National Windstorm Impact Reduction Program (NWIRP)
National Advisory Committee on Windstorm Impact Reduction (NACWIR)

Meeting Summary
June 27-28, 2017
National Institute of Standards and Technology (NIST)
Gaithersburg, Maryland

MEETING PARTICIPANTS

NACWIR Members:

Walker Ashley	Northern Illinois University
John Boudreaux	Assumption Parish Office of Homeland Security and Emergency Preparedness
Parthiv Dangodara	AIG Property Casualty
Wanda Edwards	RCI, Inc
Katherine Grieg	New York City Office of Recovery and Resiliency
Forrest Masters	University of Florida
Kishor Mehta	Texas Tech University
Walter Peacock	Texas A&M University
Tim Reinhold, *Chair*	Insurance Institute for Business and Home Safety
Donald Resio	University of North Florida
Donald Scott	PCS Structural Solutions
Kevin Simmons	Austin College
Thomas Smith	TLSmith Consulting, Inc.

Windstorm Working Group (WWG)

Ed Bensman	National Science Foundation
DaNa Carlis	National Oceanic and Atmospheric Administration
Sharon Jasim-Hanif*	Department of Energy
Ed Laatsch	Federal Emergency Management Agency
Marc Levitan	National Institute of Standards and Technology
Ted Mansell	National Oceanic and Atmospheric Administration
Shirley Murillo*	National Oceanic and Atmospheric Administration
Mike Uhart	National Aeronautics and Space Administration
Jonathan Westcott	Federal Emergency Management Agency

**participated via teleconference*

NIST Staff

Jason Averill	Division Chief, Materials and Structural Systems Division
Joannie Chin, *DFO*	Deputy Director, Engineering Laboratory
Tina Faecke	Program Analyst, National Earthquake Hazards Reduction Program
Judy Mitrani-Reiser	Director, Disaster and Failure Studies Program
Steve Potts	Program Analyst, NWIRP

Members of the Public

Joanna Blaney	FM Global

SUMMARY OF DISCUSSIONS – DAY 1 (JUNE 27, 2017)

I. Opening Remarks

Dr. Joannie Chin, Deputy Director of the NIST Engineering Laboratory (EL), and Designated Federal Officer (DFO) called the meeting to order at 9:00 a.m. Dr. Chin described the role of NIST and of the EL. She welcomed the members of the NACWIR, the WWG, and the public, provided a safety briefing, and then turned the meeting over to Dr. Tim Reinhold, Chair of the NACWIR.

Reinhold indicated that the goal of the two-day meeting was to develop a review of the priorities of the NWIRP Strategic Plan, and of the trends and developments in the natural, engineering, and social sciences and practices of windstorm impact mitigation. Those are the first two charges to NACWIR from Public Law 114-52, the statute which authorizes the NWIRP (https://www.congress.gov/114/plaws/publ52/PLAW-114publ52.pdf).

Reinhold stated the preliminary feedback on the NWIRP Strategic Plan is that it is well written, and there will be some areas that people want to emphasize and comment on. He clarified that he wanted to develop draft bullets for a consensus statement on the Strategic Plan, and draft paragraphs for the report before everyone leaves. Reinhold plans to have a draft of the report for the NACWIR prior to the next meeting. He will give the NACWIR about one week to review, then come back and deal with the remaining issues.

II. Summaries of Presentations and Discussions on Trends and Developments in Windstorm Impact Mitigation

The purpose of this portion of the meeting was for the Advisory Committee members to share their expertise related to the charge of the Committee, and set the context for the discussion on the NWIRP Strategic Plan.

A. Presentations

Presentation by Parthiv Dangodara - Resilient Commercial Construction

https://www.nist.gov/sites/default/files/documents/2017/06/28/1-resilient_commercial_construction.pdf

- Wind damage problems are mainly workmanship – not design

Presentation by John Boudreaux - Challenges for Rural Communities

https://www.nist.gov/sites/default/files/documents/2017/06/28/4-notes_and_comments.pdf

- It can be difficult to get local adoption of the latest codes and standards and other hazard mitigation programs, especially by rural communities.

