

**NTHMP Mitigation & Education and Mapping & Modeling Subcommittees Summer Meeting**  
Bennett Federal Building, Room 2401  
Salt Lake City, UT  
1-3 August 2017

**Meeting Notes**

The MMS subcommittee co-Chairs and members thank K. Gately, C. Guard, and S. Ross for taking detailed notes during the meeting.

**Tuesday 1 August**

(Joint MES-MMS meeting)

**09:45 – 10:00 Introductions, Meeting Goals, and Agenda overview**

Dr. Cooper welcomed everyone to the NWS Western Region Headquarters.

Topics: Building the Strategic Plan for the next 5 years; What is next for the NTHMP? Enables tsunami readiness; capacity differs from location to location; How can we leverage?

**Opening questions and answers**

We need to tell our stories. Emergency management community can assist; they are great at passing our message. Relationships with partners are strongest. Visual and animated visuals are powerful. How do we engage the Social Science community? How effective are your products, discussions, efforts? Use social science to show direct results.

Like the WeatherReady Nation Ambassador program the Tsunami Supporter program could be a powerful method for getting out information and building partnerships. Christa Rabenold discussed potential to do a story. Check out survey/evaluation on MES website.

T. Walsh: External media sources can be strong avenues of support for the program.

MMS Outcomes: Do we need to get with FEMA to expand HAZUS to the western and south Pacific? USVI and Puerto Rico are included in HAZUS.

Strategic Planning: (R. Lopes assisting/facilitator) 2018-2023 Strategic Plan due next year in Seattle. Draft due in November. During the Annual Meeting we will finalize it and vote on acceptance.

**Announcements**

Annual meeting: Site selection difficult and the meeting will be in Seattle, Jan 29-Feb 2 at NOAA Sand Point.

D. Nicolsky: will need to review previous strategic plan. All discussion and activities engaged in as part of this meeting will feed into 3 Aug PM joint meeting with MES.

R. Lopes and R. Wilson will be helping with strategic plan discussion.

**Agenda Overview**

- Review modeling guidelines.
- Wed 2 Aug PM: Small poster session as a test case for future meetings, including annual meeting.
- Thu 3 Aug: Discuss grant allowable activities, facilitated by J. Allan. Will be driven by what is agreed as being important for strategic plan.

- Thu 3 Aug: Powell Center discussion. Goal is to determine what considerations are important to define tsunami sources with maximum credible sources and probabilistic in mind.
- Thu 3 Aug PM: joint MES/MMS meeting.

### **10:00 – 11:00 2013 – 2017 Strategic Plan outcomes review**

(Accomplishments, Identify activities to be carried forward)

Document reference: MMSOutcomes.pdf

Two MMS Outcomes from 2013-2017 Strategic Plan

- Successful execution of NTHMP tsunami mapping, modeling, mitigation, and education efforts
- Tsunami Hazard Assessment that Supports Informed Decision Making in Tsunami Threatened Communities
  - Discussion on MMS role: just data delivery? Technical support?
  - Should evaluate effectiveness of Hazard Assessment support

Slide:

**“Strengthen NTHMP subcommittees to execute the Strategic Plan  
90% of action items from subcommittee meetings will be completed within one year of being assigned -- Mostly yes  
Conduct at least one in-person meeting per year for each subcommittee -- Completed  
Update NTHMP Rules of Procedure and subcommittee Terms of Reference by end of 2013 and bi-annually thereafter -- Completed”**

Decision: Carry each of the above forward

Slide:

**“Support a research effort to develop U.S. tsunami risk assessment methodologies  
Provide expertise to the FEMA HAZUS tsunami module development as requested  
Discussion at the meeting: Review team, Pilot projects in WA, AK, CA, OR, HI; Helping with validation of the results, providing inundation lines and other GIS products; beta testing in OR (building inventory); NTWC-FEMA coordination”**

Decision: Carry each of the above forward

#### **Discussion**

K. Gately: add that as we move forward, as do real time forecasting and currents, they can get that from us also

R. Wilson/T. Walsh: and implementation

K. Gately: also applies to the other subcommittees.

J. Horillo: how do we measure that we did this?

C. Forson: many FEMA activities take longer than a year (implementation, community buy-in), makes it hard to have deliverable for the NTHMP grant

F. Cheung: I just provided data for their software. How they used it was up to them.

J. Allan: I see some role as ongoing technical support, but beyond that we'll be doing some actual application of it. Don't see clearly what this group's role is.

D. Nicolsky: technical support is good.

C. Forson: if FEMA will be using this, they'll need a catalog of the scenarios.

K. Gately: FEMA told us they have scenarios but not the source information. It would be nice if all these things were consistent and easy to use.

T. Walsh: Metadata.

Slide:

## Testing and support leading to a database

*“Support and implement post-tsunami event protocol for U.S. states and territories  
Develop plans for implementing post-tsunami protocols for field teams CA and HI: Published a  
paper, offered a protocol to the MMS, incorporated lessons from AS.*

*PR: Pilot project for the post-tsunami surveys with Herman Fritz (IOC guidance => custom)  
Gulf Coast, AK: GPS equipment to do a survey*

*WA: discussion with NASA, an idea to prepare pilots for the surveying*

*WA, OR: looking into drone mapping”*

## Discussion

General thought is that keeping guidance for the states and training is a good idea

R. Wilson: lots of good work done. Developing guidance for states and territories could be done.

T. Walsh: training component needs to be done for anyone who hasn't done a post-tsunami survey and who will need to do one.

J. Allan: do through NTHMP?

T. Walsh: through EMS, so joint with MES

C. Forson: in Seattle; a field day?

R. Wilson: Tsunami observer programs in HI and CA

F. Cheung: group of volunteers to do post-event survey

R. Watlington: It would be very helpful to anticipate what the seafloor in a particular harbor will look like. What are bathymetries and its usage. When to re-open the harbor?

Can MMS help with the harbor heights, parameters when to open and close ports.

T. Walsh: we've wrestled with that for a long time here. The US COE has jurisdiction and wants to open harbors up as soon as possible. We've long wanted an MOU with the Corps.

R. Wilson: could be part of a plan.

T. Walsh: Navy has never participated much; hasn't shown up even when they said they were going to. Under NIMS, every support function has fed agency. US COE has jurisdiction over re-opening ports as vessels need to come into port to help with recovery. Participation by both Navy and USCG could be increased.

M. Eble: we could propose a protocol but it's not our jurisdiction.

C. Forson: we can supply a scheme so that we're all collecting data.

R. Wilson: data for scientific uses and collecting data for the ports. Probably need a guidance document.

C. Forson: clearing house would help with media response and would provide USCG and COE with access to scientific expertise.

T. Walsh: WA has a tsunami guidebook for the media. It had personal phone numbers for people who'd be involved locally. Tried doing national version but it was too general. Need local contacts.

This is project for both MES and MMS

What is an assembly area...? Not in MES guidelines...

M. Eble: MES is also doing this.

D. Nicolsky: who does the modeling afterward?

K. Gately: if there's a DEM, TWC do it through T-view.

F. Cheung: not all information gets passed to EMS.

K. Gately: that's what T-view can provide. It's on a browser, I have a web link. It used to be t-web, now it is T-view. I can send you to our older site, our development site is where it's being developed. TWC is working with USGS on EQ.

