OLD DOMINION UNIVERSITY
IDEA FUSION

TRANSATLANTIC SOLUTIONS TO SEA LEVEL RISE ADAPTATION:

MOVING BEYOND THE THREAT

OCTOBER 30-31, 2013
OLD DOMINION UNIVERSITY

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Transatlantic Solutions to Sea Level Rise Adaptation: Moving Beyond the Threat

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Transatlantic Solutions to Sea Level Rise Adaptation: Moving Beyond the Threat

October 30-31, 2013

Ted Constant Convocation Center, Old Dominion University, Norfolk, Virginia

Conference Program

	Wednesday, October 30, 2013
0800 - 0830	**Breakfast –** Please sit at the table # indicated on your name tag.
0830 - 0840	*Welcome* – **Carol Simpson,** Provost, Old Dominion University
0840 - 0850	*Conference Organization & Goals* - **Regina Karp and Larry Atkinson**, Old Dominion University
0850 - 0915	*KEYNOTE PRESENTATION* **Robert Nicholls,** Engineering and the Environment, University of Southampton
0915 - 0930	*Networking Icebreaker* - **Jenifer Alonzo,** ODU Department of Communication & Theater Arts
0930 - 0945	**Coffee Break**
0945 - 1100	**Panel 1: The Physical Threat: State of the Science of Rising Sea Levels and Extreme Storms**
0945 - 1030	**Tal Ezer *(moderator)* and Robert Tuleya** - Center for Coastal Physical Oceanography, ODU **Kelly Burks-Copes -** US Army Engineer Research and Development Center **David Titley** - Department of Meteorology, Pennsylvania State University
1030 - 1100	*Group Discussion at Tables*
1100 - 1215	**Panel 2: Political, Psychological/Health and Ethical Challenges to Adaptation**
1100 - 1145	**Glen Sussman *(moderator)* -** Political Science, ODU **Poornima Madhavan -** Psychology, ODU **Muge Akpinar-Elci –** Center for Global Health, ODU **Eelco van Beek -** Integrated Water Resource Management, Deltares, Netherlands
1145 - 1215	*Group Discussion at Tables*
1215 - 1315	**Lunch** *KEYNOTE PRESENTATION* **John Englander,** Oceanographer and Author of "High Tide on Main Street"
1315 - 1430	**Panel 3: Implications of Sea Level Rise for National Security and the Urban, Working Waterfront**
1315 - 1400	**Joe Bouchard *(moderator)* -** Virginia Conservation Network **Jurgen Scheffran -** Institute for Geography, University of Hamburg **Austin Becker -** Coastal Planning, Policy and Design, University of Rhode Island **Janos Szonyegi -** NATO Supreme Allied Command Transformation
1400 - 1430	*Group Discussion at Tables*

1430 - 1545	**Panel 4*: Flood Insurance and Adaptation: What Can the U.S. and Europe Learn from Each Other?***
1430 - 1515	**Michael McShane *(moderator)* -** Risk Management and Insurance, ODU **Diane Horn -** Geography, Environment & Development Studies, Birkbeck College **Karel Heynert -** Flood Risk Management, Deltares, Netherlands
1515 - 1545	*Group Discussion at Tables*
1545 - 1600	**Coffee break**
1600 - 1730	**Panel 5: Adaptation Implications for Hampton Roads**
1600 - 1645	**Carl Hershner -** Virginia Institute of Marine Science, College of William and Mary **Mary-Carson B. Saunders** – College of William and Mary School of Law **Tom McNeilan -** Fugro Atlantic **Ben McFarlane *(moderator)* -** Hampton Roads Planning District Commission
1645 - 1715	*Group Discussion at Tables*
1830 - 1930	*Reception*
1930	**Old Dominion University President's Lecture Series Presents:** **Dr. David W. Titley, RADM USN (ret.)** Senior Scientist, Department of Meteorology, Pennsylvania State University Director, Center for Solutions to Weather and Climate Risk at Penn State

	Thursday, October 31, 2013
0800 - 0830	**Breakfast –** no assigned seating
0830 - 0845	**Opportunities for Trans-Atlantic Collaborations** **Hans-Peter Plag -** Climate Change and Sea Level Rise Initiative, Old Dominion University
0845 - 0900	**All :** Comments on Opportunities for Trans-Atlantic Collaborations
0900 - 1015	**Reports from Day 1 Group Discussions** *Moderator - Larry Atkinson, ODU*
0900 - 0910	Panel 1: The Physical Threat: State of the Science of Rising Sea Levels and Extreme Storms – **Tal Ezer,** ODU
0910 - 0920	Panel 2: Political, Psychological/Health and Ethical Challenges to Adaptation – **Glen Sussman,** ODU
0920 - 0930	Panel 3: Implications of Sea Level Rise for National Security and the Urban, Working Waterfront **-** **Joe Bouchard,** Virginia Conservation Network
0930 - 0940	Panel 4: Flood Insurance and Adaptation: What Can the U.S. and Europe Learn from Each Other? **-** **Michael McShane**, ODU
0940 - 0950	Panel 5: Adaptation Implications for Hampton Roads – **Ben McFarlane,** HRPDC
0950 - 1015	**Break**

1015 - 1200	**Topical Talks from European Experts** *Moderator – Regina Karp, ODU*
1015 - 1045	**Karen Lewis**, George Ewart Center for Storytelling, University of South Wales
1045 - 1100	**Robert Nicholls**, Engineering and the Environment, University of Southampton
1100 - 1115	**Eelco van Beek**, Integrated Water Resource Management, Deltares, Netherlands
1115 - 1130	**Jurgen Scheffran**, Institute for Geography, University of Hamburg – ***European Challenges of Sea-Level Rise***
1130 - 1145	**Diane Horn,** Geography, Environment & Development Studies, Birkbeck College
1145 - 1200	**Karel Heynert,** Flood Risk Management, Deltares, Netherlands – ***How Should You Balance Between Investments in Flood Protection and Relying on Flood Insurance?***
1200 - 1245	**Capstone Panel Discussion** The purpose of this final discussion is to determine the priorities, research questions and action items and draft recommendations and a strategy for continued, multidisciplinary collaboration.
1245	**Lunch**
1330	**End of Conference**
1330	*Optional Field Trip:* **Field Discussion – *"Practical Challenges to SLR/Flooding Adaptation in an Urban Hampton Roads Neighborhood: The Hague"*** **Skip Stiles, Wetlands Watch**

Executive Summary

Climate change and sea-level rise (CCSLR) pose critical challenges for citizens and leaders around the world, fast becoming a public policy issue of the first order. As the complexity of CCSLR is revealed through scientific studies, media reports, town hall meetings, and personal experience of devastating storms and floods, local, state and national authorities are charged to find effective, efficient and financially viable answers.

Though reliant on ever improving scientific data, CCSLR is far from a scientific problem alone. On the contrary, CCSLR has important political, social, and economic dimensions. How affected communities live, adapt or might be forced to retreat, is largely a function of available political, social, and economic capacities. How smartly resources are allocated and how well different stakeholders cooperate will determine the extent to which public policy can be trusted to manage a challenge of this enormity.

Crafting a response to CCSLR demands the creation of wholly new communities of experts. Science does not speak but performs in an environment it rarely controls. For scientific data to become meaningful in a social context it has to be accessible to those charged with policy decisions and command of resources. It is they who must act and maintain a consensus on action.

Questions abound. CCSLR adaptation is a comprehensive effort and must draw upon a multitude of societal expertise. How should communities adapt to CCSLR? Who takes the lead and at what level? How is a largely skeptical public going to be engaged? How are politicians persuaded to plan beyond the next election cycle? What CCSLR narrative can be most effectively created?

Aware of the complexity of CCSLR and with these questions in mind, the European Union funded project ACCESSEU, whose focus is to find joint solutions to common transatlantic challenges, collaborated with Old Dominion University's CCSLR Initiative in a uniquely inter-disciplinary European-American conference, October 30-31, 2013. The goal of this conference was to forge a new community of experts drawn from a multitude of academic disciplines and professional settings. Hampton Roads is among the world's most vulnerable regions to CCSLR. There is a rising awareness of the potentially catastrophic consequences of CCSLR but this conference offered a much needed opportunity to share perspectives, explore research collaboration, and raise awareness among disciplinary experts of important work in other fields and domains.

'Transatlantic Solutions to Sea Level Rise Adaptation: Moving beyond the Threat', brought together more than one hundred experts from academia, city and state governments, the U.S. Navy and Army Corps of Engineers, NATO's Allied Command Transformation, and business and non-governmental organizations. To map the breadth of CCSLR's reach, special attention was devoted to connect natural and social sciences, including Oceanography, International Studies, Political Science, Geography, Engineering, Marine Sciences, Economics, Finance, Communication, Theater Arts, Public Health, History, and Business and Public Administration.

The organizational format reflected the aim of the conference to expose the opportunity costs associated with discipline-based expertise in the area of CCSLR adaptation. Contrary to the more traditional format of presentations and expert breakout sessions, this conference relied on plenary presentations and interdisciplinary discussions thereby assuring both the voices of different disciplines and a trans-disciplinary exchange of views. Over the course of two days, this format furnished a unique forum of mutual education. For example, participants recognized that CCSLR adaptation is primarily a human and social effort hence engineers and city planners as well as coastal management experts and insurance professionals need to work together to find appropriate solutions.

The opening keynote was given by Robert Nicholls, Southampton University (right), here during the reception in a conversation with Hans-Peter Plag, Co-Director of the Climate Change and Sea Level Rise Initiative (CCSLRI).