Presentation by Katherine Greig - NYC Wind Study Overview

https://www.nist.gov/sites/default/files/documents/2017/06/28/6-nyc_wind_study_overview.pdf

- While there are similarities between rural and urban aerodynamics, we need to develop a better understanding of loads in complex environments.
- The Japanese are making great progress with computational fluid dynamics, so it may be possible for us to incorporate these tools as well.
- Different environments lead to different levels of code complexity.
- Code adoption is a socio-political process. Need research in terms of broad based community planning, and emergency management.
- Need good solid hazard maps that can be utilized in the process and utilized by the American Society of Civil Engineers 7-10 (ASCE 7-10, Minimum Design Loads for Buildings and Other Structures).

Presentation by Wanda Edwards – Industry Trends

https://www.nist.gov/sites/default/files/documents/2017/06/28/5-nwirp_comments.pdf

- Enforcement is key, but it's always the last thing that gets funded.
- Need inspection, auditing as well as training.
- Need to create a culture of compliance.

Presentation by Tom Smith –Trends: Building Wind Performance Post- Hurricanes Hugo and Andrew

https://www.nist.gov/sites/default/files/documents/2017/06/28/2-building_performance_post_hurricane.pdf

- Wind performance has improved significantly since Hurricane Andrew
- Codes now do a better job addressing building envelope

Presentation by Tom Smith – Trends: Response to Building Damage Caused by Tornadoes

https://www.nist.gov/sites/default/files/documents/2017/06/28/3-building_damage_caused_by_tornadoes.pdf

- Occupant protection has been main focus within engineering community since 1970
- More recently, guidance has been developed for reduction of tornado damage

B. Summary of Comments Based on All Morning Presentations:

- It's important to track what is being adopted into codes and standards across the United States.
- How do we help federal programs get people to understand the benefits of adopting new developments into code, rather than seeing it as a mandate?
- The insurance industry can play a role – premiums are based on risk. When those risks are higher, there's incentive to do more.
- Generally, insurance is a highly-regulated industry, a 1-year contract. They replace what was there. Some organizations are looking at a 5-year policy, thinking they will retrofit the house and will recover that money over the 4 to 5-year period, because they've entered into a 5-year agreement with the homeowner.
- Sometimes local officials instruct homeowners to just re-shingle, because the insurance company may not enforce replacement that meets code.
- In the next 20 years, new technologies such as 3-D printing, artificial intelligence (AI) and robotics will bring changes in workmanship. We need to think about how these emerging technologies should be incorporated into research.
- Biggest risk is to existing building stock – incremental retrofits are painful, but more necessary than new builds.
- Tools for evaluating capacities of existing buildings are needed as well as research to understand how to retrofit in the most cost-effective manner.
- Important to continue to do interviews with storm survivors, such as those in the Joplin Tornado investigation.
- In the next 50 years, building codes will be designed for machines doing the design/construction/inspections that people do today. This Committee could help lay the groundwork for this process to allow different stakeholders to be engaged so all

the people working on it now can be part of it. Otherwise it will be disruptive to the workforce.

- For coastal communities - infrastructure damage needs to be factored in as part of the total resilience equation.
- Comprehensive planning is increasing in coastal communities. Need good quality hazard maps and vulnerability mapping tools. They help identify common ground among planning/zoning/regulatory groups.
- People want to know about schools and safety but don't think in terms of flood/wind risk. Need good information.
- Manufactured housing is increasing in vulnerable places of the country - up to 8-9% of housing stock.
- Some local jurisdictions prohibit enforcing any additional standard in installation of any manufactured homes.
- The interior of the country hasn't had any change in the wind codes for manufactured housing since the 1970's. The coastal areas have had a little more. Anchoring systems are left up to each state – so it varies across the country.
- Zoning maps haven't been updated for a long time. The difference in cost for a single wide zone 3 vs. zone 2 home was $2,000. The segment of the population that buys those homes is very cost sensitive.
- Timing of code cycles and code installation has many complexities, which the Committee needs to consider.
- It's going to take a portfolio approach, which needs to include retrofit issues, code improvement issues, incentive programs, special tax assessments, impact assessments, education programs. Code is important, but there are many other things we can deal with:
    - Information dissemination programs.
    - Federal programs – grants and guidance.
    - Financial tools - local/state/federal.
    - We've got to be doing research on these issues as well.
- A recent economic study used paid claim data to compare the effect of windstorm losses in Florida after Andrew (built prior to FL building code) to those losses in homes built after the building code was implemented. The reduction in losses compared to the cost of building to the code came to about a 5-to-1 benefit/cost (B/C) payoff. In Moore Oklahoma, a similar approach found that the reduction in losses that can be expected from the enhanced standards should give about a 3-to-1 B/C ratio when built to Moore standards.
- There are things out there that can be enhanced with the right incentives. People want to live in safe housing. If we can incentivize it, we can improve safety.
- Retrofitting is more expensive. Improving hazard resistance in new construction is cheaper. Ripping out elements to retrofit drives up cost – the B/C payoff is not as high. Retrofitting is not as well researched, though.
- There is lots of research that's not getting into codes.

