Stakeholder Engagement Report: Emergency Management
Climate Change Preparedness in New Jersey

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*Prepared for the New Jersey Climate Adaptation Alliance by
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Contents

Introduction

The New Jersey Climate Adaptation Alliance is developing a compendium of state and local public policy recommendations to enhance climate change preparedness in New Jersey. The Alliance solicited input from stakeholders in the Emergency Management sector in order to gauge sector-specific perceptions of climate change impacts and to gain insight on policy changes that are needed in New Jersey to allow the Emergency Management sector to better prepare for and respond to a changing climate.

Background on the Emergency Management Sector in New Jersey

Emergency Management in New Jersey is structured under the auspices of NJ State Statute Appendix A 9:33 et seq. There are three jurisdictional levels of emergency management in New Jersey: State (NJOEM), County (21 office of emergency management), and Municipal (565 offices of emergency management). Each jurisdiction has a director ("Coordinator"), who may be either paid or volunteer, appointed or not, part-time or full-time. It is common that municipal level emergency managers are either law enforcement personnel who inherit the position with the chain of promotion, are associated with other emergency services such as fire, are political appointees, or are volunteers. While all municipalities have an emergency management coordinator (EMC), they may or may not have any staff beyond the EMC. At county and state levels there is always additional emergency management staff beyond the EMC. There is not one specific mandatory organizational structure for emergency management in New Jersey.

Additional offices of emergency management are present under "agency" auspices at State, County and municipal levels, but those offices are for the specific agency operations and augment the jurisdictional offices of emergency management (OEMs). Every state agency has a designated Emergency Management Coordinator; the Agency's EMC may have that job duty in addition to their normal job responsibilities, or there may actually be a specific "office of emergency management" in that agency. This organizational structure varies from agency to agency and changes frequently.

It is a common misconception that since recovery grants and funding are administered through emergency management that emergency managers control what is done with the money (e.g. that emergency managers dictate policy). Emergency managers are the conduit for funding through the Stafford Act (the law that establishes Congressionally-directed funding for disaster relief and preparedness), but they do not dictate projects. For example, buyouts of flooded homes are determined by municipal officials and homeowners, and the NJ DEP, state statutes, and local ordinances determine construction practices. Emergency management is the point of contact for grant applications and disbursements for some funding streams pre and post-disaster but does not direct those funds. Emergency managers do not have authority to dictate policy and are themselves directed by political offices. They are not policy-makers, but rather are event response coordinators. Local emergency managers have very few actual legal authorities, mostly limited to response.

Approach

Stakeholder outreach included an in-person listening session as well as an online survey. Participants were asked about their perceptions of climate change impacts, preparedness, and policy priorities. The Emergency Management listening session was held in Wall Township in Monmouth County in September 2013. There were eight participants representing various emergency management jurisdictions, though there was no state representation present. A presentation was made at the August NJEMA membership meeting in Paramus, New Jersey to promote the listening session. Monmouth County OEM was also consulted to recruit participants for the listening session. Notes from the listening session are attached as Appendix A.

The survey link was distributed via the New Jersey Emergency Management Association (NJEMA) e-mail list to all its members. NJEMA membership consists primarily of municipal emergency managers, who represent the most numerous and diverse of the three levels of jurisdictional emergency management officials. A total of 46 respondents completed the online survey. Of the respondents, 67% (31 respondents) work for municipal offices of emergency management (OEM), 13% (6 respondents) work for County OEM, and 15% (7 respondents) work for State OEM or other state agencies. 30% (14 respondents) work in Monmouth County, with the remainder of respondents' jurisdictions scattered throughout the state. Respondents' service jurisdictions range in size from small towns (1,100 people was the smallest) to the entire state (8.8 million people). The survey questions are attached as Appendix B and a summary of the survey results are included as Appendix C.

Summary

Perceptions of Climate Change Impacts in the Emergency Management Sector

Among those that completed the online survey, there was general agreement that climate is changing and that there will be impacts felt statewide. According to the survey, 73% of respondents (33 respondents) believe climate change is occurring, while 11 respondents (24%) do not think that climate change is occurring. The majority of respondents (60%) agree or strongly agree that climate change is mostly caused by human activity, with 18% disagreeing or strongly disagreeing and 22% responding "don't know". Nearly all respondents (91%) feel climate change is a risk to New Jersey, and 82% think climate change is a personal risk to family and friends. Twenty-six respondents (58%) agreed that the international scientific community understands the science behind climate change, while only seventeen (37%) agreed that "our state and local officials understand the implications of global climate change for my region."

However, when asked to rank climate change as a concern in comparison with other concerns for the emergency management sector, climate change clearly ranked lowest. This is likely due to the "emergency" nature of emergency management: emergency managers are normally responders and operational response planners and do not have a role in large-scale community planning. It was noted during the listening session that it didn't matter

what the cause of increased flooding was, as their duty would still be to respond to events, whether the events are larger or not. More frequent flooding means more frequent response, regardless of the cause.

It was clear that emergency managers who attended the listening session have experienced a changing climate over their lifetimes and do not need convincing that it is real. However, other priorities tend to take precedence in work agendas. Participants noted that hazard mitigation planning is incorporating climate change for the first time, which is viewed as a good step. Additionally, there was probably some degree of self-selection bias in attendees; those who chose to attend the listening session perceive climate change as a true issue to a greater extent than the emergency management community at large, in the author's experience.