M. Eble: two issues. 1) Post-event response, 2) longer-term protocols and scientific expertise for collecting data. Need to separate. Coordinate with MES.

K. Stroker: a post-tsunami clearinghouse would help us. We update in weeks and years (still updating 2004 and 2011 now).

M. Eble: ID what's important to be in the strategic plan and then R. Wilson will make sense what's MES vs MMS (avoid duplication).

K. Gately: are other states working on protocol for sending people out in real time?

C. Forson: we are starting.

K. Gately: we haven't had spotter programs but they can be very helpful. Keep us in the loop. Could use a unique hashtag.

D. Nicolsky: It's more than inundation, and needs to be coordinated with MES.

Slide:

**“Continue to ensure all models utilized in mapping efforts funded by NTHMP meet the NOAA standards for inundation models as defined in NOAA-NTHMP (2012) MMS, in coordination with PMEL and TWCs, update inundation modeling standards to include new advancements in modeling technology by end of 2014 Good on this point”**

**“Develop archive location for numerical model benchmark data by 2014 On-going discussions, ideas where to store data, NCEI will move forward. An idea to use Design Safe, NSF funded”**

### **Discussion**

D. Nicolsky: need to make sure all models meet certain benchmarks. Some states are looking at sediment modeling; maybe that should go in next strategic plan.

S. Grilli: review team pointed out that looking at sediments is important on East coast.

J. Kirby: maritime

D. Nicolsky: good to have this conversation, will come back to it.

D. Nicolsky: operational vs research models.

Behind on developing archive locations for model benchmark data.

C. Guard: need to be able to tell the local jurisdiction that they need to reevaluate their maps or evacuation plans.

T. Walsh: it's complicated. It's not just the model but the input into it. Probabilistic models are becoming part of international building code next year.

C. Guard: the evacuation maps are evolving things.

M. Eble: if the modelers see significant difference, they should advise that the maps/plans need to change.

T. Walsh: pedestrian evacuation modeling example – a Port Angeles area has long walking times.

D. Nicolsky: carry forward.

Slide:

**“Ensure all NTHMP-funded inundation studies adhere to the NTHMP inundation modeling and map guidelines, except where they conflict with state/territorial-mandated laws or policies  
NTHMP-funded maps meet established guidelines Yes**

**Update inundation map guidelines by the end of 2014 Everyone reads in the guidelines and review them, move to the next Strategic Plan**

**All NTHMP-funded inundation model results publicly available via internet using GIS technologies (e.g., GoogleEarth) K. Gately reviewed/collected GIS/KML/viewers  
Nation wide GIS overlay is missing (updates on the national layer might be missed and it might be better to work with States/territories)  
Lots of paper maps in counties”**

### **Discussion**

T. Walsh: need to involve MES. Recently asked definition of “assembly area”, looked for it in MES guidelines and couldn’t find it. Jointly need to revisit it.

D. Nicolsky: different states have different approaches for maritime products. Need to be more standardized. Also tsunami travel time maps need to have similar form. Can have 2-3 approaches, but not a dozen.

D. Nicolsky: map guidelines.

K. Gately: those are often in different places. They didn’t want to incorporate it with main public area on NTHMP site because it’s more scientific.

D. Nicolsky: tsunami.gov

M. Eble: NWS’s view is that it’s a forecast site. Continuing discussions about that.

Slide:

“Support an update to the 2008 National Tsunami Hazards Assessment

**Provide expertise as requested to help NOAA/USGS update the National Tsunami Hazards Assessment** Done

**•All inundation model code used for NTHMP-funded work shall be freely available to all NTHMP partners upon request by 2013** – They all are available per request.

### Discussion

Recently updated. Need to do it again? In 5 years? Risk assessment or hazard assessment?

Don’t know how we address “risk”.

K. Gately: put this to bed, manage for 5 years and then bring in something new.

T. Walsh: are the codes freely available?

M. Eble: source is not available (as code) but there is access through applications. There are claims that the code is copyrighted.

R. Wilson: do we want to continue that whoever develops a new model makes it available?

M. Eble: caveat with any models available, are the developer available to assist? Need some disclaimers. Some care needs to be taken.

C. Guard: ComMIT?

Others: ComMIT is the interface.

F. Cheung: available to NTHMP partners or to the public?

R. Wilson: this was in original TWEA, but don’t think it’s in TWERA.

T. Walsh: just being open source doesn’t make it useable by others.

R. Wilson: drop this altogether?

D. Nicolsky: should be available.

T. Walsh: accessible but not freely available.

K. Gately: do we want it in the strategic plan or just in our guidance?

D. Nicolsky: could put it into benchmarking procedure.

Decision: remove from strategic plan but keep in guidance and in benchmarking guidelines.

R. Wilson: not everyone is following the guidance.

K. Gately: put it in the benchmarking guidelines as well as the guidance.

Many: it could be part of the benchmarking process.

T. Walsh: aside: there are questions about who does the benchmarking process.

**Decision: remove from strategic plan but keep in guidance and in Benchmark Guidelines**, i.e. to put this [**“All inundation model code used for NTHMP-funded work shall be freely available (accessible?) to all NTHMP partners (or public) upon request by 2013”**] in the guidance, ii) to make sure the developer is involved so the model does not get misused, add some disclaimers

Slide:

**“Develop inundation maps for all communities with high tsunami hazard as defined by state tsunami programs**

**Change: each state to come up with a 5-year plan so all outcomes accounted for.**

**Complete inundation maps for all threatened communities in Washington, Oregon, California, Hawaii, Puerto Rico, and the U.S. Virgin Islands by 2013 Yes. Some additional/new scenarios might need to be modeled. USVI: TBA**

**Complete inundation maps for 50% of highly- threatened communities in Alaska and the U.S. Pacific Island Territories by 2017 Yes**

**Test in a high-hazard-rated selected community the importance of updating previously computed inundation maps based on new tsunami source information, improved digital-elevation models, and/or improved modeling technology by the end of 2014. CA: 90-30m modeling => re-did at 10m resolution; AK: Kodiak mapping; Gulf: Landslide modeling: number of sources; HI, AS: 10 m resolution; WA: modeling with a better topography and L1 scenario; OR, PR: Multiple scenarios at two communities & LIDAR data; East Coast: 1st generation maps, landslide rheology “**

## **Discussion**

T. Walsh: as work on Cascadia Subduction Zone continues, it becomes a moving target. Word “completion” makes it sounds static.