- Need to educate code officials, as good science doesn't always suffice.
- Need to educate home owners too, even beginning with children. The fire community has been very effective in talking with kids in schools. The Federal Alliance for Safe Homes, Inc (FLASH) is starting to do that in hurricane-prone regions on the east coast.

C. Summary of External Trends

The Committee identified an initial list of external trends to be considered for incorporation into the final recommendations:

- Technology
    - Computational
    - Material Science
    - Construction
    - Sensors
    - Evacuation, Response, and Recovery
- Workmanship
- Workforce Developmental Education (K-12, College, Researchers)
- Educating General Public
    - Need to evacuate
    - Built-To-Code may not provide desired safety
- Education (Researchers)
    - Building Science
    - Building Systems
- Social Economics
    - Change = disruption
    - Increasing diversity
    - Increasing inequality
- Knowledge Base
    - Know a lot more than 20 years ago
    - Still need to improve
    - Improved tools
- Community-based Planning
- Access to Data
    - Big data
    - Details
- Service Life Assessment
    - Predictive Performance
- Frequency and Intensity of Events
- DIY - Do It Yourself
- Sea Level Rise – relative sea level rise
    - Subsidence

- Footprint of Development (in hazard areas)
  - Concentration of Properties
  - Where we build
  - Value of contents
- Pressure for Interagency Cooperation
  - Shared Responsibility
- Existing Building Modifications
  - Playing the system
- Convergence Research
  - Basic Science research still needed
  - Interdisciplinary
  - Multi-
  - Trans-
- Social Communications
- Incentives and Disincentives
  - Competing priorities

III. Summary of Presentations and Discussions on NWIRP Strategic Plan

The purpose of this portion of the meeting was to set the context for the assessment and recommendations the Committee will make regarding the NWIRP Strategic Plan

A. Presentations

Presentation by Tom Smith

https://www.nist.gov/sites/default/files/documents/2017/06/28/7-nacwir.strengthen_plan_tlsmith_june_24_2017.pdf

- Better tools needed for in-situ vulnerability assessment of new and existing buildings
- There is a need for more construction workforce development

B. Topics for Consideration

The Committee identified the following topics that need to be considered for incorporation into the final recommendations on the Strategic Plan:

- Mitigation standards for existing buildings
- Intro – more information on injuries and fatalities
- Education/workforce development = K-12
- Computational Wind Engineering/Computational Fluid Dynamics = Cyber/physical
- Simplification/Workmanship
- Probability of detection vs. false alarms
- Phased array radar

    - Remote sensing
    - Data fusion
- Survivorship
- Manufactured housing
- Bringing people/humanity into equation
- Technology: design/construction/operation
    - Internet of things
- Windstorms and other wind related effects
- Sequencing of operations/timing
    - Optimizing operational requirements
- More granular mapping
- Incentivizing/de-incentivizing
- Culture of compliance

IV. Discussion with the Windstorm Working Group (WWG)

Reinhold provided members of the WWG an opportunity to comment on the discussions. Topics included:

- A question was raised on how strong is the relationship between workmanship and building inspection? The relationship between workmanship and building inspection is variable. If the inspectors are not there when the work is being done, it's difficult to know if the work meets the code but is not within the tolerance.
- We don't have enough research data to change public opinion and create motivation. Data availability over the past 30 years has been disappointing. When people buy houses, they have no idea what's in building codes. Aesthetics always win. Need to reach out to other groups who have data, and find ways of making it valuable for them to share.

A question was asked about where the NACWIR report goes once it is completed.

- Levitan explained that the Committee's report will be submitted to the NIST Director, who will pass it on to the NWIRP Interagency Coordinating Committee (ICC), which is composed of the directors (or designees) of NIST, NOAA, NSF, FEMA, OMB, and OSTP. At the next ICC meeting, the Directors of those Agencies will review the Committees assessments and recommendations, and then take actions as appropriate to respond to these recommendations.

V. Adjournment for the Day

Reinhold thanked the Committee for their hard work. The meeting adjourned for the day at 4:55 p.m. on June 27, 2017.