Interdisciplinarity is often hailed but rarely acted upon. It is more convenient to acknowledge the expertise of others than make it part of one's own professional education and perspectives. This conference found that through a dedicated interdisciplinary effort these boundaries of convenience are

challenged and different conversations emerge, new cross-disciplinary research opportunities emerge, and an improved sense of what the priorities are takes hold.

Old Dominion University is committed to approach CCSLR through the collaboration of many different academic disciplines and public stakeholders in the transatlantic arena. There is much we can learn from the European experience and vice versa. The science and politics of CCSLR pose a unique challenge to the transatlantic relationship that thus far has all but ignored the security and economic consequences of CCSLR. As both Americans and Europeans adapt to CCSLR they will have to come to terms with the fact that security and trade may be deeply affected by today's adaptation decisions.

The Panel members are Karel Heynert, Flood Risk Management, Deltares (speaking) and (left to right) Diane Horn, Department of Geography, Environment & Development Studies, Birkbeck College; Jürgen Scheffran, Institute for Geography, University of Hamburg; Eelco van Beek, Integrated Water Resource Management, Deltares; Robert Nicho0lls, Engineering and the Environment, University of Southampton; Karen Lewis, George Ewart Center for Storytelling, University of South Wales.

This Conference Report is meant to stimulate discussion about CCSLR adaption especially with an emphasis on the social construction of risk and vulnerability. The goal is not to seek consensus on adaptation measures, nor is it to establish the one, best solution to CCSLR. Rather, it is to stimulate transatlantic dialogue and research collaboration and to foster appropriate interdisciplinary approaches reflecting the comprehensive nature of the CCSLR challenge.

Dr. Regina Karp, ACCESSEU Project leader, gratefully acknowledges the support of the European Union Delegation to the United States, Old Dominion University's CCSLR Initiative, The Dutch Embassy in Washington, D.C., and FUGRO Atlantic.

Appendix A
Conference Participants' Affiliations

Academic Institutions
Old Dominion University, William and Mary Law School, Virginia Institute of Marine Science, East Carolina University, Northeastern Law, Georgetown Climate Center, University of Rhode Island, University of London, University of South Wales

Academic Disciplines
Oceanography, Marine Science, International Studies, Political Science, Electrical and Computer Engineering, Business, Economics, Public Health, Law, Coastal Planning, Communications, Storytelling, Psychology, Public Administration, History, Geography, Flood Management, and Anthropology

Military
US Navy, US Army Corp of Engineers, NATO, Joint Forces Staff College

Industry
Deltares, APM Terminals, Virginia Ship Repair Association, FUGRO Atlantic, Newport News Shipbuilding, EQECAT, Moffatt and Nichols

Government
Matthews County Board of Supervisors, Virginia Port Authority, City of Norfolk, City of Poquoson, City of Virginia Beach, Virginia Municipal League, Hampton Roads Planning District Commission, Virginia Commonwealth Senate, Royal Netherlands Embassy

NGOs and Other
Wetlands Watch, Union of Concerned Scientists, Virginia Coastal Coalition, Climate Central, Virginia Coastal Policy Clinic

Appendix B
Panel Summaries

Consensus Points Across All Panels

From the detailed panel notes (Appendix D), overall consensus points shared between tables and panels were readily apparent:

- Collaboration is key due to the complexity of the problem.
- US politics, especially at the federal level, are currently a problematic impediment to an efficient and effective approach to SLR.
- All stakeholders need to be involved in identifying and implementing solutions.
- It is important for participants to think and speak about these issues positively, seeing them as opportunities for citizens, politicians and those in the private sector.
- Educating citizens and decision makers will be critical in finding and implementing solutions.
- Language and how we talk about SLR adaption are an important part of the solution.
- Especially for the business community, focus on cost/benefit analyses and approaches.
- SLR adaption is easier in countries where decisions are effectively made at the national level.
- The unique nature of the military as an apolitical organization should be leveraged.

Panel 1: Physical Threat

Consensus Points:

- Need consistent guidance on a sea level rise number that can be used for planning.
- Politicians and special interests exploit uncertainty to justify minimalist measures, deny funding. They take advantage of scientists' inclination to give RANGES and talk about uncertainty rather than solid predictions to discredit the information.
- Scientists need to make studies more accessible to policy makers and to the public.
- Research must be communicated in visual/easy to understand way.
- Shift discussion from whether or not climate change exists to what should be done now. This is difficult because of the political nature of the debate.
- Message about local awareness needs to be consistent and come from a trusted source for people to believe it.
- Combination of sea-level rise and storm effects is vital.
- Wider community participation at the local level to identify stressors.
- Can improve communication with public using social media, nonprofit groups.
- Avoid politicization of the terms and issues.
- Localities need nationwide leadership.
- Need clear strategies for how to talk to the public about preparedness. Public doesn't see sea level as being a component of flooding historically.
- New research shows SLR is accelerating and this message will have to be carefully communicated.

- Using the term ‘recurrent flooding’ as opposed to ‘sea level rise’ makes it more relevant to residents. Laws in the state are written around ‘flooding’ (or other terms) so as to allow municipalities to take action.

Takeaways/Action Items:

- Often, interdisciplinary projects are not fruitful or productive because the science may contradict the qualitative findings of a study. There needs to be more collaboration, of course, but more specifically, there needs to be more cooperative collaboration.
- Public awareness efforts need to be linked to economic benefits both for individuals and for the private sector.
- Express the risk of sea-level rise in the Hampton Roads area in economic terms to raise public awareness.
- Collaborate across the region.
- Need number to use for planning. Need scientific community to communicate with risk assessors; for example to inform the public when they’re in a flood zone when they’re purchasing a home.

General Question: Given what you've learned during this panel, what types of collaborative research and action might be most useful in affecting adaptive policy?

- Even though studies are funded by the Navy, studies should not just be limited to military bases, they should also include the surrounding city.
- Using Geographic Information Systems (GIS) to collaborate across disciplines. Often GIS is not used well collaboratively, but it can be.
- Protect the most vulnerable populations, especially for evacuation; trying to meet the needs of all of the population without going so far as telling them not to live there.
- Communication is most important. People will believe when their flood insurance policies triple. Local governments could partner with each other across the US coast lines to share information and strategies to create a communication plan.
- Research on the economic impact of past weather events, and the social impacts.
- Social learning that addresses time, space and differing socio-economic differentials is key. Ethics experts should be brought into the mix. Shifting human nature to “survival of the species”.

Miscellaneous/Interesting:

- How do we raise awareness so the public has faith in our predictions, listen to us when we tell them they have to evacuate?
- We have to make it as safe as possible while still recognizing property rights.
- Need guidance from the state so we have the authority to develop adaptive policy. Very difficult to do everything we need to do, and to plan, without guidance and political support from the state. This would be easier to do if there was some consensus on a number, a predicted sea level rise to be used for planning purposes.

Panel 2: Political, Psychological, Public Health and Ethical Response to SLR

Consensus Points:

- Parallel problems faced by Dutch specifically and Europe generally and US but political situations completely different. US politically paralyzed. Need to either move beyond this or work around it.
- This paralysis suggests the need to solve problem from bottom-up (localities to states).
- Language and framing important in educating citizens and decision makers. Risks, for example, can be portrayed as opportunities.
- Business-like approach focusing on costs and benefits essential.
- Needs and capability of military community can be leveraged here in Hampton Roads for effective change.

Takeaways/Action Items:

- One practical solution is to go spread awareness at non-SLR community meetings rather than hold your own community meeting.
- In education and activism, focus on positive language.
- Teach the subject in schools.
- Market costs or tax increases positively, focusing on economic incentives.
- Access international and NGO funding for local actions.
- Issue is complex, so we need a collaborative approach.
- Tailor the message to the audience and focus on the long haul.

Points of dissent:

- To what extent Americans are politically active.
- To what extent fear is a positive motivating factor. Could discourage investment.
- To what extent people are aware of the problem.
- To what extent states can afford to pay for their own actions and to what extent states are more efficient politically.

Panel 3: National Security & Urban Workplace Waterfront

Consensus Points:

- Collaboration, collaboration, collaboration, involving all stakeholders: local communities, businesses, military, all levels of government, public.
- Multiple stakeholders make identifying leaders problematic.
- Once again, the language we use and how we 'frame' the issues are important.
- Importance of bridging local, regional and international levels.
- General concern over education level of average citizens.
- Importance of preparation in planning for disaster response, given the fast-moving, catastrophic and sometimes unpredictable nature of events.

Takeaways/Action Items:

- Need to educate people about the interdependence of this set of issues.
- Identify coordinating agencies.
- Leverage unique aspects of military—apolitical, problem-solving oriented.
- Local institutions start locally, expand outward.

Points of dissent:

- Grassroots, bottom-up approach may not be effective.
- What projects should be funded.

Miscellaneous/Interesting:

- Human security issues particularly difficult in lesser developed countries and regions. UN could take lead in mitigating/addressing these concerns.

Panel 4: Insurance

General Question: 'Given what you've learned during this panel, what types of collaborative research and action might be most useful in affecting adaptive policy?

- Researching ways to incentivize people to leave high-risk areas and developing support for those people involved to ensure more options are available to them is necessary for correcting the current situation without extreme hardships for individuals.
- Investigate strategic approaches to determine best net gain for municipal and state governments in order to enhance decision-making on insurance financing, development measures, relocation projects, and taxation policies.
- Collaborative research needed on alternative insurance financing models!
- The presentation on insurance was a very interesting session presenting material most of us were unaware of. The collaboration between the nations to compare and contrast how the issue is dealt with seemed very useful and could provide insights in other issues as well. Collaboration between entities that look at the issues from different perspectives can provide useful new insights.
- How do we incentivize localities to turn over flood plain property to natural flood barriers? Issue is loss of revenue and no incentive because cost of relief is not borne locally.
- Insurance is a short term solution – we need a long term solution.