K. Gately: how to do a measurable on a moving target?

M. Eble: even the number of threatened communities would help.

T. Walsh: for communities, we used census-defined places. I’d never heard of ¾ of them!

M. Eble: needs to be measurable and to make sense. There’s no qualifier. It’s not measurable as is.

K. Gately: can we come up with a 5 year plan for each state? Is it feasible?

R. Wilson: we have 200 communities on our coast (100 incorporated and 100 not).

D. Nicolsky: 5-year plan for each state. Reference each state.

J. Allan: OR is done. We’re at zero.

T. Walsh: USGS subduction zone work.

K. Gately: each bullet should be part of a state’s 5-year plan.

D. Nicolsky: agree. That ties in all the components.

Slide:

***“Develop new tsunami hazard products to assist the maritime community and meet EM and other NTHMP customer requirements***

***Review existing demonstration projects and develop product guidelines (including offshore safety zones, drawdown, and currents) for maritime planning by the end of 2013. AK, OR, CA, HI: Demonstration projects, maritime guidelines***

***Benchmark numerical tsunami models for use on maritime products to ensure NTHMP funded models meet NOAA-NTHMP standards by end of 2015. Completed***

***Develop prototype maritime products for one community within each high tsunami hazard state/territory by the end of 2015. Some states/territories have developed maritime products***

**New outcome? -> Enhanced IDSS for maritime tsunami hazards**

**USCG – we need to know what maritime community (Could this be a new outcome?)**

**Lends to consistency. Each local region/chapter would need own local document,**

MMS member efforts are at different level, so best to be flexible.  
USCG has “Extreme Weather” Planning process

*Dependent on success of the two above milestones and Emergency Management and other NTHMP customer requirements, develop maritime products for 25% of threatened communities within each high tsunami hazard state/territory by the end of 2017. It is not complete, most partners are working towards this*

*Produce guidelines/standards and prototypes for new products specified by EM and other NTHMP customer requirements. Completed and transferred to MES “*

## **Discussion**

Can we identify the products for maritime communities that are the most useful?

D. Nicolsky: often there is no outcome after I talk to a harbor; they like the product but don't know what to do.

F. Cheung: could you talk to the Coast Guard? They have to have a plan and can be very specific on what they need from us.

R. Wilson: we find that the Coast Guard is focused on the ports, but smaller harbors are often left to themselves.

K. Gately: HI is a golden case with Coast Guard letting you know their needs. They're one of our main core partners.

M. Eble: Important to know what products work. They're all about standards and consistency.

K. Gately: with T-view, we're trying to keep consistent binning, color schemes, etc.

R. Watlington: with rotation, need a local Coast Guard document that they can go to.

D. Nicolsky: work with Coast Guard to set up assembly areas, where currents will be minimum.

C. Forson/R. Wilson: mixed responses about assembly areas (separated by boat size). Guidelines point to regional variability.

R. Wilson: first need to finalize maritime guidance, then work with MES.

T. Walsh: more than ports and harbors. Also include shipping lanes. What do we need by maritime? (had a discussion previously).

J. Allan: it's about modifying the third bullet.

R. Wilson: maybe have a priority list. How far get along the list is a measurable.

T. Walsh: haven't done it as one port, and then another. Port of Seattle, Townsend, .. have to work together. There's limited areas in Puget Sound.

R. Wilson: maybe have a Coast Guard workshop. Get things into their guidance.

F. Cheung: in our case, they have a response plan.

K. Gately: how does it work with DOD?

F. Cheung: Coast Guard in charge of 10 commercial harbors. Port captain decides whether to clear channel. Coast Guard has no jurisdiction on the Navy.

K. Gately: should Navy be involved?

R. Wilson: going through the all weather planning process could be useful.

F. Cheung: we had a very supportive port captain, he laid the ground work.

K. Gately: proposed that NTHMP rep rotations from TWC also be 3-year rotations.

D. Nicolsky: move review of TWERA language to after lunch.

**11:00 – 12:00 Using TWERA: language and MMS impact**

Deferred until later in meeting due to time

### **13:00 – 16:30 Strategic Planning**

**Using NTHMP External Review Report (R. Lopes facilitator)**  
**(Takeaways; Identify and discuss plans to address actionable items)**  
**Using 2017 Strategic Plan elements: (R. Lopes facilitator)**  
**Review of R. Wilson draft list provided April 2017 (R. Wilson facilitator)**  
**Develop Strategic Planning Worksheet content (R. Wilson facilitator)**

R. Lopes: anticipate that will have a draft strategic plan available to coordinating committee by November. Will hash out final conclusions at annual meeting. Work group: R. Wilson, C. Forson, J. Horillo plus MES and WCS colleagues and Mike Angove. R. Lopes is facilitating the effort, he's not the author. By writing it, you own it.

There are some issues with current strategic plan. It was written by dedicated workers, included objectives, outcomes, milestones. Want to come up with a 5-year strategy. Keep the strategic plan STRATEGIC! It's visionary. This year's Strategic Plan, will only have over-arching or national NTHMP outcomes. Previously, much wording was about lessons learned from Indian Ocean tsunami and applications to the U.S. We now have a mature NTHMP, with three subcommittees (external review suggested a 4<sup>th</sup>). Vision of the next five years to benefit and improve the national capacity for tsunami mitigation. Three inputs for this: MMS review of previous strategic plan, language from TWERA, and the language from external review.

Over \$57M spent on our United States (of course including all our regions, territories, state partners). 2014 expanded from three regions (Pacific, Gulf, East coast) to allow each territory to have their own representations. American Samoa, Guam, and CNMI had not felt represented. As we look toward future strategic planning, I don't have any preconceived notions. Want everyone to feel they have equal role and opportunity to speak. Don't want any constraints on the discussion.

Upcoming strategic plan should work in a manner with an annual work plan for each subcommittee, which will set that subcommittee's work for the year. That's a difference with the previous strategic plan. WCS had something like this. New Development -> Subcommittees will have a dynamic Annual Work Plan with milestones and deliverables.

R. Wilson: how do longer-year planning?

R. Lopes: have observed struggles figuring out which activities you completed and which you wanted to carry forward. I want to simplify the process. Also see calls for topics for your conference calls. This will give you more organization.

D. Nicolsky: the annual work plans will come from the strategic plan.

R. Lopes: milestones are like annual planning while the strategic plan is where you want to be in 5 years (5 year vision that's comprehensive enough to encompass natural changes). The current strategic plan outdated itself in a couple of years, had to be updated 2 years after it was written. On Friday, will discuss to what degree you want to put measurable outcomes into the strategic plan. An annual work plan can help you efficiently organize your NTHMP plan. ID major goals and outcomes, which will be linked to workplans. Develop 1 annual workplan and outyear objectives for other years (don't have to develop 5 annual plans at once).

Every subcommittee has its own culture and way of doing things. I'm trying to bring more uniformity across subcommittees. Want this to continue without me. But it's really your plan strategic and annual.



Strategic: global, visionary, high thinking, big picture; don't get lost in the weeds. That will help lead to annual work plan.

M. Eble: If put specific milestones in strategic plan, some states aren't at the same level. Can help avoid stress. Allows states to ID their own milestones.

R. Lopes: continuing to build a national capability across the entire U.S. and its broad range. Some states further along. Have to remember that the N in NTHMP is "National."

R. Wilson: one of the driving forces in TWERA is that we should develop guidance. Develop guidance as a group, it's there when each state/territory/region wants to pursue it.

R. Lopes: ex: "guidance on maritime hazards is prepared for the U.S."

R. Wilson: in the past used milestones and measurable as justification for our proposals.

R. Lopes: I read every word submitted for every grant (every round). Although we say which strategic plan elements and goals are linked, it's not as well linked as you'd think.

M. Eble: milestones will be linked to a strategic plan goal. As long as you're working toward the goal, YOU decide which milestones are appropriate.

R. Lopes: grant guidance rolls out in November. Want the draft strategic plan paralleling it.

The requests are now right on target with current capabilities.

C. Forson: are any of the milestones not being listed in the state proposals?

R. Lopes: good question. Yes, there are a number of milestones in the 2013 Strategic Plan that were not included in any grant proposals.

Better way to measure a grant request is how well it will help that state/territory accomplish its goals.