Summary of Discussions – Day 2 (June 28, 2017)

Dr. Joannie Chin, the Designated Federal Officer, called the meeting to order at 9:00 am. She turned the meeting over to Committee Chair Tim Reinhold.

I. Trends

Reinhold provided a summary of the previous day's discussion on Trends.

A. Characterization of Trends

- Reinhold characterized the Trends in terms of:
    - Existing societal and technical trends that are likely to affect windstorm injuries, damage, and losses.
    - Trends relating to what we want to accomplish (needed trends):
        - Workmanship
        - Education
    - External Trends:
        - Growth of windstorm research facilities in the last 10 years that are increasing our capabilities.
        - Code adoption and development of safe room requirements in the national level codes that we should pay attention to.

B. Trends in Big Data

- Reinhold reported that there is currently poor data on building characteristics.
    - Some groups, however, are capturing big data on bldg. properties, e.g.:
        - Core-logic.
        - BuildFax.
        - Tax assessor databases.
        - Safe Homes programs in FL, AL, SC are going out inspecting homes. FM Global and others doing their own inspections. Not out in the public domain.
        - NYC effort to capture data on vulnerability of buildings.
- Need to encourage the National Science Foundation (NSF) to consider how they could contribute to meeting wind resilience data needs:
    - NSF is trying to create big data hubs. The wind hazards community doesn't seem to be linked to them. They have a call for proposals out right now.
    - Encourage NSF to fund proposals that gather boundary layer data from field studies, in addition to their work in computer simulations. Investments in cyber-infrastructure, and computer networks have potential to create a secure environment in which data can be gathered and worked on by teams, in the context of proprietary data, and data that needs to be protected, so we can amass large network data sets.

C. Trends in Vulnerability Assessments to Buildings

- There needs to be a framework in terms of guiding research. We have a good sense of where our vulnerability is, but will have blind spots as we can't test everywhere and every permutation.
- We can look at the model from the seismic community in terms of taking care of some of the problems with retrofitting. The cities of Los Angeles and San Francisco looked at buildings to see the bigger problems, and created a hierarchy of the most critical retrofit issues.
- Once vulnerabilities are identified, need to decide: who's responsible for making modifications; who funds them, and who is liable if something falls off a building and injures someone?
    - California issued a mandate around the year 2000 that all hospitals be updated to meet current seismic codes, with the time-line depending on the level of the building. The mandate was not funded, but updates had to be made to receive an occupancy permit by the health department. Most critical facilities were required to update by 2015, but many are continuing to update.
    - In San Francisco, if the updates are not done by a certain time, the city can issue fines.
    - Los Angeles and Seattle are beginning to look at wind-related standards, similar to ASCE's standards for seismic.
- Water related losses are a little different – they are generally not to the structure, but to functionality and property.
    - Different materials can be used to make homes more resilient to flooding, but are generally not available for residential space because the Federal Emergency Management Agency (FEMA) is toggling between different issues of life safety, and reducing damage.
    - Opportunities for commercial grade materials could be made more widely available to residential owners. If water comes in, rather than soaking you carpet, just have a tile surface and mop it out. Rather than raze the whole structure, just get the heating, ventilation and air conditioning (HVAC) and electrical systems fixed.
- Buildings have different vulnerabilities to wind events than seismic events.
    - Seismic codes are strictly for preventing collapse during an event. Codes for wind events are mostly for protection of the building and what it will look like after the event – not collapse prevention.
        - The exception is in surge areas, where the whole building can be wiped out.
        - Timing is different too – there is a warning for most floods and some wind events.

D. Trends in Property Taxes

- A question was asked whether property taxes are reduced as a form of incentives, e.g. for buildings designated as soft-story structures, or if it is typically assumed that the owner

needs to make investments to improve the structure? Different incentive options were described, including:

- Incentives through property taxes for buildings designated as soft story structures.
- Incentives through fines by designating some as a dangerous building.
- https://www.floodhelpny.org/ is a portal where qualified homeowners can get a resiliency audit for your home. Might serve as a model for wind, to help people increase their knowledge and make better decisions. The most opportune time to educate people is immediately after a crisis, so need to have something like this ready to respond.
- Encourage authorities not to send mixed messages through buyouts for some buildings, and elevating others on the same block where there's going to be a berm.
- In rural areas, buyouts are promoted heavily through FEMA, but local governments don't like them because then a parcel of land in a subdivision is no longer taxed.