Consensus Points:

- Bundling is a good measure to incentivize people to buy flood insurance.
- Flood protection is a combined effort between the state, local government and individual homeowners. Authorities should do more in order to increase public trust in the existing flood protection measures and new initiative.
- The current model needs reform and should not be a blunt object approach to correcting what is in place with undue hardship at the individual level.
- Innovative approaches to correct today's system in the US should be devised with significant incorporation of European-style approaches.
- Balance between investments in flood protection, incentives for mitigating risk important.
- Intergovernmental, international collaboration important for forming adaptive policies, learning about adaptive strategies.
- Waterfront is essential to all aspects of life in Hampton Roads. Disconnect between economic costs and benefits hinders change.

Takeaways/Action Items:

- Educate people (and builders) about incentives and possible future savings as a result of preparing their property for floods.
- Need societal discussion on whether to go on individual-based insurance or more collectivized. Fear-mongering as a tactic??
- Recommend include flood insurance in homeowners insurance (spreading risk, "bundling perils").
- Difficulty identified: VA reluctant to use FEMA funds to buy out local residents in floodplain area but they would have to keep that area permanently green and that reduces the tax revenue.

- Applied sciences: more resilient materials (mold); and perhaps have it required – making it more flood resistant.
- Localized insurance; paid to community for reinforcement and restructuring in order to mitigate future impacts.
- Neighborhood communities to take similar actions; raising everyone up, rather than isolated areas – as those unaffected have to pay towards damaged areas regardless.
- Invest in storm water systems, rather than simply waste water (Norfolk as an example).

Appendix C
Conference Evaluation*

Identification of Urgent Issues
Among the most pressing concerns identified by participants, public education, communication of risk, research and policy support, and collaboration consistently stand out.

Research Planning Needs
Participants urged the creation of SLR adaptation planning models for business, government, and consumers. Improvements in international collaboration on SLR adaptation were emphasized. Intensified research at local, national and international levels as well as sharing of research findings must take priority.

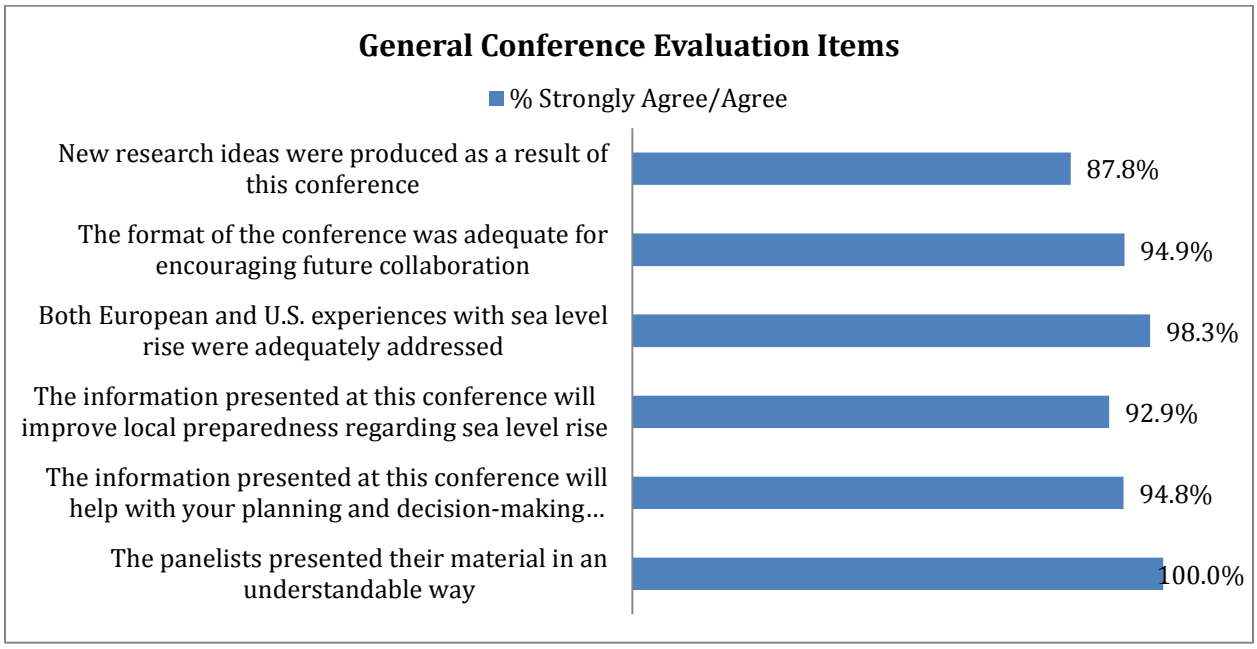
Hampton Roads Role
Hampton Roads is a unique laboratory for the study of SLR adaptation. Hampton Roads should position itself for a leadership role in local, national and international SLR adaption research and policy planning.

Old Dominion University's Role
Participants expressed the need for the university to play a central role in hosting SLR adaptation seminars and workshops, reaching out to the international community of stake-holders as well as fostering local community engagement. Partnering with the locally stationed national and international military entities to address the security implications of SLR offers a natural leadership role for the university.

*The conference evaluation was conducted by the Social Science Research Center at Old Dominion University.

General Conference Evaluation Items

Participants were asked to give feedback on a variety of topics regarding the Sea Level Rise conference that was held October 30-31 of 2013. The majority of respondents had very positive feedback regarding the conference. Of the 59 respondents who completed the survey, all respondents either agreed or strongly agreed with the statement, "The panelists presented their material in an understandable way." Likewise, about 95% of respondents either agreed or strongly agreed that the information presented at the conference will help with their planning and decision-making regarding sea level rise. The majority of respondents also indicated that they agree/strongly agree that the information presented at the conference will improve local preparedness regarding sea level rise. When asked if both European and U.S. experiences with sea level rise were adequately addressed, over 98% either agreed or strongly agreed. Almost 95% of respondents agreed/strongly agreed the format of the conference was adequate for encouraging future collaboration. Roughly 85% of respondents stated they either agree or strongly agree with the statement, "New research ideas were produced as a result of this conference."



Over half (51.9%) of respondents indicated that they had met between one and five new colleagues at the conference from within their discipline. Another 15.3% stated they met between six and ten new colleagues from within their discipline and only 27.1% stated they did not meet any new colleagues from within their discipline. Just fewer than half (49.2%) of respondents stated they met between one and five new colleagues from outside of their discipline. Additionally, 37.3% indicated they met between six and ten new colleagues from outside of their discipline and 1.7% met eleven or more. Almost 80% said they felt the interdisciplinary nature of the conference was very useful. Another 18.6% said the interdisciplinary nature of the conference was somewhat useful and only 1.7% said it was not very useful. Respondents were asked to rate the overall quality of the conference and 57.6% stated the conference was excellent, while another 40.7% stated the conference was good. Only 1.7% indicated that the overall quality of the conference was fair.

How many new colleagues did you meet at this conference within/outside your discipline?	0	1-5	6-10	11+

Within your discipline?	30.8%	51.9%	17.3%	0%
Outside your discipline?	0%	55.8%	42.3%	1.9%

Respondents were given the opportunity to state the best way to maintain channels of communication after the conference. More than one selection could be made from the following options; "conferences/workshops", "networking opportunities", "website updates", and "other." Almost 85% of respondents indicated that conferences and/or workshops are the best way to maintain channels of communication. Networking opportunities (61%) and website updates (62.7%) were also indicated by a majority of respondents. Additionally, 23.7% wrote in another way with the "other" option. A complete list of these responses can be found in Appendix 1.
The majority of respondents (78%) attended both Day 1 and Day 2 of the conference. Another 13.6% attended only Day 1 and 1.7% attended only Day 2. Just fewer than half of respondents indicated that their occupational field was Academic/Research (47.5%) and provided their area of discipline. Another 13.6% listed local government as their occupation and 10.2% listed non-profit. Additionally, 3.4% listed Business/Industry and 18.6% listed "other." While 11 respondents chose "other," only 10 provided a description of their job. A complete list of the Academic/Research descriptions and "other" responses can be found in Appendix 2.