We're adding on the element of every subcommittee having its own annual work plan with measurable milestones. Individual milestones will be developed annually.

5-year strategy, **overarching** outcomes. Should be some MMS outcomes and strategies.

Three inputs for the strategic plan process:

1. The external review (R. Lopes worked closely with the review team members). The strengths (how well NTHMP members share knowledge with each other) and weaknesses. "Model practices" (R. Lopes doesn't like the term "best practices" because it implies that some practices are not "best" and therefore not good). How to make NTHMP self-sustaining and self-sufficient. Whatever goes into strategic plan should be collective process, not dependent on any one thing (or funding source). Another strength is relationship between EMs and scientists. Reviewers liked that we have an Island Caucus; it could become a Subcommittee. Liked that we have annual meetings. They wanted R. Lopes to point out that the first order goals have been accomplished but it doesn't mean the job is done; need to point out what else needs to be accomplished. Weaknesses: they'd like better interaction between the three subcommittees. Limited research focus (esp. social science research). Guidance products: not all partners follow the guidance at all times. Mapping: uniform color scheme. Delivering products to the last mile. [R. Lopes congratulated J. Kirby and S. Grilli on conducting a map briefing for EMs in Boston, and looks forward to them fulfilling their grant deliverable with two more site visits in the U.S. Southeast Coast]. Overall, the NTHMP is better at identifying problems than solving them.

Mike: capability gaps? R. Lopes: the panel was trying not to finger any specific state or territory, and they couldn't find an overall NTHMP-wide gap. Refinement of first-order accomplishments

(even maps developed 5 years ago are out of date). Telling the story about why we need to refine our maps – that's something that needs more work.

Overall, the only gaping hole is social science. 2/5 of the panel members were social scientists.

What are the ways the NTHMP can help address that gap? Include social science research in grant requests on behalf of a multistate activity.

2. Feb. 2017, what you want to carry forward from current strategic plan. D. Nicolsky: we discussed today which activities we want to carry forward and which should be folded into others. R. Wilson will be expanding on that input.
3. TWERA has lots of suggestions. They are suggestions. It is not Congressional mandate that you do everything in it. Congress does ask for a report (generally short and simple) one year after to see how things are going. Number of congressional visits to our website dropped off after TWERA passed. R. Wilson: we could have a couple paragraphs on what we've accomplished since TWERA passed.

Discussion of general vs. specific response to Congress' request for report 1-year after TWERA passed.

Tsunami resilience. The word "resilience" has many definitions.

Risk assessments. Grants allowable work group looked at that. If only do risk assessment for tsunami (without interrelated earthquake), is it as useful. 2008 risk/hazard assessment; the question is how much more effort do you want to put in or did previous one answer the need. What do you think meets the fundamental requirement? Risk assessment – redefine and do what YOU THINK meets the fundamental requirements. Do what you know best. You are the expert. If you think what we have meets the basic premise, say so and move on to higher priority requirements.

Preparedness in at-risk ports and harbors. That's the natural next order of activity for the NTHMP.

Community based outreach: MES

Guidelines and standards for community planning, education and training.

Multi-disciplinary vulnerability assessment research, education and training.

Risk management training for local officials and community organizations. MES has taken it on.

J. Allan: we're doing all of these in some capacity. Are you suggesting we phrase the strategic plan process so that it captures these without getting into the weeds.

D. Nicolsky: two new words: risk and resilience.

R. Lopes: risk can be defined many different ways; there is no national definition. Don't get into the weeds of trying to define global terms that everyone has a different meaning for.

R. Wilson: idea of mitigation and recovery caucus or committee; they could address some of the new issues (building code). We have ad hoc, but having it under NTHMP would give it gravitas.

R. Lopes: caucus would be a subgroup of NTHMP partners. For example, the states that have to work on ASCE 7. Things that affect all 12 members should be in subcommittees. Extra subcommittees require extra resources; NWS has been paying NOAA employee travel for CC reps and subcommittee reps, and for FEMA. In FY18, it looks like NWS will be providing 60% of previous travel funding and will have to tell some people we can't fund their travel. We won't have the resources to support travel for the current subcommittee Co-Chairs, much less any new ones.

T. Walsh: recovery and mitigation committee: conflict in review panel's comments. They said that there's not enough interaction between committees and adding committees will make that worse. (Vicky Nadolsky said no one can be on more than one committee and kicked Tim off other committees).

R. Wilson: a mitigation committee could have both EMs and scientists.

R. Lopes: can have subcommittee members who aren't part of CC. (example: K. Stroker)

R. Wilson: mitigation and recovery subcommittee might be way of getting more FEMA interaction (they're helping fund PTHA in CA).

R. Lopes: MMS is dealing with ASCE7 issues. Could have parallel meetings of ASCE7 and Island caucus (they involve different states/territories).

R. Lopes: it could be useful to have a longer discussion of this at a CC meeting.

R. Lopes: overall strategic plan is overall. Can have appendix/addendum for each subcommittee with their strategic plan.

J. Allan: is it necessary to spell out future subcommittees in the strategic plan?

R. Lopes: it lays out global vision and goals, CC decides how it structures plans to get there.

R. Wilson: assuming that there's a benefit to having Island Caucus in the strategic plan and could be benefit to have mention of a future mitigation/recovery subcommittee.

R. Watlington: would like different subcommittees to witness each other's work on combined issues.

R. Lopes: that was the attempt with the combined agenda; I think we'll see that.

K. Gately: what does the CC do with the strategic plan before it comes back to the MMS?

R. Lopes: approves it, adds thoughts, comments.

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#### R. LOPES: UPDATE TO TERMS OF REFERENCE

Looked through TWERA to see what changes should be made to terms of reference. They're small changes.

Public Law 115-25 Title V. (Other titles in P.L. 115-25 apply to the National Weather Service and are known as "The Weather Bill.") Do not use HR353! (That was its number while in development).

For the MMS, NOAA co-chair elected even years; state in odd years. Added a provision for what happens if someone leaves a chair post (call for nominees) to fill remainder of time. [Gala leaving; T. Biasco taking her place as co-chair]. No term limits, although desirable to limit it to two full 2-year terms. Added that MMS will develop an annual workplan, approved by CC. (Can be modified). Develop milestones.

MMS will update progress on measurable milestones during meetings during the year.

Will vote on approval to adopt on Thursday.

**Review of R. Wilson draft list provided April 2017 (R. Wilson facilitator)**

## **Develop Strategic Planning Worksheet content (R. Wilson facilitator)**

Participants are referred to MMSStrategicPlanWorksheetSchedule\_v1.xlsx (and R. Wilson was editing it in real time during the discussion).

*“Post-tsunami response activities which are run uniformly and support state and local emergency managers.”*

In response to what happened in American Samoa.

*“Continue to ensure all models funded by NTHMP meet the NOAA standards for inundation models as defined in NOAA-NTHMP (2012a) and Lynett et al (2017).”*

*“Determine the impact of sediment and debris transport on tsunami inundation modeling, and integrate appropriately into modeling and mapping activities.”*

Work on this as an MMS project and possible MMS workshop going forward.

J. Allan: also reference erosion (beach and dune erosion).

S. Grilli: debris vs. sediment. R. Wilson: both have impacts we should develop guidance for.

J. Horillo: tides. Tides are more important with sediment modeling.

R. Wilson: anything that’s missing from modeling.

M. Eble: “improve the accuracy of modeling results by including other physical properties. “

R. Wilson: “determine impact of other physical properties on tsunami modeling and include them in the modeling (examples include sediment and debris transport, and tides).”