Climate Change Impacts of Greatest Concern

Concerns were greatest for operational issues impacting response. Regardless of event type, responders need communications equipment, training, response equipment, etc., whether the emergency is a flood, fire, or hazmat incident. Responders were also careful to point out that they respond to events, without regard for cause; OEMs must barricade roads and oversee evacuations, whether flooding is caused by a water main break, rainfall ponding, or storm surge.

Increased flooding was clearly the top concern, as more frequent flooding means more frequent response. Other climate change impacts that stakeholders believe are relevant to the sector include changes in precipitation, sea level rise, extreme weather events, storm surge, coastal flooding, and inland flooding.

The participants in the listening session have witnessed the shoreline changing in their lifetimes as a result of sea level rise and erosion. Those who attended are "believers" in climate change because they have seen physical impacts in the past 20-30 years. It is not a political issue to emergency managers in the listening session, as they have observed a different environment than what existed in their childhoods at the same locations.

Heavy and more frequent precipitation was noted as a concern, especially as development increases. All participants agreed that changes are clear and evident, with areas flooding on roadways that did not flood previously, which has created issues with storm drains. There was a general impression that the extreme events of Irene and Sandy may be related to climate change, but participants emphasized response needs rather than causes of extreme weather events.

According to the survey results, respondents overall were much more concerned about impacts from extreme weather events than they were about impacts from heat, drought, infectious disease, or other exposures. The biggest concerns arising from extreme weather events, as measured by the percentage of respondents choosing the impact as a "great concern", are damage to energy infrastructure (71%), injuries from storm events (70%), and

damage to communications infrastructure (64%). Other extreme weather impacts of major concern include interrupted care for vulnerable populations, e.g. during evacuations (60%), strain and stress on responders (60%), deaths from storm events (58%), and increased need for sheltering (52%).

Hurricane Sandy and Irene Experiences

According to the survey, the service areas of all 46 respondents (100%) were impacted by Tropical Storm Irene in 2011, with common impacts including power outages (93%), road closures (89%), minor property damage (80%), short-term stress (78%), and resident evacuation (63%). Injuries and deaths were reported by 8 and 3 respondents, respectively. The service areas of 44 out of 46 respondents (96%) were affected by Hurricane Sandy in 2012. Common impacts included power outages (98%), road closures (95%), short-term stress (80%), major property damage (77%), longer term stress (77%), and resident evacuation (75%). Injuries and deaths were reported by 20 and 8 respondents, respectively.

A major issue that arose from Irene which was noted in the listening session is that although considerable effort goes into producing letters of intent for FEMA Hazard Mitigation Grant Program funding, the money goes to the state and the state then determines funding distribution. Stakeholders identified the "mystery" of decision-making at the State level as an issue; they would like more transparency in the process. Letters of intent are a pre-requisite to be eligible for funds, but there is limited staff at the local level and participants noted that they often end up not getting funding despite the large effort put into applications.

Another lesson learned from Hurricanes Irene and Sandy was to direct people to use shelters only as a last resort, and to prioritize self-reliance measures such as staying with family, friends, at hotels, etc. The group agreed that there is a major need to educate populations to be more self-reliant and resilient.

Vulnerable Populations

The elderly were the top population of concern for those in the listening session. This is consistent with the survey results. Among populations that are particularly vulnerable to climate change impacts, 69% of survey respondents expressed great concern for the elderly, followed by the physically disabled (49%), mentally disabled (47%), the poor and economically disadvantaged (44%), car-less households (27%), low income homeowners (27%), non-English speakers (23%), middle income homeowners (20%), and racial minorities (20%).

Stakeholder Perceptions of Sectoral Preparedness

The nature of emergency management is to focus on "emergent" events and short time horizons ranging from zero seconds to one year. Emergency managers view their role as being primarily limited to event response rather than playing a larger role in preparedness.

Participants in the listening session noted that they have a limited role in controlling community growth and development, and thus have limited involvement in planning for resilience to hazards.

During the listening session, stakeholders commented that climate issues exceed the power of a single municipality or county, and that a broad, unified approach is needed. Participants feel that planning for climate change is better handled at county and state levels to ensure comprehensiveness since one town cannot prepare in isolation. Stakeholders also noted that political will drives action and can be a roadblock to any activity addressing climate change.

Emergency managers pointed out that grant and funding processes tend to be reactive and do not support long-term planning that would be needed to address climate change. The biggest issue is that there is no funding, and most emergency management departments have insufficient staff to meet immediate needs, let alone to address long-term goals. In the survey, the biggest challenge identified by emergency managers to achieving preparedness for climate change in New Jersey is a lack of adequate and consistent funding and staffing. Other challenges include a lack of public education on personal preparedness, limited buy-in from the public and elected officials on climate change issues, and inadequate infrastructure.

Leading Practices and Policy Priorities

At the listening session, no leading practices were identified. OEMs do not have separate plans or stockpiles of equipment by event type (with some exceptions, like nuclear or active shooter events). Quality of communications is not based on the frequency events, and even with very infrequent events there is a need for the best communications possible; communications need to be effective and optimally functional in all events. Additionally, the cause of an event is often immaterial. Climate change may exacerbate coastal flooding, but it does not require an operationally different response from routine coastal flooding. The only demonstrable item with a linear increase is sea level rise along the shore, but sea level is rising at a slow enough rate that there is no recognized need to change procedures.