II. Strategic Plan

Summary of Comments on Measuring Progress in the Strategic Plan

- The Strategic Plan does not incorporate an adaptive management process – to measure progress. A recommendation was made to have something like an annual meeting where people ask "What have I done that's advanced what I said would get done?"
- Adaptive management is not always seen as realistic.
- A better methodology would be to actuarily correct with statistics, and not depend on safety factors, and conservative assumptions.
- Need something that closes the economic gap between societal benefits and costs with true rates. Evacuation plans, for example, are set at reasonable levels for surges.
- How does NIST expect to be able to mark changes over time? Difficult without using a model to estimate what you would have lost, to justify benefits.
    - Levitan responded: NIST's strategic priority number 1 addresses baseline studies. We discussed increases in population, and increases in hazard prone areas of coast – if we could level off the accelerating trend, that would be a win.
    - Levitan explained further that within the context of year to year variability, the baseline study is intended to help determine what's causing the losses in terms of fatalities, and property damage, which will help with identification of best opportunity to make reductions, and prioritize research and actions.
    - NOAA has great overall statistics on impacts, but need to dig down deeper to prioritize actions, and determine where we can have the most effect. How and where are people dying? Then we'll improve data collection techniques to find out causation from impacts from the storm. It will take time, for example, the process from research to a code change can be 15-20 years. Need to identify what

other things in our strategic priorities we can do much quicker, and get out to communities now.

- Have to make best estimates of how many buildings there are, what their vulnerabilities are, and include an uncertainty factor. Once you do that – you have a marker, then when you make changes you have the same marker to show progress. We need something like that here to show measurable progress all the way through to the end goal.
    - Levitan explained: One of the things called out in the legislation authorizing NWIRP is to improve our loss estimation methodologies and tools – how would you know from just loss statistics if you had really made an improvement? Maybe it was just a quiet year for storms? We have HAZUS or FL Public Hurricane Loss Models. Committee member Simmons is working with NOAA on predictive tools, other things to look at on tornado impacts. Those tools will help us to predict changes in the future if we can make a code change or incentivize different kinds of construction - code+ construction.
    - We'd like to predict it, and go back in hind-cast, and evaluate the change in our building stock – for example noting this did happen, ask what would have happened?
- Important to quantify so people can see you met the goal.
- Like to see the ability to use technology for search and rescue included. For example, technologies exist which allow you to find a cell phone, so someone who is trapped can be located. The only drawback is that people must subscribe. In general, technologies are available, the task is to get those technologies to the local levels.
- Tool development to conduct field vulnerability assessments to evaluate the resistance of both existing and new construction should be included.

III. Breakout Group Discussions on the NWIRP Strategic Plan

A. Topics:

Breakout groups formed and worked on different topics, looking at why it is a trend, and what the implications are. They worked on paragraphs for each topic, which will then be sent to Committee Chair Reinhold to compile. Topics included:

- Bringing people-humanity into the equation.
- Emphasizing the role of computational wind engineering.
- Mitigation standards for existing buildings.
- More granular mapping of infrastructure.
- Fostering a culture of compliance.
- Building codes.
- Technology trends.
- Big data trends.
- Trends in diversity in equality and planning.
- Trends in exposure, including the footprint of increasing population.

- Manufactured housing.
- Sequencing of operations.

B. Question on Frequency and Intensity of Storms

Reinhold raised, and the Committee discussed a question regarding the frequency and intensity of storms that came up over the course of the meeting, and was of interest to several of the breakout groups:

- The concern was changing risk of hazards, for which flooding has gotten thrown in. There is little evidence that frequency or magnitude of tornadoes has changed, or severe windstorm events. There is evidence to suggest increasing variability of, and high end magnitude precipitation events (includes both flooding and drought). Hurricanes can go in both directions – in the Atlantic there may be fewer hurricanes, but of higher magnitude. These are the front lines of the research now.
    - There has been a trend northward and eastward of tornado reports, but teasing it out is very messy.
    - The write-up in the Strategic Plan was OK, as written. We just need to address these issues moving forward.
    - Research suggests there will be increases in the number of environments supportive of tornadoes as we move into the latter part of the century, but we're not there yet – too early to develop any conclusions.
    - Several papers suggest that clustering, or distribution has changed, but still not enough to be conclusive.