T. Walsh: for Ocosta Elementary School, included earthquake-induced landslide and one potential landslide was right in front of the school.

M. Eble: state work plan would deal with different prioritizations. (Hawaii isn’t affected by large tides, for example).

*“Support that all NTHMP-funded inundation models adhere to the NTHMP inundation map guidelines, except where they conflict with state/territorial-mandated laws or policies.”*

Discussion about meeting minimum guidelines; every state is different.

R. Lopes: TWERA requires guidance to local governments and tribes. We’ll be asking for requests from local governments and tribes. Need to have subaward capability, which will be a challenge for the East Coast. Local governments are going to need to be provided NTHMP funds through their states. May need the prime on the East Coast and Gulf Coast be state entities and have the university be a subawardee. Have not figured out how to deal with the regions with TWERA.

J. Allan: will need to have a review process within the state.

T. Walsh: currently do it by having state and local groups work together.

R. Lopes: yes, for example, Washington has been doing it well for years.

*“Develop inundation maps for all communities with high tsunami hazard as defined by state tsunami programs.”*

J. Horillo suggested adding meteotsunamis.

T. Walsh: Hong Kie Thio and Young Wei’s work (Probabilistic) should be mentioned. Might apply more to the next item:

*“Develop expected inundation limits for communities which are not provided with high-resolution inundation maps.”*

J. Allan: the maps I've seen are community-centric, not coast-wide.

Tim: I've seen coast-wide.

*“Develop new tsunami hazard products to assist the maritime community, and meet emergency management and other NTHMP customer/partner requirements.”*

K. Gately has ideas about past subcommittee outcomes on this and how to reduce them (will discuss with R. Wilson).

J. Allan: also evacuation modeling.

*“Support that pedestrian and traffic evacuation modeling and mapping is performed in a consistent manner.”*

Keep the strategy but reduce the outcomes. Get less prescriptive.

*“Develop foundation for long-term mitigation and recovery planning to make communities more resilient to tsunami hazards.”*

K. Gately: MES has an outcome creating a community-based culture. R. Lopes: could give it to MES.

R. Wilson: both subcommittees should be involved.

D. Nicolsky: you have an outcome about updating tsunami inundation maps based on new tsunami sources? R. Wilson: had one in previous strategic plan that we put back in this one.

R. Wilson: If we need to host a database with NCEI, the funds need to be allocated before grant funds...

**Participants asked to send thoughts and comments out before dinner Wednesday to R. Wilson, J. Horillo , and C. Forson**

Review Wed 2 Aug agenda

Clarify instructions for posters:

We will have a small poster session for the NTHMP Partners on August, 2. This is a trial.

Please prepare some material to post on the wall. The focus is on the content, and not on the shape and form of the poster. It is okay to print a few letter size figures and put them together. Tape will be provided to adhere them to the wall. The idea behind this poster session is to promote conversation and sharing of the ideas, discuss completed activities or any potential topics for cooperation.

**16:30 Adjourn**

## Wednesday 2 August

**08:30 - 09:00 Arrival and networking**

**09:00 – 10:00 Lessons learned from Tsunami Currents Workshop**

**Journal article and proceedings publications;**

**Ensemble modeling (Supercomputing center?)**

Results of currents workshop: P. Lynett's results have been published in *Ocean Modeling*  
Evaluated only a single location type. Need to address grid resolution, sensitivity to location and source;  
opening of the harbor, use Pat's 1/3 rule: for 30 meter channel use at least 10 meter resolution grids.  
Binning (consistency); Estimated a 50% error; F. Cheung's model has a 10% error.

**Draft guidance working group (R. Wilson, J. Kirby, F. Cheung, J. Horillo, D. Nicolsky)**

SIFT model includes drawdown, surge and currents in the near shore; PTWC provides RIFT which is based on Green's Law (deep water)

There are two needs: planning, which needs all kinds of information and operations which needs a single ocean currents data. Need to know where are current less than and greater than 3 knots.

Oregon approach: advisory and warning options; California approach: playbook and advisory/warning.

Different models can give similar results in the open ocean, but very different results near shore; this is due to numerical dissipation; F. Cheung uses 10 meter resolution; this high resolution resolves the eddies and the currents better.

Discussion on ensembles: C. Guard was able to educate them on how TWC ensembles and consensus forecasts are done.

D. Nicolsky: P. Lynett paper (in *Ocean Modeling*)

Coupling: D. Nicolsky compared Alaska wave model vs. FUNWAVE to see differences in making maps for EMs. Kodiak Island.

Two scenarios: 1964 repeat and Cascadia Subduction Zone (40 m slip, double XL)

Pointwise comparison: for real geophysical tsunamis, not significantly different

J. Horillo: would a strong continental shelf make for more difference?

Local source, repeat of 1964: nearly the same; from an EM standpoint, there's almost no difference. (Distant source, Cascadia Subduction Zone,) also extremely similar).

R. Wilson: any difference when zoom into harbors? Would expect them to be similar offshore.

J. Allan: at the currents workshop, did comparisons of different grid resolutions and they were very similar. R. Wilson: 10m and 30m resolution were similar, but, oddly, 20m was different.

F. Cheung: we had settled on 10m as optimal. R. Wilson: but D. Nicolsky doesn't have 10m available for lots of Alaska areas.

D. Nicolsky: for Emergency Management, important to see where currents are small. Very close to shore, don't know what's going to happen.

R. Wilson: your comparison is great; first step toward ensemble modeling. Do we circle areas where eddies will occur because we can't capture them well with single model?

D. Nicolsky: going to go with 2 models.

*Unalaska and Dutch Harbor (for distant source: Cascadia Subduction Zone).*

S. Grilli: need to talk with mariners. R. Wilson: Pat found that for newer harbors (beefed up), damage doesn't occur until about 5 knots (instead of 3 knots for older ones). We found that mariners tend to exaggerate (double) speed/size of observations.

L. Kong: examples from Japan.

R. Wilson: 1.5 m/s (3 knots) is where damage starts to occur.

L. Kong: is there an error value?

R. Wilson: there's a group that compared with each other.

S. Grilli: Pat gave a percentage when comparing the diff models (maybe 20% on velocities).

D. Nicolsky: biggest uncertainty coming from the EQ source.

R. Wilson: if took into account error percentage, the two plots may look more similar

D. Nicolsky: I think the contours would look different, but what would Emergency Managers want to see?

F. Cheung: Coast Guard just wants maximum speed from me.

M. Eble: do you have any zoomed in views?

R. Wilson: the Coast Guard we dealt with liked the binning process/color bands.

F. Cheung: during event (deciding whether to close a harbor), just want one number; for planning purposes, want a map.

R. Wilson: our Coast Guard wanted a number that would tell them which of their maps to use.

C. Guard: F. Cheung, don't you provide 4 numbers: height, drawdown, period, surge? F. Cheung: yes.

L. Kong: F. Cheung, didn't you also show vorticity?

F. Cheung: they use my data products in 2 ways: drawdown map (surge, vorticity). During event, want a summary table.

R. Wilson: the difference between CA and HI is that in CA, the real time response tool is related to forecast amplitude.

K. Gately: SIFT includes drawdown, speed, period (time series). Trying to figure out how to get the products streamlined.