The listening session group was quite adamant in that there are worse problems at present (e.g. insufficient interoperability with communications, which can cost millions of dollars) than something twenty to fifty years down the road. Immediate needs will always take precedence, and climate change is not viewed as a priority because there is no perceived difference in response. The consensus was that the purview of emergency management is operational response rather than directly addressing climate change. The primary obstacles to improving approaches to address potential hazards associated with climate change include political will (directives and support) and funding for proper mitigation and development planning.

The survey asked "what are the most important actions or programs needed at the regional, state, or federal level to support local emergency managers in preparing for and responding

to climate change impacts?" and respondents were asked to rank options as "high need", "some need", or "little to no need". The highest priority item, as measured by the percent of respondents choosing it as a "high need", was resilient emergency communications infrastructure, selected by 82% of respondents. Improved coordination was also identified as a high priority, both between different levels of government (80%) and among emergency management and other sectors such as transportation and health (76%). Other priority actions at the regional, state, or federal level include additional training and exercises for emergency management (67%), critical infrastructure assessments (66%), rapid response system for extreme weather events (64%), and improved climate and weather modeling capacity for local scale assessments (60%). Other perceived needs include provision of regional shelters (59%), better regional transportation options (59%), enhanced weather forecasting (56%), and enhanced weather monitoring (58%).

There was a wide variety of responses to the survey question which asked "what does your jurisdiction/agency most need to prepare and be ready to respond to climate change impacts over the coming decades?" Several respondents identified a need for additional financial and staffing resources, while others pointed to a need for more and better equipped shelters, warming/cooling centers, and stockpiles of supplies. Other needs identified included better communication equipment and systems, updating of plans and a more regional approach to planning, flood control, and better climate and weather modeling.

Recommendations

A major priority suggested by stakeholders to enhance emergency management is to make the grant process easier by providing longer timeframes for grant submission, simplifying submission processes, and having dedicated staff for grant management. Several participants noted they wished they had a staff position of 'Grants Manager' to seek out and apply for preparedness grants, but often at the municipal level they are an office of one, or even split their emergency management duties with other job responsibilities.

Participants emphasized the need for public outreach to build individual and household resiliency, so that we don't keep training people to rely on government response (e.g. rescue, money, shelter). Stakeholders stressed the importance of individual self-reliance and of keeping shelter populations low. Programs such as CERT (Community Emergency Responses Teams) were highlighted as positives, and there was interest in educating children on climate and environmental science in schools. Social media was seen as an important tool for public outreach.

Stakeholders also pointed to the need for ordinances that allow people to better protect themselves for the long term by exceeding existing building standards. Emergency management stakeholders were adamant that buyouts do not resolve flooding issues and that abandoning the shore is not feasible. Governing bodies do not want to lose the tax base and will resist planning to accommodate nature. Instead, the emergency management sector feels that it should be easier for people to voluntarily exceed construction minimums

to protect their homes; they noted that residents often have difficulty getting the necessary community approvals to elevate their homes above existing standards.

Insights from the Author

In comparison to other issues and challenges presented in the survey, climate change ranked last. This is to be expected as "emergency management" by nature focuses on "emergent" events and immediate time horizons. Emergency managers have very little actual power and almost no role other than administration in preparedness and recovery stages. Response (operations) is the focus of emergency management.

Participation in the stakeholder engagement process for this sector was low. Some emergency managers participated in the Coastal Communities sector survey and listening session, but others noted they are just burnt out with initiatives, requests, and meetings since Sandy. There may be other issues at play as well, since emergency managers tend to be a conservative group and climate change is not fully accepted by many.

Since emergency management has an emphasis on responding to what is happening now, and Incident Command System principles (mandatory nationwide) dictate the priority of saving lives, stabilizing scenes and protecting property (if possible), it is almost counterintuitive to prioritize long-term processes. I feel that folding issues into "events" (e.g. talk about increased flooding scope, more frequent storms, etc.) will bring more success. It is critical to make the material and issues relate to events that emergency managers need to address in response planning and operations. Acknowledging climate change is not a major priority for responders, but it is important for addressing longer term response capabilities such as personnel, equipment, communications needs, information (alert and warning), etc.

Because emergency management is run by jurisdictional political leaders (Governor, County Administrators, Municipal Mayors), political will must be present to make policy changes. Due to the politicized nature of the topic, it is a challenge to convince political officials that climate change is even occurring, let alone need that it needs to be part of an organizational agenda.

I feel that as emergency management is really about event response planning and operations, there should be a "lead" from other sectors to take actions to address long-term land use and development planning that accommodates climate change. Then emergency management can better plan for response operations. If a follow-up project occurred, I suspect that emergency managers would identify someone else as the choice for climate change planning, with their role limited to response to events (e.g. flooding), regardless of the cause.