Identification of Urgent Issues

Respondents were asked to list the three most urgent issues they felt needed to be addressed further. Many different examples were given; however, many issues were given consistently by different respondents. Public education, communication, and support were the most frequently discussed issues that need to be addressed further. One respondent listed "two way communication with the public," while another stated, "helping the public understand the need to work collaboratively across the region." Collaboration was another issue that was discussed frequently by respondents. Several respondents were concerned with government collaboration, as two respondents stated, "Bringing in private and government sector," and "encouraging collaboration between different sectors." Several other issues were discussed including, adaptation, funding, policy, and modeling. Examples of other responses include:

- Applied science of adaptation
- Continued diverse participant dialogue
- Exploring social justice issues related to SLR
- How to incorporate sea level rise into regulatory requirements such as the general permit
- Integrated monitoring systems
- Mitigation
- More specific proposals for what the state can do to assist localities
- Developing of risk based approaches to sea level rise
- Understanding the economic implications
- Develop communication strategy
- Moving commerce inland
- Tools for quantifying risk, vulnerability (models, GIS, techniques)

Research Planning Needs
Respondents were also asked, "What other research and planning needs and priorities have you identified during today's conference?" Again, there was a wide variety of topics discussed, but a few

were mentioned by several different respondents. Adaptation was discussed, including defining adaptation for business, government, and consumers, as well as expanding the positive outcomes of adaptation. Another topic discussed for this question was collaboration and cooperation; specifically between universities and groups/panels/countries across the world. In addition to collaboration and cooperation, one respondent indicated a need for "balance between flood protection and insurance." How to go about changing policy and identifying issues associated with sea level rise locally were also discussed. Examples of other responses can be seen below:

- Civic resource and crowd sourcing
- Have time – put a plan in place to implement long haul improvements
- Importance of regional cooperation. Removing structural institution obstacles to implementing policy. Importance of preserving coastal wetland/living shore lands
- Methods for protecting adapting shoreline/waterfront
- Need for national and state strategies for VA
- Physical and public health
- We need a national and state strategy for dealing with sea level rise

Roles for Regional and ODU Leadership

A central theme was apparent from respondents when asked, "How can the Hampton Roads region show leadership on the issues presented today?" Many believed that it was paramount for Hampton Roads to become the leading voice on sea level rise. As one respondent stated, "by working together with ODU to establish this area as the 'kingpin' for others to follow." In fact, many respondents indicated they feel the Hampton Roads area should continue to do what it already is to maintain itself as a leader as opposed to becoming a leader. As with many of the questions, respondents also stated that collaboration with other areas is key to this region becoming a leader in sea level rise. Examples of other responses include:

- Collaborative, multi-jurisdictional approach
- Continue to be a leader on this topic; an example others can look to
- Develop center/clearing house for information and outreach
- Inform constituents and encourage them to be vocal about A6 to representatives
- Motivate the state to take leadership so we have one sponsor to Federal interests
- Organize, work together, cooperate, and communicate
- Press coverage
- Work collaboratively across jurisdictions
- Y'all are already showing leadership; great job!

Respondents were asked to respond to the question, "Following this conference, how should Old Dominion University support regional efforts to address sea level rise?" The most common themes were continuing to hold seminars and workshops and communication. As one respondent stated, "Continue to hold the forums, but make them outlets for collaboration and progressive action rather than just being informative." Another idea that was presented was to involve more stakeholders and networking. One respondent indicated, "Involve tourism stakeholders," while another stated, "partnership with military and local governments." Community outreach was another common theme discussed for this question. Examples of other responses can be seen below:

- Bringing together different stakeholders
- Continue outreach

- Continue to provide excellent scientific research; demonstrate interdisciplinary approach; encourage community outreach
- Engage cities to assist with practical applications and outreach
- More workshops; facilitate collaborative research projects/grant writing
- ODU should help faculty develop these international relationships and interdisciplinary teams for research
- Work with HRCCF
- You are being very open and inviting; please continue

Focus Areas for Future Conferences

There was a wide variety of answers given to the question, "What additional information/focus areas should be addressed at future conferences?" An increased focus on technical and engineering aspects was mentioned by a few respondents. One respondent stated, "Engineering was barely present. Need all kinds of applied science input." Civic engagement and community impact were also mentioned as potential focus areas for future conferences. Another focus area that was mentioned was one that came up in many of the other questions as well; how to get local, state, and national government involved. Examples of other responses include:

- A little more on economics and the impact of SLR on the economy
- Adaptive engineering strategies
- How to gain and coordinate funding from both public and private sectors
- Integrated monitoring systems
- More on civic engagement
- More science and technical contents
- Specific adaptive policy solutions; strategies for working with other localities; share latest scientific research

Appendix D
Selected European Experts' Panel Reports

Robert Nicholls

Engineering and the Environment, University of Southampton

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The problems of Norfolk, Virginia illustrate the problems that most coastal areas around the world will face later in the 21st Century. This reflects that the present rates of relative sea-level rise in Norfolk are typical of what is widely expected later in the 21st Century according to the IPCC Fifth Assessment Report. While a rise of sea level of 5 mm/yr sounds quite a small change, if it is sustained the consequences are severe with increased occurrence of flooding, erosion and salinization to list three of the more significant impacts. The increasing frequency of 'blue sky' flooding in Norfolk brings home the reality of these forecasts for the world's coast.

As well as the direct impacts of sea-level rise, the responses to sea-level rise and climate change are also of great interest. The actual impacts of sea-level rise will depend on both the magnitude of the rise in sea level and the ability to adapt. If we can adapt, sea-level rise is less of a problem. In Norfolk, buildings that are now being frequently flooded are being raised or even abandoned, which communicates that this flooding is beyond nuisance level. In addition, one strategic road is being raised to maintain this import at communication route, suggesting that other more strategic responses may be prudent in the near future. Adaptation is a multi-faceted activity including (1) awareness raising, (2) planning, (3) implementation, and (4) monitoring. Investment in the development of strategic planning approaches is apparent represented by model-based tools by the US Army Corps of Engineers for the Norfolk Naval Base to analyze extreme events both today and under different sea-level rise scenarios. However, the issue of strategic response to sea-level rise clearly requires much more attention.

It is also clear that the Norfolk area can act as a great natural laboratory for sea-level rise impacts and adaptation and comparative studies with coastal areas. The Solent region, including Southampton, would provide an interesting contrast as there is ongoing research on sea-level rise impacts and adaptation, but the current rate of sea-level rise is less than 2 mm/yr. The Norfolk case indicates future

impacts with sea-level rise, while the Solent provides a range of methods and exploration of adaptation approaches. The transferability of adaptation approaches will be interesting as this reflects socio-economic, political and cultural issues as well as the technical dimension.

Vulnerability, Security Risks and Resilience of Sea-level Change in Coastal Communities

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Global mean sea level rise is considered to be one of the most important and long-term consequences of anthropogenic global warming, with far-reaching consequences for coastal communities around the world. According to the first volume of the fifth assessment report of the Intergovernmental Panel on Climate Change (IPCC) published in September 2013, it is very likely that the mean rate of sea level rise has reached 3.2 mm per year between 1993 and 2010 (about twice the average for the whole century), resulting in a total of 0.19 m. For the period 2081–2100, compared to 1986–2005, global mean sea level is likely to rise 0.26–0.54 m for the best-case scenario and 0.45–0.81 m for the worst-case scenario. In the latter case, a rate of 7–15 mm per year is projected and a total rise of 0.53–0.97 m by 2100.

Despite some progress in understanding the causes, large uncertainties remain, revealing fundamental gaps in quantifying involved processes and regional effects across different spatial and temporal scales. Many components of the climate system contribute to sea-level change, including the ocean and coastal zones, the cryosphere and terrestrial hydrology, as well as solid Earth. While anthropogenic causes of temperature rise, affecting ocean warming and loss of mass from glaciers and ice sheets, has been identified as a major driver, coastal sea level can be also influenced by ocean and air dynamics as well as movement of land and sea floor.

Many low-lying coastal regions and islands will be affected by sea-level change. While rising mean sea levels are a global indicator of climate change, the impacts on natural and social systems are quite different along the world's coastal regions. Regional variations in sea level expose particular coastal zones to different consequences, with diverse environmental, economic and social implications. Potential risks include coastal flooding and erosion, intrusion of saline sea water into fresh water reservoirs and river deltas, as well as loss of coastal wetlands and agricultural land. Prominent examples include the densely populated river deltas of the Nile in Egypt, the Indus in Pakistan, the Ganges-Brahmaputra in Bangladesh, the Pearl River in China, the Mississippi in the USA and the Elbe River in North Germany. Many big cities are located along the coastlines and are growing, partly through migration processes. More than one tenth of the world's population lives within 10 m

elevation of the current sea level, and coastal populations are increasing much faster than inland population. Besides deltaic and low-lying coastal shelf regions, increasingly vulnerable to sea level change are small islands which increasingly suffer from inundation, submergence and saltwater intrusion of coastal land.

The consequences of changing sea levels have a direct impact on human livelihood and society, and make it increasingly difficult to protect the security of affected communities. In highly vulnerable areas, sea-level rise could induce a number of security and conflict issues:

1. Impact on ecosystems, species and biodiversity (flooding, erosion, wetlands, mangroves, river deltas, coral reefs) essential for humans security
2. Risk to socio-economic infrastructures and resources along the coast vital for society (water, energy, agriculture, urban, transport, tourism, property)
3. Threat of loss in human health and life in densely populated regions
4. Impact on coastal military installations and transportation routes
5. Human migration, displacement and relocation in response to coastal risks
6. Challenges to national sovereignty, borders and coastal economic zones due to land loss and shifting geographic and political conditions
7. Violent conflicts induced by sea-level risks and threats as well as foreign interventions (rescue, disaster management, military force)

Other conflict types could emerge due to the struggle on strategies to respond to the challenge of sea-level rise at local to global levels. Conflicting positions and strategies can occur on how to avoid sea-level rise (mitigation), how to cope with it (adaptation) or how to modify the natural environment to minimize impact (geoengineering). For any of the measures controversies can escalate who will pay for these measures and who will suffer from them, raising issues of equity, fairness and justice. Due to the high interconnectedness of many of these systems, combination effects could occur such as instability events, tipping points and risk cascades. The diverse consequences, risks and conflicts of sea-level rise interact in a complex way, and need to be analyzed systematically in an integrated framework of climate-society interaction, involving systemic and actor-oriented approaches.

The vulnerabilities to changing sea levels are a function of the exposition and sensitivity as well as the adaptive capacity and resilience of the affected systems and communities. Ecological resilience is the ability of an ecosystem to cope with or compensate for external shocks and surprises. Resilience of human societies rests on their possible responses to risks, including resistance, restructuring and recovery. Social resilience depends on human perceptions and responses to the challenges posed by sea-level rise. Enhanced resilience is becoming more urgent for coastal communities at risk due to a combination of environmental and socio-economic stresses, including land scarcity, attraction to coastal zones, population pressure and migration into flood-sensitive areas.