F. Cheung: from university, we like data. Coast Guard said they don't have time to look at a map in case of tsunami.

R. Wilson: magnitude is not a particularly good indicator of the forecast.

F. Cheung: I explained the uncertainty.

R. Wilson: 1946 had small magnitude, but big effect in HI.

L. Kong: thresholds to reach a warning.

M. Eble: F. Cheung and the Coast Guard are not getting a forecast where they need it because PTWC forecasts are based on Greens Law.

K. Gately: PTWC uses SIFT. L. Kong but they don't use a mechanism; SIFT uses DART, which requires time.

R. Wilson: consistency-wise, we found there's not a lot of difference in directionality (in our harbors), once you get to a peak.... Would it be beneficial in HI to test once you do get forecasts?

F. Cheung: I'm open, it's what the customer wants. They look at a table; there are several scenarios. (If there's a tsunami warning, don't bother with table, just evacuate). They factor the surge into harbor entry clearance. They also use the info to decide whether to evacuate ships out of the harbor.

M. Eble: Need to move on. Two things here: 1. work for planning. 2. Info for decision making during an event. Look at CA, HI, OR products.

R. Wilson: would be good to get F. Cheung's work into the guidance. Similar products but different events. In OR, the key is advisory vs. warning (simple distinction). Guidance shows which to use in which locations.

D. Nicolsky: they want to know the safe and the dangerous zones. Where are currents smaller than 3 knots.

F. Cheung: we do worse case scenario and figure out how far they have to go offshore.

K. Gately: want to move toward some sort of consistency. Some are for planning and some are for during an event; with both, we need to work with the other subcommittees (MES for planning, WCS for during event).

S. Grilli: for all our products that use multiple sources, Emergency Managers say it doesn't help us – they want the results broken down (Canary Islands collapse vs. Lisbon event).

D. Nicolsky: we break it down to advisory vs. warning. We model 2-3 large distant events, make map for warning level.

M. Eble: sounds like what S. Grilli is talking about parallels California's playbooks.

L. Kong: playbooks/guidance focusing on large vessels?

R. Wilson: it's mostly the small boat basins but we're also looking at the big harbors. We need more work with the larger ships (tankers, cruise ships).

F. Cheung: large commercial ships are priority (only have 2 weeks of food).

J. Allan: focusing on both in OR. Big one is Columbia River (massive container vessels). May have to look at more complex approach like playbook.

C. Forson: Coast Guard workshop. K. Gately/R. Wilson: plus others.

Tim: the Puget Sound harbor safety committee.

R. Wilson: we have those committees, too.

L. Kong: region by region

M. Eble: CA, OR, HI already engaged. Want to bring some of them to have common understanding of decision-making tools.

R. Wilson: have been working with locals. Need to find higher level person in Coast Guard.

J. Allan: one Coast Guard person on the OR coast does education and outreach (reaching higher just comes back to that person, and they don't seem to rotate as quickly as other Coast Guard).

L. Kong: is that a common position?

C. Guard: yes.

R. Watlington: main station is in San (?)

J. Horillo (same central authorities).

M. Eble: just covered maritime section on agenda. (Getting back to agenda).

D. Nicolsky: current benchmarking. Ensemble modeling is important. Guidelines. Lab experiments are good for calibrating models, but maybe don't need such requirements for the lab (use it as a guideline).

R. Wilson: in our inundation modeling, we developed several levels of inundation. 90m resolution was class C/3. 9 m was highest level. Allows for progressive approach. I would not like to see everyone having to use an ensemble model (more costly than IDing areas where eddies might occur). If allow for range of levels.

J. Allan: seconds R. Wilson's comment; sediment transport issue can change year to year, we can't run the models every year, but can bracket areas where eddies might occur.

F. Cheung: numerical dissipation related to viscosity.

M. Eble: some models did perform better than others.

F. Cheung: target resolution is 10 m, compare 5 m with.

R. Wilson to D. Nicolsky: combine or compare models? D. Nicolsky: combine.

J. Kirby: can't expect convergence with finer resolution when essentially simulating a turbulent flow field.

F. Cheung: same models get different results.

C. Guard: think ensemble means comparing runs from one model with diff parameters, not combining 2 models. M. Eble: they're both ensemble modeling.

M. Eble: how do we interpret and apply outcomes of the current benchmarking workshop?

J. Kirby: if use multiple models, how to combine them is a question (not just average).

J. Allan: how much affect does bathymetry have on current results? R. Wilson: so, does 20% apply offshore?

K. Gately: it's a study you'd want to do (look at results of ensemble modeling, but in doing that you'll choose one or the other; can we do the study easily/quickly?)

R. Wilson: or do we do it some other way?



M. Eble: we're finding that some models are better than others and we're trying to find a solution that allows people to use their models.

C. Guard: cyclone – we could learn from them about combining models.

T. Walsh: other ways to use ensembles.

K. Gately: at TWC, did a study with different methods, some ensemble, got best answer by averaging, but we also had a lot of observations that went into it.

M. Eble: maybe a couple of high-value/population locations to do a study.

F. Cheung: did that for Hilo with the benchmarking.

K. Gately: what's the problem with using the models that Pat identified.

F. Cheung: it's best for one situation

R. Wilson: we only benchmarked one location with all the models.

D. Nicolsky: different levels/categories. Lower levels, use single model, higher levels use 3D/ensemble.

J. Kirby: how define hierarchy.

R. Wilson/K. Gately: if go with ensemble models, maybe just use the best models available. One model on an accessible platform.

M. Eble: Neptune Canada.

J. Kirby: SimCenter putting FUNWAVE up online soon; could ask them to put all the models there – then a lot of the work would be done by someone else.

F. Cheung: they already have an NSF grant to do it (EQ is primary, tsunami secondary); they sell it as a multi-hazard platform; funding is NSF natural hazards EQ program.

M. Eble: J. Kirby can forward the contact information.

F. Cheung: should be some sensitivity testing.

J. Allan: with respect to grid resolution, we made a decision with Columbia River system, we're using an unstructured grid (can't use high resolution along whole 180 km area). High resolution in some areas, lower others. There will be some variability. C. Guard: how far up river is Portland? J. Allan/Tim: ~180km, but tidal all the way to Portland.

R. Wilson: we can prescribe some things, but other things could have a range.

M. Eble: what can be prescribed?

R. Wilson: we did sensitivity analysis on grid resolution (10m was best, saw converging at 20-30m).

The resolution for a confined harbor like Santa Cruz needs to be high.

Whatever the mouth of your harbor is, Pat says you want to be at a third the resolution. (If have 90 m wide harbor, should have 30 m resolution at a minimum). It's very constricted. Similarly, in Crescent City, the small boat basin is constricted (protects them from storms, puts them at greater tsunami danger).

K. Gately: are we saying any model that was at the currents workshop can be used?

R. Wilson: if compensated (binning, error, 3-6-9 approach).

M. Eble: with the models Pat had problems with, suggest they check the results in some way.

Tim: 2 groups ran same model with diff results.

D. Nicolsky: if look carefully at Pat's results, with 50% error bars, only 4 models qualify?

With inundation modeling, we made maps with missing areas.