Suggested next steps within the sector for advancing policy recommendations, in order of priority, include:

- Assist municipalities with public outreach to build self-reliant populations, reduce the number of people who rely on the local, county or state government to provide shelter during disasters, and teach the general public resilience and self-reliance strategies.
- Provide municipalities with grant writing assistance.
- "Gentle" outreach to convince political leaders that the issue is important combined with visible action from other sectors. Once political will is established, emergency management officials would possibly be able to add climate change issues to their agendas.
- Outreach to emergency managers via state conferences and training opportunities, such as the NJEPA conference in May and hosted events throughout the state as travel is often impossible/improbable.
- Relate climate change impacts to specific event types that concern emergency management (increased flooding and precipitation in particular) to show the direct connection of climate change to the mandates of emergency management.

Coastal/OEM Community Listening Sessions to Support the NJ Climate Adaptation Alliance
Wall Township – September 12, 2013

Before Intros:
Mariana did background of climate adaptation alliance mission and handouts and said she would go over Raimy's survey results at the end.

Discussion Topics – *(Adapted from S. Moser's August 2013 Focus groups held in Monteray Bay April and June 2012)*

- Broad Questions:
    o **What are some words that describe your connection to the coast/Shore**
    o Life long resident, grew up on horse farm effluent went into shrewsberry river, have been in water since early age
    o concern
    o **What are your worries about the coastal environment?**
    o All bets are off if water goes over bulkheads.
    o Clean ocean action has done some good, not all bad.
    o changes in the shrewsberry river are visible – climate change is impacting it as well as wetlands have been filled too for residential development, some of these towns no one told them they were built on marshes so they were inundated with water
    o Big problem is back bay flooding.
    o Sea Bright - 1st beach replenishment project was done in 1994 and lasted until 2008/9 and strong winds scour the beaches, doesn't take a nor'easter. Sea bright OEM guy a firm believer in global warming – in 30 years he saw perhaps a 6 inch change in the mean high water of the shrewsberry river. (Said his daughter threw a bottle with a letter in the shrewsberry river and got a letter back in the mail 9 months later from a man in nova scotia)
    o sea bright - Out of 7 beach clubs, 6 were substantially damaged in Sandy, 1 not damaged was built post Katrina to a higher hurricane standard. – lost all downtown businesses – have a "10million dollar lot" in downtown that they use to store dumpsters and trucks (oem guy said it is dumbest thing) and it substantially damaged the downtown buildings and peoples homes when dumpsters went crashing into walls

- SB oem guy said he studied the barometric pressure drop before storm and knew the tide would rise and the storm was going to be bad and they were going to get hammered but never thought it would be as bad as it was
- Manasquan is "sea bright south" minus the sea wall
- Sea level rise is happening and it is documented at certain stations – a combo of SLR and land development
- Climate change is driven by development changes – it is a piece of the puzzle
- Manasquan floods on typical full moon tide and once SLR is factored in a major large scale project is going to have to be done or certain people won't be able to access their homes on a regular high tide
  - Perhaps a tide gate at a choke point – thinks it will definitely happen question is just when
- Doesn't think retreat is feasible because not economically feasible
- State wants to buy out land but best way is by the block/large swath but it happens more like one house at a time and that isn't helpful
- Wall twp – heavy rain precip events has caused flooding they haven't seen before – they contribute this to climate change
- Local streets are flooding that they have no record of ever flooding in towns history – they are updating storm drains and adding pumps – there is stream/riverine flooding
- Street ponding – an outfall problem – the state says they've cleaned out the outfalls but the twp doesn't believe they have
- Monmouth county – depending on the municipality – there are more proactive officials in certain towns and the county is well notified of issues in certain places – everyone is swamped and busy but county is getting worse response with HMP now than with 1st one years ago. FEMA thinks post sandy is great timing for HMP update but it's actually the opposite. Thinks a county level of govt, especially with this planning, would be much more effective – giving the county more power also makes it harder for twp to play the blame game "the flooding is the development in town X and then it runs here and there is nothing we can do about it"
- FIRM mapping done by someone in Boulder who took data from a point in sandy hook – SB mapping project confusing and doesn't make sense
- SB immediately adopted an ordinance to do elevation of the ABFE plus 2 – Manasquan did ABFE plus 1
- Monmouth county said some towns wont adopt the ABFEs because people want to go above and then they don't meet the ICC codes for height guidelines or won't get local variances to go above the max height
  - Need to work on local ordinances and regulations

- o What words would you use describe the major challenges facing the future of the coastal community where you live or work?
- o Sayreville – buyout of small amount of homes will not solve flooding
- o Rt 35 from Sayreville into old bridge during hurricane donna – first time this ever flooded and now area floods during every time
- o Marker in old bridge section shows where storm surge has been for Irene and sandy
- o Raritan bay is filling with sand, much more shallow, storm water has nowhere to go
- o Destruction of islands in the navesinc river
- o **How do you view these threats as compared to other concerns you deal with?**
- o