To protect the livelihoods and assets of vulnerable communities in coastal areas and to effectively plan for the consequences and responses, it is necessary to have a deeper understanding of the vulnerability, resilience and adaptive capacity of the respective regions. Reactive approaches to adaptation are often coping with the dynamics of natural processes, e.g. by “defending” hazard zones against floods and storms, relocating people or assets, financial compensation or other post-disaster adjustments (like those measures applied to Hurricane Katrina in New Orleans). Addressing adaptation deficits, preventive approaches to adaptation are generally more effective (e.g. shoreline stabilization and flood protection). Anticipative adaptation would not only identify data of key impact factors (affected land area, population, migration, GDP, urban area, agricultural area, wetlands, river deltas) in science-based assessment, but would also involve the perceptions, values, capabilities and cultural backgrounds of those affected through stakeholder dialogues. To make adaptation strategies more location-specific, geographical factors of scale and space, regional variability and diversity need to be considered as well as contrasting perspectives, institutional settings and cultural framings. Affordable adaptation measures and conflict resolution mechanisms could reduce negative impacts of sea-level rise, but the adaptive capacities are limited in many developing countries.

From a social science perspective it is important to understand how regional sea level change interacts with and transforms social patterns of local coastal communities which may have cumulative global dimensions as well, e.g. through migration, trading and media. At the local scale sea level rise interferes with other human activities which may aggravate the problem, e.g. land and water use, fossil energy extraction or rapid coastal development. Considering the context of human-environment interaction, the impact will not only depend on the rate of sea level change and the natural response of coastal system, but also on the technical, economic and political pathways societies choose to adapt

and the interaction patterns between social agents, including conflict and cooperation. Here the social basis of adaptive capacity matters, the structure of social networks, the role of collective responses, political institutions, legal and governance mechanisms. In these processes adequate scientific knowledge is important in participatory assessment and informed decision making and for future development. In this regard, vulnerable regions are not only victims but also agents in responding to sea level change.

Future directions for flood insurance research

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The meeting on Transatlantic Solutions to Sea Level Rise Adaptation, sponsored by the EU and the Old Dominion University Climate Change and Sea Level Rise Initiative, brought together an international group of researchers, policymakers and stakeholders. All of the participants are concerned about the implications of sea level rise and how best to identify and facilitate the adoption of adaptive strategies. The conference, which was organized in an innovative manner designed to encourage collaboration, was very effective at promoting interaction between groups of people who might not ordinarily work in partnership. This is particularly valuable as the key issues associated with sea level rise - whether they relate to the science, communicating the science, the implications for security and the urban waterfront, or flood insurance - will all require an interdisciplinary approach. This meeting has made a good start on bringing people together to address these important problems.

As we work together, we will need to develop a common language: we may all use words such as 'adaptation' and 'mitigation', but we may not all mean the same thing. In the context of climate change, adaptation in human systems is defined as 'the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities' (IPCC 2012). The term 'mitigation' can be used to describe actions taken to reduce the likelihood of an event occurring (e.g. reducing greenhouse gas emissions in order to reduce increases in global temperature and thus reduce the rate of sea level rise) or actions taken to reduce the impact if the event does occur (e.g. building flood defenses). Recent IPCC reports acknowledge this distinction by distinguishing between mitigation of climate change, which is defined as 'a human intervention to reduce the sources or enhance the sinks of greenhouse gases' and mitigation of disaster risk and disasters, which is defined as 'the lessening of the potential adverse impacts of physical hazards, including those that are human-induced, through actions that reduce hazard, exposure, and vulnerability' (IPCC 2012). In other words, mitigation can be thought of acting to limit sea level rise, while adaptation is learning to live with rising sea levels. In this context, flood insurance is considered as an adaptive measure only – no amount of flood insurance can stop sea levels from rising nor stop floods from occurring.

Flood insurance is often cited as a tool which can encourage adaptation to sea level rise. Flood insurance can contribute to risk reduction by using pricing or restrictions on availability of cover to affect decisions on land use, by communicating risk, by discouraging development in flood risk areas, and by encouraging the uptake of flood resilience measures. Insurance can play a key role in loss sharing between the public and private sectors within an individual country and can also allow major risks to be spread globally. The way in which flood insurance is implemented varies widely by country and no two countries are more different than the US and the UK. Despite these differences, however, the future of both programs is under intense debate.

In the US, flood coverage is excluded from property policies provided by private insurers, and is only available through the National Flood Insurance Program (NFIP), with the federal government acting as insurer of last resort. Following massive payments for flood claims related to Hurricanes Katrina and Sandy, the NFIP is approximately $26 billion in debt. The financial standing of the NFIP is made even worse because many property owners are heavily subsidised and do not pay fully risk-based rates. In addition, flood insurance is required only for certain property owners in high-risk flood zones. The NFIP debt has prompted calls to bring private insurance back into the flood insurance business and to end subsidies for high-risk properties. These calls led to the Biggert-Waters Flood Insurance Act of 2012, which phases out subsidies under NFIP over 5 years, with annual rate increases of up to 25% until premiums reflect the true risk rate. Biggert-Waters mandates studies on the feasibility of privatising flood insurance and the transfer of some flood risk from the NFIP to reinsurers. Penalties are also increased on lenders who do not require borrowers to carry flood insurance in cases where it is mandated. However, as the provisions of Biggert-Waters come into force, the NFIP is facing another set of critics: property owners who are experiencing big increases in their flood insurance premiums as the subsidies are phased out. Bipartisan bills in Congress are making their way through the legislative process that if passed would delay the move toward risk-based rates.

In most countries, the government plays a role in securing coverage of flood losses. The current UK insurance market is unusual in having an entirely market-based scheme without direct Government involvement. Flood coverage is available only from private insurers as a standard peril covered by general property insurance for households and small businesses, rather than being purchased as a separate policy. For most home buyers there is no choice over whether or not to purchase flood cover for the fabric of the building because buildings insurance will be a required condition of their

mortgage agreement. The financial cost of floods is borne entirely by the private sector. However, this arrangement is now changing significantly, as the insurance industry is reluctant to continue to bear the financial cost of flooding alone.

For over 50 years, flood insurance in the UK was conducted under a series of informal agreements established between the insurance industry and successive Governments, known as the 'Gentleman's Agreement' (1961-2002) or the Statement of Principles (2002-2013). Under these informal agreements, private insurance companies agreed to cover properties at risk of flooding, with flood cover as a standard element of domestic and small business building and contents policies, in return for Government commitment to manage flood risk. The 1961 Gentleman's Agreement was not severely tested for several decades, with no major floods in England between the late 1960s and the late 1990s. The first serious test of the 1961 Gentleman's Agreement came with the 1998 floods, when more than 4200 properties were flooded with insurance claims exceeding £300 million. In the autumn of 2000, over 11,000 premises were flooded in about 700 locations across England and Wales. Another 37,000 properties were classified as 'near misses' by the Environment Agency (saved by sandbags alone). The insurance claims from these floods came to £692 million and led to the first significant challenge to the Gentleman's Agreement. Following the 2000 floods, the Association of British Insurers (ABI) began to negotiate with the Government, with an agreement reached in September 2002 setting out what was now referred to as the Statement of Principles (SoP). The insurance industry promised to provide cover for customers in high-risk areas as long as the protection against flooding met or exceeded the Government's minimum standard. In addition, the industry agreed to cover properties where improvements to flood defences were scheduled for completion by 2007. However, unlike the original Gentleman's Agreement, where the insurance industry committed to widely available flood cover with only a minimal unspoken commitment by the Government, the 2002 SoP placed a number of responsibilities on the Government, particularly greater investment in flood defences, reduction in the amount of development in flood risk areas, and faster and more consistent decisions on flood defences. The SoP applied from 1 January 2003, but was subject to review in the event of significant external shocks.

Such a shock occurred in the summer of 2007, when extensive floods affected over 48,000 homes and 7000 businesses, with insurance claims totalling £3.2 billion. The 2007 floods led to a re-evaluation of flood insurance provision. After extensive discussion between the ABI and the Government, the

Statement of Principles was renewed in July 2008, setting out the respective responsibilities of the industry and Government.

The 2008 SoP was designed to last until 30 June 2013, when a competitive flood insurance market was expected to be in place. The view of the ABI was that the SoP was a temporary measure to allow insurance to be offered for properties at significant risk until that risk was managed sufficiently. Insurers felt that the SoP distorted the insurance market because new entrants to the industry did not have to adhere to the agreement and so could avoid offering insurance in areas known to be a higher risk of flooding. Existing insurers, who were bound to continue offering cover under the SoP, were left at a commercial disadvantage as they were committed to provide flood cover for some risks that they might not ordinarily accept. In contrast, new insurers were not bound by the SoP to take on the higher risk properties that existing insurers were expected to cover, giving them a significant commercial advantage (ABI 2010). Extensive discussions about a successor to the SoP were held between the ABI and successive Governments, involving at least 60 meetings, with an announcement of a preferred solution very late in the day. On 27 June 2013, the Government published a consultation paper on securing the future of flood insurance (Defra 2013a). The preferred solution is the establishment of Flood Re: a stand-alone, industry-run, not-for-profit insurance fund. Flood Re is intended to protect primary insurers from exposure to extreme flood risk on UK domestic property and to protect many of those most at risk by in effect capping the amount that high-risk households pay for the flood component of their home insurance.