IV. Review of Goals and Strategic Priorities in the NWIRP Strategic Plan.

Levitan reviewed and gave further explanation regarding the thinking and intent of the Goals and Strategic Priorities. He described the intent of the Strategic Priorities (SP's) in relation to the Objectives of the Strategic Plan, referring to the strategic plan overview slides used at the last meeting (https://www.nist.gov/sites/default/files/documents/2017/05/17/nacwir_meeting_1_-_nwirp_strategic_plan_overview.pdf):

A. Goals

- Goals A-C represent the broad range of research and development and implementation needs to be accomplished to reduce windstorm fatalities and property losses, without prioritization.

B. Strategic Priorities

- Chapter 3 identifies several strategic priority areas, some spanning across multiple objectives, which build upon, support and tie into all the objectives. Some lay the foundations for future research, others are things we can do right now for more immediate impact reduction, and others deal with human resource development.

- Strategic Priorities:
    - **SP-1**: Baseline estimates – how do we measure current losses of life and property, and in the future, to identify best opportunities for reduction, and to assess progress.
    - **SP-2**: Measurements of surface winds and storm surge current and waves in severe storms – we need measurements of extreme wind and storm surge and waves where buildings are located, not just up higher in the atmosphere or in stream channels or coastal waters.
    - **SP-3**: Databases of windstorm hazards and impacts – ideally want both in the same databases. Work with NHERI and NSF may help in this regard.
    - **SP-4**: Performance based design – is called out in the Legislation.
    - **SP-5**: Outreach – a lot of outreach going on by Federal agencies, for example Weather Ready Nation. Other outreach being done with private sector, e.g. FLASH, IIBHS – how do we build on this good work and improve?
    - **SP-6**: Sheltering strategies – how do we get information out there to communities? FEMA and Texas Tech for example are great work on design of storm shelters and safe rooms and providing that information to the public, but we also need guidance for communities, for overall sheltering strategies.
    - **SP-7**: Human Resources – making sure the next generation of windstorm impact reduction professionals is well trained, and also broadening public education. Good comments at this meeting to make sure that construction trades are also included.

- A question was asked about where improvements to predictive modeling would be incorporated into the Strategic Priorities?
    - Levitan indicated there are several objectives that include modeling. Strategic Priority 1 will use and enhance predictive modeling tools to understand losses of life and property.

C. Funding

- This plan covers a lot of ground. Ultimately, it will have to be decided where we put those resources.
    - Levitan responded that if you looked at trying to fund the entire Strategic Plan as written, that would be multi-hundreds of millions of dollars across the government. He suggested at this point that the Committee not worry about funding when considering comments on the Goals and Objectives. Rather if there is something the Committee thinks should be in Chapter 2 of the plan, they should comment on it.
    - Levitan clarified that Chapter 3 covers priorities. Comments by the Committee related to priorities of the Strategic Plan would be addressed in Chapter 3.
- Will it be part of this plan to address priorities or allocations of resources that come outside of this plan?

- Levitan pointed out that FEMA spends huge amounts of money on different things like flood mapping, which in some ways help support the goals of NWIRP, but are not reflected in the NWIRP Coordinated Budget.
- FEMA representative Jonathan Westcott pointed out that FEMA doesn't get a line item budget from Congress for NWIRP.

V. Planning the Next Meeting

A. Speakers from Other Agencies?

- Levitan asked if there were other speakers from any of the participating agencies that the Committee would like, beyond the four main NWIRP partners at the next meeting in August?
  - A request was made that as part of FEMA's presentation, they address their emergency communications system – the Integrated Public Alert Warning System (IPAWS), and how they work with the FCC, particularly related to the potential for pinging cell phones to locate disaster survivors.
  - A request was also made for a presentation from the Department of Housing and Urban Development (HUD) on manufactured housing, noting that a disproportionately large percentage of windstorm fatalities come from residents of manufactured homes.
- Levitan stated that NIST will make requests to those agencies for speakers.

B. Follow-up

- Reinhold asked the Committee to get the breakout group paragraphs to him as soon as possible, so he can compile them into a report. He will create a checklist so members can indicate what they would like to list as a recommendation and what should be listed as a suggestion.

C. Meeting Dates:

- The Committee agreed to move the August meeting from August 22-23, to August 23-24.
- Two web-based meetings were added to the schedule, to facilitate completion of work the Committee needs to get done to meet the statutory deadline of September 31, 2017. The two meetings are scheduled for:
  - July 31, 1-4 p.m. EDT
  - September 18, 9-12 p.m. EDT

VI. Adjournment

Dr. Chin thanked the Committee for their hard work. The meeting adjourned at 4:22 p.m. on June 28, 2017.