- - **Coastal Hazard Preparation**
  - o **What are some of the hazard preparations you are undertaking?**
  - o 10-30-and 50 yr climate change predictions going in the monmouth co HMP
  - o **What else needs to be done in this regard to support your efforts?**
  - o Contracting efforts, particularly in debris removal, to stop waste but pay to play (politics) locks them into contracts - this doesn't help them
  - o SBA program no longer being used and state giving loans directly
  - o The MB3 computerized system should make it easier – NJEMgrants.org (all PA reimbursements)
  - o PDM/FMA grants everyone assumes someone else is working on it and nothing gets done
  - o Grant opportunities that come in email – cumbersome, local officials have no training, not enough notice to get grant apps in– officials feel like they are failing the town when they can't apply for this money – they don't not apply on purpose
    - ▪ In wall twp they are trying to get 1 person to be the grants liaison
  - o 1 example of experience with grants that worked - Pass through emergency preparedness grants were simple and seemed to work
  - o Twp were asked to put in LOIs for what projects they wanted to pursue – manasquan put in for millions in home elevations and that amount was awarded to the entire state – it was laughable and a waste of time
  - o
  - o **Are you/how familiar are you with coastal hazard mitigation strategies and plans by community – local and county?**
  - o 4 categories – acquisitions, elevation, generator, muni infrastructure – previous plan In Monmouth county wasn't very helpful and state will make county the bad guy because they will decide final projects for approval (? – doesn't State OEM do this?)

- o Prior to sandy generators weren't priority but during it was major
- o Sewage was most important issue – generators for plants – tie into water resources
- o A lot of things in first mitigation plan was fillers because deadline needed to be met – meeting admin requirement and not really hazard related
- o **What do you think needs to be done to improve local/county hazard mitigation strategies and plans?**

- **Climate Change and Sea Level Rise**

  - o **Please describe how climate will impact hazard planning.**
  - o Budget is biggest issue, towns aren't really in position to fund anything and they are lost without outside funding. In SB state cleaned state highway and side streets and parking lot
  - o Wall still needs vehicles, generators – sitting in a surplus building in PA but wall is having a hard time getting it – other towns have had no issues
  - o Belmar got multiple hummers – seen as waste – not conducive to emergency management
  - o HMP is knee jerk and not proactive to climate change – planning for climate change is beyond scope of twp and better handled at county
  - o SB sees a need to hire someone just to work on building up and maintaining dunes
  - o **What are your other climate change –related concerns?**
  - o **How do you perceive these concerns affecting the coast/Shore?**

Climate change discussion:

Pg 6 of climate change in nj use the projections in your grant apps

Twps are worried that the more they do – plan for more cooling centers for example – the more people will depend on the govt

More education for kids on climate science and environmental sciences

More training for public CRT team is important but public also has to be responsible to take care of their own families neighbors – cannot rely on govt for everything

A Sandy success story was that shelters did not have high occupancy; people went to friends and families homes

** goes back to creating resiliency in your communities

Water rising and also getting warmer which will also cause more storms

-this may cause the Bermuda high to weaken and therefore cause less storms – will bring things further north but more to the east

People don't even know there are streams running through their towns – people moving in from cities don't know the history of the towns and what goes on

Mentioned social media emergency management training for Monmouth training – oct 23rd – town can use their facebook and twitter pages to get CRS points for community outreach

Appendix B: Survey Questions

Preparing for Climate Change Impacts in New Jersey: Emergency Managers Survey

Q1 Please read the following information and sign electronically in the box below, indicating your informed consent.Thank you for agreeing to participate in this online survey. This research is being conducted by Rutgers University in conjunction with the New Jersey Climate Adaptation Alliance. Leaders representing emergency management agencies are being asked to participate. The purpose of the survey is to obtain data to assess New Jersey's most pressing concerns resulting from climate change as they affect emergency management, and to help to prioritize a set of program, planning and policy adaptations that are necessary to prepare for and mitigate these impacts.There are no reasonable or discernible risks to your participation in this study. We are not asking for your name on the survey, and will only utilize information collected in summary form to categorize or further explain important differences. If we are able to deduce your identity, the research will be confidential. Confidential means that the research records will include some information about you and this information will be stored in such a manner that there is some linkage between your identity (as deduced but not specified) and the response in the research. The information collected about you includes your opinions about climate change risks, ratings of concern about climate change impacts and your assessment of the needs for various climate adaptation programs. Please note that we will keep this information confidential by not including your name in the data records,limiting individual access to the research data and keeping it in a secure location.The research team and the Institutional Review Board (a committee that reviews research studies in order to protect research participants) at Rutgers are the only parties that will be allowed to see the data, except as may be required bylaw. If a report of this study is published, or the results are presented at a professional conference, only group results will be stated. All study data will be kept for three years.The benefits of completing the survey are that you will contribute to further knowledge and insight about impacts to New Jersey from climate change and help to inform the development and prioritization of resources needed to support new or expanded programs or policies to address these impacts.The survey should take about 10-15 minutes to complete. Participation is completely voluntary and refusal to participate will result in no penalties. You may opt out of completion of the survey at any time while taking it.   If you have questions related to the research, please contact Jeanne Herb, Associate Director of the Environmental Analysis and Communication group, 33 Livingston Ave., New Brunswick, NJ 08901, 848-932-2725, jherb@ejb.rutgers.edu.If you have questions about your rights as a research subject, you may contact the IRB Administrator at Rutgers University at: Rutgers University Institutional Review Board for the Protection of Human Subjects   Office of Research and Sponsored Programs   3 Rutgers Plaza   New Brunswick, NJ08901-8559   Tel: 838 932 0150   Email: humansubjects@orsp.rutgers.edu

❍ I have read and understand the risks and benefits of this research and agree to participate by typing my initials in this box. _____

Q2 Please list the geographic area that is your jurisdiction or service area:

Q3 Where do you work? Select one:

○ State OEM
○ County OEM
○ Municipal OEM
○ Other State Agency
○ Other County Agency
○ Other Municipal Department
○ Other (non-government) _____

Q26 What is the population of your jurisdiction or service area (approximate)?