Flood Re is intended to support up to about 500,000 properties where accessing flood insurance in an open market would be problematic (approximately 2% of total insured properties). The remaining 98% of properties will continue to be covered by the industry as normal, and the rest of the household insurance price for risks such as fire or burglary will be set by the insurer as usual. Both buildings and contents insurance will be supported by Flood Re, which will include only residential properties and will exclude high-value properties, small businesses, and properties built after January 2009. The flood risk element of premiums for policies ceded to Flood Re will be capped at a maximum price set by the Government. The level of this cap will increase with council tax bands (which are based on property values in 1991 prices), starting at no more than £210 per year and rising to £540 per year. Only household policies whose risk-based premium is greater than these maximum values will be eligible to be subsidised by the Flood Re pool. The threshold for entry into Flood Re will initially be indexed to

the Consumer Price Index and will increase over time to effect a gradual transition to a free market where insurers charge fully risk-based prices (in contrast to the US, where NFIP subsidies are ending over a 5 year period). Flood Re will be funded by premium income topped by an annual contribution from insurance companies (an industry levy) based on their share of the UK home insurance market. Current modelling indicates that Flood Re will initially need £180 million per year to operate. It is expected that insurance companies will pass this cost to policyholders, effectively adding £10.50 per year to the cost of every household policy.

The Government carried out a six week consultation exercise on the proposed structure of Flood Re and published their response in November 2013 (Defra 2013c). Responses to the consultation exercise identified a number of potential problems. For example, Flood Re assumes that flood risk remains the same over time without accounting for changes in risk due to deterioration of existing flood defences, development in flood risk areas, or climate change (Diacon 2013). The current structure of Flood Re does not provide policyholders or communities with incentives to improve the flood resilience of their properties. In fact, Flood Re will largely remove any financial incentive for flood risk to be reduced by householders covered by the scheme, as high-risk properties will pay the same for their insurance no matter how severe the risk and whether or not they take steps to protect their property (ASC 2013).

There is also no commitment on the part of the Government to strengthening planning controls or building regulations on the floodplain, and it seems unlikely that Flood Re will significantly reduce development in flood-prone areas without changes in the planning system. Despite the issues identified in many responses to the consultation exercise, the Government has indicated that the existing proposal for Flood Re will not be significantly modified, although a revised impact assessment will be published which will take account of the potential impacts of climate change. Many respondents to the consultation exercise believe that greater clarity is needed in the event of Flood Re's annual losses exceeding the 1:200 year loss scenario, and the ABI and most insurance companies felt that Government should have primary responsibility for any losses above this level. However, the Government "continues to believe that the Memorandum of Understanding (MOU) sets out a clear process for what should happen in the unlikely event of Flood Re's losses exceeding a 1:200 year loss scenario" (Defra 2013c). This does not resolve the question of who will bear the costs of flood losses greater than this cap. The MOU says only that "Should claims on Flood Re exceed a 1:200 level, the Government of the day would take primary responsibility, working with Flood Re and representatives

of the industry, for deciding how any available resources should be distributed to Flood Re customers" (Defra 2013b). This does not represent a commitment from Government to pay out in such an event.

The UK flood insurance market is often viewed as an endorsement of private insurance for flood coverage and is cited as an example of a successful system because of the high penetration rate, with buildings insurance held by 91% of owner-occupied households (ABI 2013a). However, the high penetration rate is not because UK property owners see the value of flood insurance, but rather due to the fact that flood insurance forms part of the general property cover rather than being purchased as a separate policy for flood. An additional factor leading to the high penetration rate in the UK is that mortgage lenders appear to enforce the requirement for buildings insurance. The existence of a private market does not mean that policyholders pay actuarially sound rates; in fact, about 78% of premiums for high flood-risk properties in the UK are subsidised (ABI 2013b). It is not possible to tell exactly where this subsidy comes from, as information on pricing is viewed as commercially sensitive by private insurers, but it is almost certain that high-risk properties are subsidised by policies on low-risk properties, and probably also by other perils. Unlike the NFIP, flood insurance premiums in the UK are not subsidised by taxpayers. This will not change under Flood Re: the entire subsidy in Flood Re comes from low-risk households and the financial risk is still covered by the insurance industry, with the Government carrying no liability (Horn and McShane 2013). Flood Re does not reduce flood loss, but spreads the risk, protecting some policyholders from the costs of flooding at the expense of others. In fact, the Flood Re component of a domestic insurance policy will be invisible to policyholders, as they will not deal with Flood Re and may not be aware that their property is reinsured through Flood Re (Surminski et al. 2013). Flood Re will not reduce risk unless it is designed to incentivise people to do so (ASC 2013).

As the provisions of Biggert-Waters and Flood Re are implemented, research will be needed to assess the extent to which the move to risk-based pricing will encourage adaptation. Will Biggert-Waters and Flood Re encourage individuals to buy flood insurance or encourage lenders to mandate the purchase of flood insurance? The panel presentations at the Access EU meeting, and the discussions following the presentations, have identified additional important research questions relating to flood insurance: What role should flood insurance play in encouraging adaptation to sea level rise? How can insurance help to reduce flood risk? What are the implications of charging fully risk-based prices? What contribution should be made by stakeholders (policyholders, mortgage lenders, developers, local

government, central government, regulators, insurance companies)? What is the best balance between public and private sector contributions? How can floodplain management and insurance be better integrated? These questions can only be answered by a collaboration between researchers and stakeholders working across disciplines to assist coastal communities in adapting to the challenges of a rising sea level.

References

Association of British Insurers (ABI). 2010. Fighting flood risk together. Unpublished document, 12 pp. https://www.abi.org.uk/News/Publications

ABI. 2013a. Data bulletin: household spending on insurance in 2012. Unpublished document, May 2012, 24 pp. https://www.abi.org.uk/News/Publications

ABI. 2013b. Written evidence on flood funding submitted by the ABI to the House of Commons Environment, Food and Rural Affairs Committee. In EFRA 2013. http://www.publications.parliament.uk/pa/cm201314/cmselect/cmenvfru/330/330.pdf

ASC. 2013. Adaptation Sub-Committee of the UK Committee on Climate Change. Annex: improving Flood Re from an adaptation perspective. http://www.theccc.org.uk/wp-content/uploads/2013/11/ANNEX-to-Letter-to-Rt-Hon-Owen-Paterson-MP-22Nov13.pdf

Department for Environment, Food and Rural Affairs (Defra) 2013a. Managing the future financial risk of flooding. Impact Assessment, 24 May 2013, 57pp. https://consult.defra.gov.uk/flooding/floodinsurance/consult_view.

Defra 2013b. Flood Re Proposal: Memorandum of Understanding. https://consult.defra.gov.uk/flooding/floodinsurance/consult_view

Defra 2013c. Government response to the public consultation on securing the future availability and affordability of home insurance in areas of flood risk, 18 November 2013, 47 pp. https://www.gov.uk/government/consultations/insurance-in-areas-of-flood-risk

Diacon, S. 2013. Independent review of flood insurance analysis, June 2013. https://consult.defra.gov.uk/flooding/floodinsurance/consult_view

Horn, D.P. and McShane, M.K. 2013. Flooding the market. Nature Climate Change 3(11): 945-947.

IPCC 2012. Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. A special report of Working Groups I and II of the Intergovernmental Panel on Climate Change. Cambridge: Cambridge University Press, 582 pp.

Surminski, S., Crick, F., Eldridge, J. and Ward, B. 2013. Response to public consultation on 'Securing the future availability and affordability of home insurance in areas of flood risk'. Policy paper, Centre for Climate Change Economics and Policy, Grantham Research Institute on Climate Change and the

Environment, 20pp. http://www.lse.ac.uk/GranthamInstitute/publications/Policy/docs/Securing-the-future-availability-and-affordability-of-home-insurance-in-areas-of-flood-risk.pdf

Hearing fresh voices in the climate change conversation: A brief overview of Project Aspect

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My intention in this brief paper is to bring some new voices into the conference space and share with you a little of a recent research project on which I was Co-Investigator.

Project ASPECT began in 2010 -- a collaborative research project between two UK Higher Education Institutions: the University of South Wales and Falmouth University. The idea for the project developed as a response to an approach from the Director of Communications at the Department of Energy and Climate Change (DECC) in the UK government, who had identified a problem within his department, with which he thought we might be able to help:

- In spite of extensive (and expensive) campaigns to raise awareness around Climate Change, scepticism around and/or disengagement with the subject appeared to be on the increase.
- A communications strategy which was largely driven by climate change science and expert opinion did not seem to be engaging the broader public in the climate change debate. In fact, the opposite seemed to be the case.
- Government policy consultations only ever engage a small proportion of the public. As regards climate change, it was largely those representing the polarities of the debate who had become included, leaving about 80% of the population who, in DECC terms, are 'hard to reach'. (Wilson, 2012)

My colleague Professor Mike Wilson (Falmouth University) and I began to think about how we might use creative narrative approaches to address the issues highlighted by DECC. Our discussion led us to formulate a research question, which became central to the inquiry that was to become Project Aspect.

Our question was :
"By recasting the public conversation into a narrative framework, can storytelling, and specifically Digital Storytelling1[1], broaden and democratise the debate around climate change and encourage deeper and wider levels of engagement?"
We received funding from the UK's Arts and Humanities Research Council and embarked upon just under two year's of activity with Project ASPECT. We had two excellent research assistants whose job it was to identify and engage with individuals and communities in the UK who were not already actively engaged in the Climate Change conversation and would be considered by DECC to be "hard to reach."