R. Wilson/M. Eble: lowest level: maps with areas not modeled/ID'd as possible eddy areas.

R. Wilson: MOST vs Coullwave. 10m most to capture most things in harbors, then sectioned off hazard bins.

K. Gately: why not have everyone use the best model?

D. Nicolsky: all openings were in red, most models would give same result. We have to tune our models for what Emergency Managers want. Most models are producing the same results.

K. Gately: we know that none of the models nailed it. Should we be going forward with high resolution currents? Going with several models – would rather see consistency. Either ensemble or choose a model.

D. Nicolsky: economics – takes more funding to run 3D (best) model. We have to run things we have training and confidence to run. Less expensive to run AK model and could do more locations.

M. Eble: a few options:

Different levels of confidence. No modeling is base. Then higher levels (single model). Then ensemble (after doing sensitivity analysis). 4-6 models Pat thought did a good job; have other entities contract with them to do the modeling, maybe trade for things they're better at.

R. Wilson: when doing guidance, kept hearing that we need to let each state go with what they can do. States could ID highest hazard harbors and only have them go to the high level models. (not all states have the highest hazard harbors).

J. Allan: that's a reasonable approach.

M. Eble: tiered approach. Outsiders might wonder about the different models.

R. Wilson: we need to do the most cost-effective best products.

D. Nicolsky: 0-3 knot currents, 3-6, 6-9. R. Wilson: the binning is already in our guidance. OR is binning, as is WA, and NTWC.

Draft guidance working group: R. Wilson, F. Cheung, D. Nicolsky, J. Horillo, J. Kirby.

**10:00 – 10:30 Status of and opinions on NTHMP partner maritime efforts**

**10:30 – 11:30 Landslide Workshop update (Preliminary results, status of activities)**

J. Kirby update on Landslide Benchmarking:

Workshop at Galveston, 9-11 Jan 2017; journal article in the works; problem for many different areas (East Coast, West Coast, Gulf Coast, Alaska, Hawaii, Papua New Guinea); one model with different types of input were treated as different models; Pat presented six variations on slide types; fjords are most severe; most models are using submarine slide as source; models binned by type (hydrostatic, Boussinesq, fully dispersive, Navier-Stokes solvers); solid slide, depth-integrated, Newtonian viscous, etc.; non-dispersive models can't work for the underwater tsunamis;

- workshop products (3 benchmarks chosen as subjects of concern)
- Importance of submarine mass failures (SMFs)
- Complexity of landslide tsunami generation mechanisms (graphic from a P. Lynett paper)
- Dependence of results on modeling choices
- 7 benchmarks developed by the workshop committee
- 16 models or model variations presented by modelers
- comparisons of model results for benchmarks 2, 4, 7
- Geology lectures by Pat Lynett (Icy Bay), Homa Lee, Jason Chaytor, D. Tappin
- choosing benchmark problems (data availability, subaerial vs. submarine), etc.
- description of the benchmarks
- Benchmark 7 is the one field case: 2 landslides in Port Valdez, AK 1964 (old town=HPV; collapse in Shupe Bay=SBM). Have personal observations and debris line and pre- and post-shorelines for HPV. For SBM, have George Plafker table of observations.

J. Allan: some subsidence? J. Kirby: not sure what was subsidence vs erosion. D. Nicolsky: area is on hinge line of tectonic uplift/subsidence from the EQ.

- categorizing the models:
  - models char by hydrodynamics
  - models char by approach to modeling slide motion

Results:

- Benchmark 2: one group of models didn't do well.

To-Do list:

- reanalysis of data being conducted
- product development:
  - tech report,
  - journal paper,
  - update of website to incorporate analysis and cleaned up the presentation of data

### **Questions and Discussion**

R. Wilson: Pat talked about modeling. How good is the product? What do you see the needs are from a geologic standpoint? Do we need to do more work characterizing the sources?

J. Kirby: we need additional categories of rheology models, especially for continental margin

F. Cheung lures (cohesive well-compacted deposits). All of the model (except solid slide) have adjustable parameters; we fiddle with those. Will get really different answers with different parameters. Also, all of the tests probably biased toward favoring dispersive models (due to wave train). None of the models focused on what do you see in front of you. We have run-up data for benchmark 2 that hasn't been incorporated yet. We were going to do numerical modeling to see how much dispersion has on shoreline runup. Trying to see if can weed out unconscious biases toward dispersive models.

S. Grilli: Maybe still room for non-dispersive models if just interested in big splash at the coast that's not affected much by direction.

R. Wilson: how develop guidance for the states?

J. Kirby: don't have access to many things to make those decisions. Don't really know the geology in most areas where landslide might occur; don't know what's there. For events that have happened, don't have 1:1 correspondence of geology vs. model.

R. Wilson: don't even try to do guidance?

J. Kirby/S. Grilli: can't get a commitment.

J. Horillo: Newtonian... If have some historical, can assume that might have something like Newtonian.

C. Guard: how big?

J. Horillo: big! One in Gulf is about 23 km by ~50-60 km, 150 m thick, slope usually small – less than 5 degrees.

D. Nicolsky: in Valdez, was a LS that was a mixture of viscose fluid and rocks embedded in the slide. How to get % of viscose vs. granular flow tough to get.

R. Wilson: part of Powell Center workshops will be how to characterize the sources.

J. Kirby: they don't settle on the ocean bottom is some way that can figure out where came from.

Tim: assume getting acceleration right would be a big problem unless it's a rockfall.

J. Kirby: data repository/archiving.

K. Stroker: need the links

R. Wilson: 3: Inundation model benchmark, current model benchmark, landslide model benchmark. Keep it as simple as possible.

### **11:30 – 12:00 Develop archive location for numerical model benchmark data**

Agreed that official archive site will be at NCEI, with links; it will also be kept at the NTHMP website.

T. Walsh/M. Eble: Archive Light (previous creation of someone at NCEI).

T. Walsh: can we see what they settled on.

R. Wilson: we're going to show K. Stroker what we have from the 3 modeling workshops and see if NCEI could host it.

K. Stroker: if it's simple, we can have it on our spinning disk. If complicated, then need funds and more difficult.

S. Grilli: we'll move things off J. Kirby's site when it's all final.

M. Eble: isn't inundation modeling available through NTHMP page?

D. Nicolsky: results are stored at J. Horillo's site.

J. Horillo: Randy LeVeque

D. Nicolsky: probably just need to provide links to results, just inputs.

R. Wilson: any tools/instructions on how they get benchmarked.

M. Eble: looking at NTHMP site: for tsunami modeling: has the inputs for the first modeling workshop. Results are at university websites.

D. Nicolsky: what if a university website go dead at some point?

R. Wilson: copy that information to NTHMP web site

M. Eble: we can ask R. Lopes.

R. Wilson should coordinate with Pat Lynett.

M. Eble: director's assistance helped with the website before.

J. Allan: couldn't they be housed at NCEI.

K. Stroker: how do you provide a link to this. NWS doesn't act as an official archive, so good to back it up at an NCEI archive center. Will want to create a metadata record so future people know what's in there.

J. Allan/M. Eble/K. Stroker: put a line on the NTHMP web site that the information is provided here and are archived at NCEI (with link).