Q5 How many full-time employees work specifically in emergency management functions in your jurisdiction or service area?

Q6 What type of community do you serve?

○ Rural
○ Suburban
○ Urban

Q4 What is your position?

Q27 How many years have you served in this position?

Q5 Do you Strongly Agree, Agree, Disagree or Strongly Disagree (or Don't Know) with the following statements?

	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't Know
Global climate change is not occurring.	❍	❍	❍	❍	❍
Global climate change is mostly caused by human activity.	❍	❍	❍	❍	❍
Global climate change is a risk to New Jersey.	❍	❍	❍	❍	❍
Global climate change is a risk to me, my family, and my friends.	❍	❍	❍	❍	❍
The international scientific community understands the science behind global climate change.	❍	❍	❍	❍	❍

I trust the scientific community to truthfully report their findings related to climate change.	○	○	○	○	○
Our state and local officials understand the implications of global climate change for my region.	○	○	○	○	○
The media I rely on communicate honestly with us about global climate change.	○	○	○	○	○

Q6 Please rate how concerned you are about the following climate change-related impacts to emergency management in your jurisdiction or service area: HEAT / DROUGHT IMPACTS

	Great Concern	Some Concern	Little Concern	No Concern	Not applicable
Increases in heat stress/stroke	○	○	○	○	○
Food scarcity	○	○	○	○	○
Decreased water supply	○	○	○	○	○
Increases in wildfires	○	○	○	○	○
Other	○	○	○	○	○

Q7 EXTREME WEATHER EVENT IMPACTS

	Great Concern	Some Concern	Little Concern	No Concern	Not applicable
Human rescues / strandings	○	○	○	○	○
Animal rescues / strandings	○	○	○	○	○
Deaths from storm events	○	○	○	○	○
Injuries from storm events	○	○	○	○	○
Acute emotional distress	○	○	○	○	○
Long term economic impacts	○	○	○	○	○
Strain/stress on responders	○	○	○	○	○
Interrupted care for vulnerable populations (e.g. during evacuation)	○	○	○	○	○
Toxics from flooding of hazardous or contaminated sites	○	○	○	○	○
Extreme cold from power outages	○	○	○	○	○
Ensuring food safety during power outages	○	○	○	○	○

Disruption of food supplies	○	○	○	○	○
Increased need for sheltering	○	○	○	○	○
Disease spread from sheltering	○	○	○	○	○
Damage to wastewater infrastructure	○	○	○	○	○
Damage to water supply infrastructure	○	○	○	○	○
Damage to energy infrastructure	○	○	○	○	○
Damage to communications infrastructure	○	○	○	○	○
Other	○	○	○	○	○

Q8 INFECTIOUS DISEASE IMPACTS

	Great Concern	Some Concern	Little Concern	No Concern	Not applicable
Increases in vector-borne diseases	○	○	○	○	○
Increases in food and water-borne diseases	○	○	○	○	○
Emerging diseases	○	○	○	○	○
Other	○	○	○	○	○

Q22 OTHER EXPOSURES

	Great Concern	Some Concern	Little Concern	No Concern	Not applicable
Drinking water contamination (e.g. salt water intrusion)	○	○	○	○	○
Increased mold and mildew	○	○	○	○	○
Other	○	○	○	○	○

Q23 IMPACTS TO VULNERABLE POPULATIONS

	Great Concern	Some Concern	Little Concern	No Concern	Not applicable
Elderly	○	○	○	○	○
Poor / economically disadvantaged	○	○	○	○	○
Non-English speakers	○	○	○	○	○
Physically disabled	○	○	○	○	○
Mentally disabled	○	○	○	○	○
Racial minorities	○	○	○	○	○
Low income homeowners	○	○	○	○	○
Middle income homeowners	○	○	○	○	○
Car-less households	○	○	○	○	○
Other (describe)	○	○	○	○	○

Q24 Was your jurisdiction or service area impacted by Tropical Storm Irene (2011)?

○ Yes
○ No

Q11   If yes, in what ways was your jurisdiction or service area affected by Tropical Storm Irene? Select all that apply:

- ❑ Deaths
- ❑ Injuries
- ❑ Short-term stress
- ❑ Longer-term stress
- ❑ Minor flooding
- ❑ Severe flooding
- ❑ Minor property damage
- ❑ Major property damage
- ❑ Road closures
- ❑ Resident evacuation
- ❑ Nursing home / assisted living facility evacuation
- ❑ Power outages
- ❑ Other _____

Q12 Was your jurisdiction or service area impacted by Hurricane Sandy (2012)?

- ○ Yes
- ○ No

Q13 If yes, in what ways was your jurisdiction or service area affected by Hurricane Sandy?
Select all that apply:

- ❑ Deaths
- ❑ Injuries
- ❑ Short-term stress
- ❑ Longer-term stress
- ❑ Minor flooding
- ❑ Severe flooding
- ❑ Minor property damage
- ❑ Major property damage
- ❑ Road closures
- ❑ Resident evacuation
- ❑ Nursing home / assisted living facility evacuation
- ❑ Power outages
- ❑ Other _____

Q28 Of the following climate change adaptations, which are in place, planned, or needed for your jurisdiction or service area?

