for support for the proposed FY 03 budget. States to also send letters of support to their state Congressional members.

**ACTION:** Bernard, Yanagi, states

# 2002 Meeting

Eddie Bernard proposed one meeting for next year to be held at PMEL in late October or early November. To avoid the duplicate discussions of mitigation issues, the format will be changed so that the Mitigation Meeting and Mapping Meetings would each meet for 1/2 day on Tuesday. The Steering Group would meet for one day on Wednesday. All budget and other proposals would be prepared in advance and brought to the meeting for discussion as was done this year. Additional conference calls, small group meetings, or e-mails would be used during the rest of the year to transact any business necessary. The group endorsed this plan and added that there should be an additional Mitigation meeting during the year.