[R. Lopes after-the-fact addition: The NTHMP website archives a record of NTHMP activities, official foundation and governing documents, meeting notes, and presentations. The resources required for data archiving are beyond the scope of NWS capability for NTHMP website hosting. If NCEI were to do this and there are associated costs, such archiving services would have to be classified as "financial support of states/territories" and transferred from the overall NTHMP grant pool when appropriated by Congress. Be careful of what you ask for – all demands on the NTHMP grant pool for overall NTHMP activities such as data archiving will result in a reduction of available funding for states and territories.

There is already an illustrative example: Each year, the NTHMP MMS prioritizes four DEMs to be developed by NCEI. The FY17 cost of developing the "NTHMP DEMs" was \$213,000. That cost was transferred from the FY17 NTHMP grant pool from the NWS to NCEI, thus reducing the available grant pool by that amount. The NWS no longer pays for the "NTHMP DEMs" out of what was a "tsunami operating budget" because *there is no tsunami operating budget after the 2015 NWS reorganization.*]

K. Gately: what are 2 most important links to have [tsunami.gov](http://tsunami.gov) go to? We link to NOAA home, NWS home, there's some space and room to incorporate more.

M. Eble: NTHMP, NWS TsunamiReady Program

**13:00 – 14:00 Update inundation modeling standards  
(Include advancements in modeling technology; add currents benchmarks to modeling standards).**

(for this section, M. Eble is editing the critical docs as MMS discusses)

K. Gately: do we want to add wording that model code is freely available?

Suggested to add wording as to the affect that models will be made available to the public.

Reevaluate map guidelines document every 5 years or as needed.

*A key outcome specified in the National Tsunami Hazard Mitigation Program (NTHMP) Strategic Plan is the development of “tsunami inundation maps that support informed decision making in tsunami-threatened communities.” To achieve this goal, the NTHMP Coordinating Committee charged the Mapping and Modeling Subcommittee (MMS) with the following actions:*

- *Establish (minimum) inundation map guidelines by 2009.*
- *Establish a prioritized list of communities for which to develop inundation maps by 2009.*
- *Develop guidelines to establish areas of inundation for non-mapped and low-hazard areas by 2010.*
- *Develop a process to assess applicability of previously produced maps by 2012.*
- *Determine the potential inundation zones for non-mapped coastal regions using the established guidelines by 2012.*

Intended audience:

Tim: originally thought these would be used just for evacuation modeling. Time for a change.

*“All relevant and credible tsunami sources should be considered for modeling of inundation. “*

Who’s the overseer of relevant and credible? The state. State geological survey if there is one? HI doesn’t have one.

Tim: we don’t have power to make decisions on policy. Take it out.

R. Wilson: like to remind people doing modeling that they should look at reliable and credible sources, and these guidelines were basically for ourselves.

M. Eble: “a suite of sources.... as determined by the NTHMP members.

R. Wilson: we should develop guidance down the road for ASCE7.

J. Horillo/R. Wilson: under source characterization, we should include source model (example, for landslides). Lots of specifics could deal with.

J. Allan: in future, develop landslide guidance.

DEM Development:

Mean high water discussion. Is F. Cheung running his at minimum of mean high water? (he’s out of the room).

Don’t have time for all 3 documents today. Skipping to map categories.

Get rid of categories?

...Base data resolution.

**Decision:** M. Eble recommended that we have one person review Part II and another review Part III, and then we would look at recommendations. MMS members will review independently and provide comments to M. Eble.

**Terms of Reference discussion continued from Tue 1 Aug**

M. Eble makes changes on the document as MMS discusses.

J. Allan: Idea of 5-year implantation plan.

R. Lopes: MES not doing 5-year implementation plan. Doing 5-year outcomes. They have milestones but don't know where those are going.

R. Wilson: in previous 5-year plan, we had milestones, outcomes, activities. Thought those would go in the new strategic plan, but we're hearing that they're not - that the 5 year strategic plan doesn't get into those details. That's why we thought of doing 5-year implementation plan.

R. Lopes: MES is putting in annual workplan the 2018 activities, will look at milestones for developing the annual plan.

R. Wilson: Do we legitimize the 5-year implementation plan in the terms of reference?

R. Lopes: MES is doing basically the same thing you are, they're not calling it an implementation plan (the list).

M. Eble/all: we're calling the implementation plan a "vision plan".

Annual work plans are the most complicated of the recommendations. This was resolved with the assistance of R. Lopes. After much review, there was unanimous approval by the subcommittee.

It was decided that the Island Caucus results would be given at the Joint MES-MMS meeting on Thursday and not at separate times.

New version of terms of Reference are unanimously accepted!

M. Eble will send the updated and approved Terms of Reference to R. Lopes.

M. Eble will send Modeling part I (modified today) and II (modified a bit today) to MMS. Also feel free to look at part III.

**14:00 – 14:15 BREAK**

**14:15 – 16:30 NTHMP Partner poster session/presentations**

Poster Session: 5 minutes each.

**16:30 Adjourn**

## Thursday 3 August

### **09:00 – 10:00 Grant allowable activities under TWERA (J. Allan facilitator)**

Jonathan Allan went over the presentation and asked for comments and prioritization on the grant allowable activities. MMS members have to provide input to the table.

### **10:00 – 10:30 DEM priorities**

Kelly Stroker asked for the next year DEM priorities. Any requests go to Kelly and MMS Co-chairs.

### **10:30 – 11:00 Island Caucus Report**

Skipped due to time constraints

### **11:00 – 11:30 Discussion: MMS and MES collaboration**

Skipped due to time constraints

### **11:30 – 12:00 Powell Center Proposal (tsunami source inquiries)**

Stephanie Ross: Present on USGS tsunami program and overview of the USGS centers... Submitted a proposal to the Powell Center with three Co-PIs, it was partially funded (3 workshops and a fellow).

- Workshop 1: Gather experts in creating a process to develop a suite of vetted sources
- Workshop 2: Alaska Sources
- Workshop 3: Pacific sources other than Alaska
- Workshop 4 & 5: Gulf and East Coast

Ask to MMS members to ask for funding in the NTHMP proposals. Each workshop is between 15 and 20 people. Unfortunately, we cannot invite everyone to the first workshop.

Diego: Is source and model together?

Stephanie: Just source. Fellow is going to analyze complexity of the sources and investigate what matters

Corina: Is a database going to be created?

Stephanie: Database will be discussed at the first workshop

Corina: It would be good to discuss the database with modelers.

Stephanie: Next slide.... Inquires about existing sources.... An example of the California database.

Rick: Here is the list of sources, CA used in the 2009 mapping. Columns: Event name, slip, location, depth, Mw. NOAA FACTs database with segments. The database has a few tabs: tectonic and landslide sources

Diego: how were the landslide sources modeled?

Rick: Just the initial condition: negative and positive waves.

Rick: Non-Cascadia events at local faults, fault parameterization at California Geological Survey and University of Southern California.

Corina: Is it easy to add data to this table?

Diego: yes, for tectonic; not so much for landslide sources

Corina, Kara: talk about the GIS table

Jon: When to provide data to populate?

Dmitry: Probably by October.

Chip: Asks about the Guam sources, where to find the parameterization

Diego: It is based on the NOAA sub-faults and can provide assistance.

Jon: How to keep it up-to-date?

Rick: it is up to discussion, it is important to capture the current state.

Stephanie: please help us to populate the database.

**Decision: MMS members are asked to populate a template with tsunami sources used for the tsunami inundation mapping.**

**12:00 Adjourn**