	In Place	Planned	Not Planned but Needed	Not Needed	Don't Know	Not Applicable
Local climate adaptation plans	○	○	○	○	○	○
Heat warning system	○	○	○	○	○	○
Cooling center	○	○	○	○	○	○
Warming center	○	○	○	○	○	○
Home energy assistance program (heating and cooling)	○	○	○	○	○	○
Vulnerability assessments / Census of vulnerable sub-populations	○	○	○	○	○	○
Risk maps	○	○	○	○	○	○
Emergency preparedness plan that incorporates climate change and local capacities	○	○	○	○	○	○
Inclusion of vulnerable populations in emergency preparedness plans	○	○	○	○	○	○

Local utility communication plan for outages	○	○	○	○	○	○
Risk communication	○	○	○	○	○	○
Short-term sheltering plans	○	○	○	○	○	○
Public awareness program on climate change impacts	○	○	○	○	○	○
Stockpiling of supplies (fuel, food, water, medicine)	○	○	○	○	○	○
Mosquito control	○	○	○	○	○	○
Other	○	○	○	○	○	○

Q15 What are the most important actions or programs needed at the regional, state, or federal level to support local emergency managers in preparing for and responding to climate change impacts?

	High Need	Some Need	Little or No Need	Don't Know
Enhanced hydrologic modeling (flood and drought)	○	○	○	○
Enhanced weather forecasting	○	○	○	○
Improved climate and weather modeling capacity for local-scale assessments	○	○	○	○
Critical infrastructure assessments	○	○	○	○
Improved coordination between municipal, county, state, and federal resources	○	○	○	○
Improved coordination among emergency management and other sectors (infrastructure, transportation, health)	○	○	○	○

Additional training and exercises for emergency management	○	○	○	○
Rapid response system for extreme weather events	○	○	○	○
Resilient emergency communications infrastructure	○	○	○	○
Provision of regional cooling and warming centers	○	○	○	○
Provision of regional charging centers	○	○	○	○
Provision of regional shelters	○	○	○	○
Better regional transportation options (for ease of evacuation, etc.)	○	○	○	○
Assistance with stockpiling of supplies	○	○	○	○
Updated or new regulations on heat action levels	○	○	○	○

Updated or new regulations on food and water handling	○	○	○	○
Updated or new regulations on disease reporting	○	○	○	○
Updated or new regulations on emergency planning and sheltering	○	○	○	○
Updated or new regulations on mold	○	○	○	○
Updated or new regulations on infrastructure upgrades	○	○	○	○
Updated or new regulations on floodplains	○	○	○	○
Other	○	○	○	○
Enhanced weather monitoring	○	○	○	○

Q29 What does your jurisdiction/agency most need to prepare for and be ready to respond to climate change impacts over the coming decades?

Q17 What are the biggest challenges for emergency managers in achieving preparedness for climate change?

Q18 Please rank the following emergency management concerns in order of importance. (Drag and drop to rank 1 to 5 with 1 being most important and 5 being least important):

_____ Climate Change Impacts
_____ Alert and Warning Systems
_____ Communications Interoperability
_____ Training, Education, and Outreach
_____ Facilities and Equipment

Appendix C: Summary of Survey Results

Summary of Emergency Managers Survey: Preparing for Climate Change Impacts in New Jersey

Administered to members of the New Jersey Emergency Management Association (NJEMA)

Survey conducted online August 15 – September 5, 2013.

Overview of Participants

46 respondents completed this online survey. Of the respondents, 67% (31 respondents) work for municipal offices of emergency management (OEM), 13% (6 respondents) work for County OEM, and 15% (7 respondents) work for State OEM or other state agencies. 30% (14 respondents) work in Monmouth County, with the remainder of respondents' jurisdictions scattered throughout the state. Respondents' service jurisdictions range in size from small towns (1,100 people was the smallest) to the entire state (8.8 million people). 78% (36 respondents) serve suburban communities, with 7 respondents serving urban areas and 3 serving rural areas. Respondents' reported experience in their present emergency management capacity ranges from 1 to 37 years.

Views on Climate Change

73% of respondents believe climate change is occurring, with 24 of the respondents strongly disagreeing and 9 disagreeing with the statement "global climate change is not occurring". Eleven respondents (24%) do not think that climate change is occurring. The majority of respondents (60%) believe that climate change is mostly caused by human activity, with 13% strongly agreeing on this point, 47% agreeing, 18% disagreeing or strongly disagreeing and 22% responding "don't know". Nearly all respondents (91%) feel climate change is a risk to New Jersey, and 82% think climate change is a personal risk to family and friends. Slightly over half of respondents (26 respondents/58%) agree that the international scientific community understands the science behind climate change, while 20% disagree and 22% don't know. 64% trust the scientific community to truthfully report their findings related to climate change while 23% do not. Trust in the media is low, with only 29% agreeing that the media communicate honestly about global climate change, 53% disagreeing, and 18% responding "don't know". In response to the statement "our state and local officials understand the implications of global climate change for my region", 37% agreed, 42% disagreed, and 20% responded "don't know".