The term "climate change" was not used in promoting events as our initial conversations with communities indicated that the term would alienate people who felt that either had nothing to contribute, or thought it would be "all about clever scientists." (Quote from community member in

[1] The process of digital storytelling is one of personal curation of archive and memory, resulting in a "bricolage" that offers a glimpse into the life of the individual and, often, their local community. (McEwan, Lewis et al 2013) It is a creative form particularly suited to individuals who have a story they wish to share, but who have never before ventured into the world of creativity and/ or the arts.

Cornwall.) Rather, we worked through local community "brokers" to bring together groups of people who might be intrigued by the notion of sharing stories and memories; and we offered plenty of free tea and cake too!

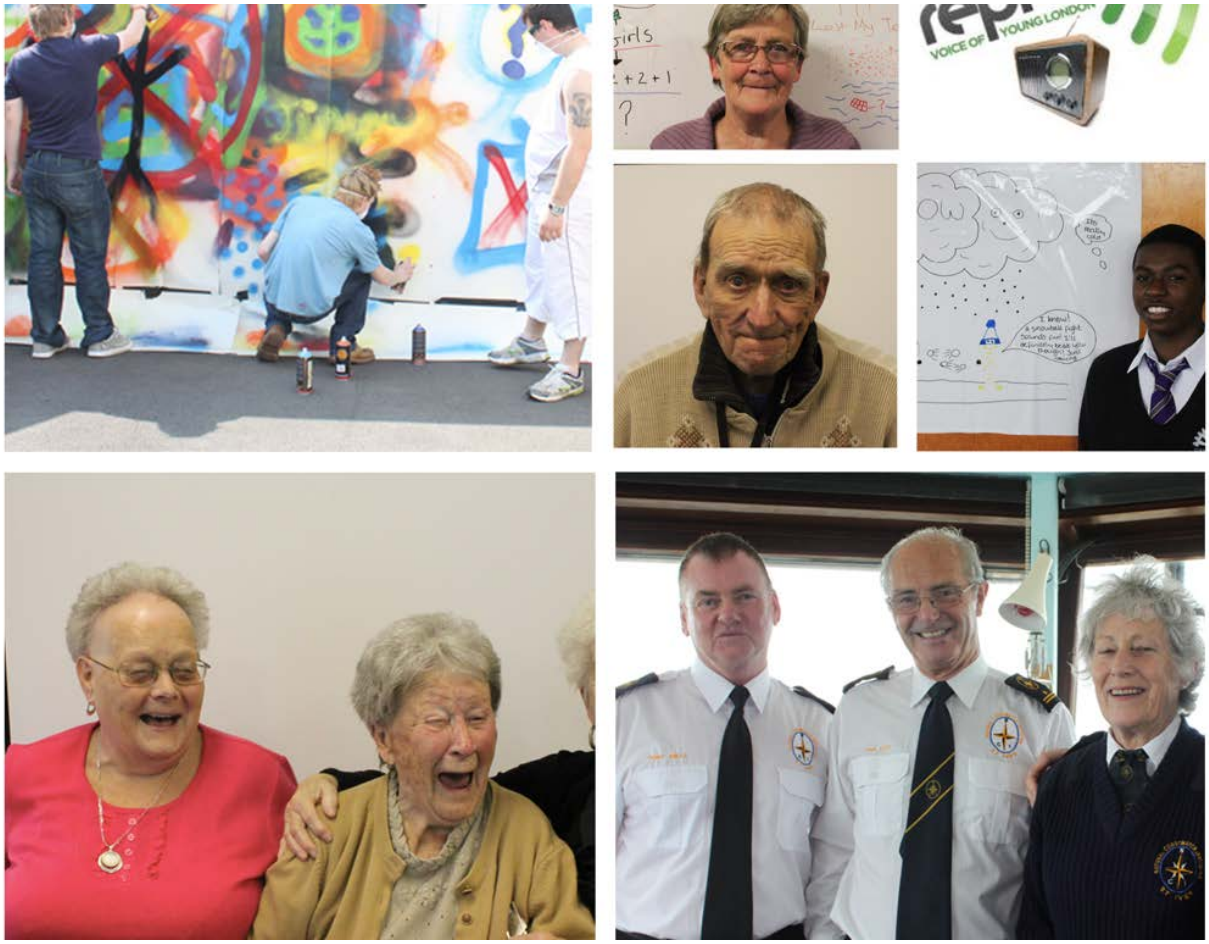
In some cases we worked with groups that were already formed (young mums; lifeboat crews; women's institute etc.) and in others we publicised open events to encourage people to come together and, hopefully, create a new community of interest around story and climate change. Our researchers were creative in their approach to encouraging public engagement:

[2]

We delivered a wide range of creative activities run in village halls, lifeboat stations, inner city council estates, day centres for seniors and so on, to stimulate story sharing and narrative exchange on the theme of climate change. Some individuals worked with us to co---produce their individual digital story, on a theme that in some way linked to the wider issues of climate change.
See: http://www.projectaspect.org/our_films?page=babacar

We showed some of the digital stories to a range of diverse groups, and encouraged them to respond with stories of their own.

[2] Example of poster used to promote Project ASPECT events



[3]

The digital story that was most successful in eliciting a wide range of responses on the theme of climate change was Heather's: http://www.projectaspect.org/our_films?page=heather
Here we are presented with a voice rarely heard in the rarefied atmosphere of climate change communication when scientists and other "experts" compete for column inches and airspace. Yet Heather is indeed an expert too --- an expert in her own world, based on a lifetime's experience as a farmer --- and the daily weather diary that she has kept since she was a child is a valid and valuable record of local weather patterns.

Notions of authenticity of voice and hierarchy of knowledge are foregrounded and unsettled when listening to Heather. Wilson (2013) says:

> Hers may be a voice that is unschooled, textured by a strong Cornish accent and lacking academic authority, yet this is what gives it authenticity. It is these very attributes that distinguish her from the more commonly heard voice of scientific expertise and lend her greater authority, believability and trustworthiness. She speaks from subjective experience, not objective data and her expertise is derived from her experience, rather from scholarly endeavour.

It was interesting to see the responses of policy makers and communications experts when we played Heather's story to senior staff at DECC. Something changed in the room as we moved from statistics to story and everyone began to engage with the subject on a different, more human level. Discussion was stimulated around notions of weather and climate and how for many lay people (at least in the

[3] Some of the individuals and groups we worked with.

UK) engagement with the idea of climate change begins with their own personal experience of living with weather; especially changing weather patterns and extreme weather incidences. Project ASPECT had only began to touch on this complex area of debate and enquiry, but it was evident that first person narrative, memory and story were powerful catalysts for opening the discussion and allowing easier access to complex subjects.

In addition to digital story work we engaged with our research groups in a range of creative ways, including working with a group of young people in central London who run a community radio station called Reprezent. We ran a digital storytelling workshop with them and encouraged sharing of stories, thoughts and experiences on the theme of climate change. They then took to the streets to interview local people about the subject and our engagement with them culminated in Local Warming Day on Reprezent:

In this very brief snapshot there is insufficient space to discuss the longer---term impact and potential of this work, but we concluded that the research had demonstrated that sharing stories can:

- Encourage nuanced responses
- Offer opportunity to enhance public engagement
- Reveal received narratives that underpin perceptions
- Help personalise and localise complex global issues
- Democratise debate

Afterword

Project ASPECT was just the beginning of some thinking and investigation that we would like to develop further. I was therefore very pleased to be approached after my presentation by several delegates who wish to use some of these creative approaches within their research and public engagement activity in the field of sea level rise and climate change. So I am looking forward to some interesting international collaborations going forward and am very happy to be contacted by anyone who is interested. You can reach me here: karen.lewis@southwales.ac.uk.

Thank you once again for inviting me to this extremely interesting and stimulating conference. Karen Lewis November 2013

References

McEwan L, Lewis K et al. *Archiving memories of changing flood risk: interdisciplinary explorations around knowledge for resilience*: (Journal of Arts and Communities, Intellect, October 2013)

Wilson, M (2012) "The tradition of personal storytelling, the narrative superhighway and notions of authority in the public debate on climate change", International Conference on Storytelling Today: *Instrument, Tradition and Art*, University of the Algarve, Portugal.

Project ASPECT website: http://www.projectaspect.org

Appendix E
Bios of Panelists

Muge Akpinar-Elci, MD, MPH

Dr. Muge Akpinar-Elci joined ODU in September 2013, and in October was appointed as director of the Center for Global Health. Dr. Akpinar-Elci has more than 15 years of experience in clinical and field research working in public health and global health. She completed her residency training in both Pulmonology and Occupational Medicine in Turkey. Dr. Akpinar-Elci also received a Master of Public Health (MPH) degree from Tulane University School of Public Health and Tropical Medicine in New Orleans, LA. After completing her degrees, she worked as a staff physician in Asthma Clinic at Chest Diseases and Surgery Training Research Hospital, Turkey. During her career Dr. Akpinar-Elci worked for NIH, CDC's National Institute for Occupational Safety and Health (NIOSH), East Carolina University, Agromedicine Institute. In her last position, she was an Associate Professor and Environmental and Occupational Health Track Director at St George's University School of Medicine, Department of Public Health and Preventive Medicine in Grenada. She was also a director of World Health Organization (WHO) Collaborating Center for Environmental and Occupational Health. She has been the recipient of several awards including: Centers for Disease Control and Prevention, Bullard-Sherwood Research to Practice award, 2008; East Carolina University Division of Health Sciences, Author Recognition Award 2006; On-the-Spot-Award of Department of Health and Human Services, Public Health Service for commitment, initiative, and hard work under difficult circumstances in 2002 and 2006. She intensively published scientific articles and book chapters on Occupational and Environmental Health and pulmonary medicine.