Climate Change Impacts

Respondents overall were much more concerned about impacts from extreme weather events than they were about impacts from heat, drought, infectious disease, or other exposures, with the majority of emergency responders expressing concern about all of the extreme weather impacts presented in the survey. The greatest concerns arising from

extreme weather events were injuries from storm events (95% concerned – 70% great concern/25% some concern), damage to energy infrastructure (96% – 71% great/24% some), and interrupted care for vulnerable populations, e.g. during evacuations (98% - 60%/38%). Other extreme weather impacts of major concern included damage to communications infrastructure (93% - 64%/29%), strain and stress on responders (93% - 60%/33%), deaths from storm events (93% - 58%/36%), and increased need for sheltering (98% - 52%/45%). Additional issues of concern include damage to water supply infrastructure, long term economic impacts, extreme cold from power outages, ensuring food safety during power outages, damage to wastewater infrastructure, disruption of food supplies, and toxics from flooding of hazardous or contaminated sites.

Other (non-storm-related) climate impacts of concern include drinking water contamination, increases in food-, water-, and vector-borne diseases, and increased mold and mildew. Issues such as decreased water supply, more heat stress/stroke, and increases in wildfires, were relatively less important to emergency managers.

Amongst vulnerable populations, respondents expressed by far the greatest concern for the elderly (96% - 69% great/27% some), followed by the physically disabled (96% - 49%/47%), mentally disabled (91%), the poor and economically disadvantaged (89%), car-less households (91%), low income homeowners (84%), middle income homeowners (84%), racial minorities (80%) and non-English speakers (75%).

Impacts from Irene and Sandy

The service areas of all 46 respondents (100%) were impacted by Tropical Storm Irene in 2011, with common impacts including power outages (93%), road closures (89%), minor property damage (80%), short-term stress (78%), and resident evacuation (63%). Injuries and deaths were reported by 8 and 3 respondents, respectively.

The service areas of 44 out of 46 respondents (96%) were affected by Hurricane Sandy in 2012. Common impacts included power outages (98%), road closures (95%), short-term stress (80%), major property damage (77%), longer term stress (77%), and resident evacuation (75%). Injuries and deaths were reported by 20 and 8 respondents, respectively.

Climate Change Adaptation and Preparedness Activities

Several of the climate change adaptation actions listed in the survey are already in place or planned in many emergency managers' jurisdictions. Of the options presented, cooling centers are the most common (60% in place, 18% planned), followed by short-term sheltering plans (56% in place, 29% planned), warming centers (56%/19%), local utility communication plan for outages (50%/30%), inclusion of vulnerable populations in emergency preparedness plans (50%/28%), risk communication (45%/33%) and risk maps (40%/38%).

Major needs identified, as measured by the percentage of respondents reporting that the activity is not planned but needed, include public awareness programs on climate change impacts (64%), emergency preparedness plans that incorporate climate change and local capacities (51%), local climate adaptation plans (68%), and vulnerability assessments/censuses of vulnerable subpopulations (44%).

Policy Priorities

When asked "what are the most important actions or programs needed at the regional, state, or federal level to support local emergency managers in preparing for and responding to climate change impacts?" and presented with a list of options, there were several actions or programs that 100% of respondents indicated a need for (i.e. 100% of respondents selected either "high need" or "some need"). The highest priority item was resilient emergency communications infrastructure, selected as a "high need" by 82% of respondents. Improved coordination was also identified as a high priority, both between different levels of government (80% high need) and among emergency management and other sectors such as transportation and health (76%).

Other priority actions at the regional, state, or federal level that respondents nearly unanimously agreed are needed include additional training and exercises for emergency management (67% high need), critical infrastructure assessments (66%), rapid response system for extreme weather events (64%), and improved climate and weather modeling capacity for local scale assessments (60%). Other perceived needs include provision of regional shelters (59%), better regional transportation options (59%), enhanced weather forecasting (56%), enhanced weather monitoring (58%), assistance with stockpiling of supplies, and updated or new regulations on floodplains, infrastructure upgrades, and emergency planning and sheltering.

Critical Needs

When asked "what does your jurisdiction/agency most need to prepare and be ready to respond to climate change impacts over the coming decades", there was a wide variety of responses. Several respondents identified a need for additional financial and staffing resources, while others pointed to a need for more and better equipped shelters, warming/cooling centers, and stockpiles of supplies. Other needs identified included better communication equipment and systems, updating of plans and a more regional approach to planning, flood control, and better climate and weather modeling.

Challenges

The biggest challenges identified by emergency managers to achieving preparedness for climate change in New Jersey were lack of adequate and consistent funding and staffing. Other challenges include a lack of public education on personal preparedness, limited buy-in from the public and elected officials on climate change issues, and inadequate infrastructure.

Issue Prioritization

When presented with a list of five emergency management concerns and asked to rank them in order of importance, with 1 being most important and 5 being least important, there was no clear consensus on which issue was the most important. The average rank order was 1) Communications Interoperability; 2) Alert and Warning Systems; 3) Facilities and Equipment; 4) Training, Education, and Outreach; and 5) Climate Change Impacts; with the top four choices clustered fairly close together but with climate change impacts clearly the lowest priority.