Austin Becker

Dr. Becker is Assistant Professor of Coastal Planning, Policy, and Design at the University of Rhode Island (URI). He is an interdisciplinary social scientist working across the fields of planning, policy, engineering, and climate-change science. His research contributes to untangling complex problems involving uncertainty, consequences of large-scale shifts in climate over long time horizons, and the resulting challenges in policy and planning. He teaches courses in coastal climate adaptation, maritime transportation systems and ports, and GIS. He is particularly interested in the use of GIS-based risk and vulnerability assessments and decision-support tools for local stakeholders in both the US and developing nations facing rising seas and stronger storms.

Austin's work is recognized globally and he is a regularly invited speaker at expert meetings of the United Nations Conference on Trade and Development (UNCTAD), the United Nations Economic Commission for Europe (UNECE), and the Joint Research Center of the European Commission, as well as numerous conferences in the United States. He also served as a contributing author to the National Climate Assessment and to the American Society of Civil Engineers manual on sea level rise considerations for marine civil works.

Austin earned his PhD in Stanford University's Emmett Interdisciplinary Program in Environment and Resources. He earned his Master of Marine Affairs and Master of Environmental Science and Management degrees at URI and he holds a B.A. from Hampshire College. His previous career was as a captain of educational sailing ships, including Rhode Island's Continental Sloop Providence. He maintains a 500-Ton U.S. Coast Guard captain's license for ocean-going vessels.

Eelco van Beek

Prof. Eelco van Beek (Netherlands, 1948) is a senior Integrated Water Resources Planning specialist. During the 40 years of his professional career he has been involved in many water resources projects all over the world, integrating the water resources issues 'too much, too little and too dirty' into an overall spatial and environmental planning approach. This includes national water resources plans for the Netherlands, Egypt and Trinidad-Tobago, as well as more specific regional water resources projects in Indonesia, Iran, China, Philippines, Vietnam, Ghana, India, Mexico and Bangladesh. In many of the more recent projects climate change adaptation and increasing the resilience of the system to climate variability and change plays a major role. He combines his advisory specialist role at Deltares (70%) with an academic role as full professor at Twente University and UNESCO-IHE (30%), among others supervising MSc theses and PhD dissertations on strategic issues on water resources. He is project leader of several major national research projects on how to deal in water management with the uncertainties of an unknown future. Since January 2012 he is a member of the Technical Committee (TEC) of the Global Water Partnership (GWP), the leading international organization advocating Integrated Water Resource Management.

Kelly Burks-Copes

Ms. Burks-Copes is a Research Ecologist in the US Army Engineer Research and Development Center's Environmental Lab located in Vicksburg, MS. Over the course of her 19-year career, she has focused primarily on the development of tools to assess the restoration of habitats, communities and landscapes across the country. She is the Project Manager for a ground-breaking study addressing risks to coastal military installations in the face of sea level rise and storm impacts that she will present today, but she is also involved in the development of ecosystems goods and services tied to green-blue infrastructure – something the USACE is calling "natural and nature-based features" to reduce coastal flood risks and improve ecosystem integrity for the North Atlantic Coast Comprehensive Study to address post-Superstorm Sandy recovery efforts. On top of all of that, she is currently wrapping up 5 large-river studies spread across the US focused on characterizing ecosystem response to management and goods and services returns on investments for dredging and operations. She earned a BS from the University of New Mexico in 1991, an MS from NM State University in 1993, and is currently pursuing a PhD from the Univ. of Florida (in her spare time!).

John Englander

John Englander is an oceanographer, consultant and author. Combining personal experiences as a global ocean explorer with expeditions in Antarctica, Greenland, the High Arctic and deep dives in research submarines, his mission is to be a clear, objective voice on our changing climate and oceans. In other words - no scientific jargon, no political advocacy - he just explains the scientific facts and potential impacts in plain English.
His broad marine science background, coupled with dual majors in Geology and Economics enable him to see the big picture on climate and look ahead to the large scale financial and societal impacts particularly as they relate to sea level rise.
John also combines non-profit CEO experience with the insights of a time-tested business entrepreneur. Today his firm, The Sea Level Institute, works with corporations, government agencies and community organizations advising them on the potential impacts, finanical risks and new opportunities from sea level rise.

Karel Heynert

Karel Heynert is a flood management specialist at Deltares in The Netherlands with a degree in Civil Engineering from Delft University of Technology. Both as project leader and specialist he has participated in research and specialist advice projects focusing on water resources assessment, flood risk assessment and management, flood forecasting and early warning, and the conceptual design of complex water management systems. He worked on in The Netherlands and overseas. His work in the United States includes the definition and initial implementation phases of the Community Hydrologic Prediction System (CHPS) — the national river forecast system that is based on Delft FEWS (oss.deltares.nl/web/delft-fews) — for the National Weather Service in the period 2006-09. Since 2008, Karel Heynert has on behalf of Deltares been responsible for the Flood Control 2015 research programme on operational flood risk management (floodcontrol2015.com).

Diane Horn

Diane Horn is a Reader in Coastal Geomorphology in the Department of Geography, Environment and Development Studies at Birkbeck College, University of London (http://www.bbk.ac.uk/geds/our-staff/full-time-academic-staff/horn). Her research interests include beach processes and the role of non-structural approaches, such as flood insurance and land-use planning, in reducing risk in coastal hazard areas. She was the first Visiting Scholar appointed under the ODU Climate Change and Sea Level Rise Initiative, working with Michael McShane on a comparative study of flood insurance in the UK and the US. The first paper from their collaboration will be in the November 2013 issue of Nature Climate Change and will be published online on 25 October.

Poornima Madhavan

Poornima Madhavan is an Associate Professor of Psychology at Old Dominion University, where she is also the Director of Undergraduate Research within the Honors College. She received her Ph.D. in Engineering Psychology from the University of Illinois at Urbana-Champaign, followed by a post-doctoral fellowship at the Department of Social and Decision Sciences at Carnegie Mellon University. Currently, Dr. Madhavan is the founder/director of the Applied Decision Making Laboratory at ODU where she supervises projects that examine human decision making under risk, stress, time pressure and uncertainty, and the intersection of social science and public policy. Recently, she has been studying decision processes that impact the adaptation of urban coastal communities such as Norfolk and rural communities along the eastern shore of Virginia to climate change and sea level rise. Her research helps understand why communications on climate change are failing to get public attention, steps to be taken to create a sense of urgency required for public discourse and action, and how to encourage the development of public support for policies that lead to environmental resiliency and sustainability through social marketing and adaptive persuasion techniques.

Michael McShane

Michael McShane is an Associate professor of Finance at Old Dominion University in Norfolk, VA, USA. His research interests include enterprise risk management and flood insurance, which had led to substantial interdisciplinary collaboration. He is associated with the Climate Change Sea Level Rise Initiative (CCSLRI) (http://www.odu.edu/research/initiatives/ccslri), the Emergent Risk Initiative (ERI@ODU) (http://sites.google.com/site/emergentrisk/), and the ODU Insurance and Financial

Services Center (http://bpa.odu.edu/insurancectr). A sample of his papers is available at http://ssrn.com/author=1000990.

Robert Nicholls

Robert is Professor of Coastal Engineering at the University of Southampton where he actively contributes and leads research and education in this area. His research is mainly focussed long-term coastal engineering and management, especially the issues of coastal impacts and adaptation to climate change, with an emphasis on sea-level rise. This work occurs at all scales from local research in the Solent, up to global assessments. A major recent theme of research is the future of deltaic areas which are the most threatened coastal setting in the coming century. He has also been involved in a number of international assessments, and in particular the International Intergovernmental Panel on Climate Change (IPCC), who were awarded the Nobel Peace Prize in 2007. He was awarded the Roger Revelle Medal by the Intergovernmental Oceanographic Commission in 2008. This recognises 'outstanding contributions to the ocean sciences by inspired researchers who communicate their knowledge and global vision of the challenges facing our Planet in order to shape a better future for humankind'.

Jürgen Scheffran

Jürgen Scheffran is professor at the Institute of Geography of Hamburg University in Germany and head of the Research Group Climate Change and Security in the KlimaCampus Excellence Initiative. After his PhD at Marburg University he worked in the Interdisciplinary Research Group IANUS of Technical University of Darmstadt, at the Potsdam Institute for Climate Impact Research, and as Visiting Professor at the University of Paris (Sorbonne). Until summer 2009 he held positions at the University of Illinois in the Departments of Political Science and Atmospheric Sciences, the Program in Arms Control, Disarmament and International Security, and the Center for Advanced BioEnergy Research. His research interests include: climate change and energy security; environmental conflicts and sustainability science; complex systems analysis and human-environment interaction; technology assessment and international security. He served as consultant to the United Nations, the Technology Assessment Bureau of the German Parliament, the Federal Environmental Agency, and he took part in the German delegation to the climate negotiations in New Delhi in 2002. He organized a number of workshops and conferences, most recently on climate change and security; nuclear disarmament; severe atmospheric aerosol events; environmental migration; limits to the anthropocene; risks and conflicts of geoengineering; renewable energy; and climate change in the Himalaya region.

Glen Sussman

Glen Sussman is University Professor of Political Science at Old Dominion University. During his professional career, his research has focused on U.S. environmental politics and policy, the politics of climate change, environmental opinion, and science and environmental politics. Dr. Sussman's scholarship and professional activities include 5 books, over 90 journal articles, book chapters, and professional papers and approximately 100 lectures, interviews, panels, and speaking engagements. His most recent book is U.S. Politics and Climate Change: Science Confronts Policy (Lynne Rienner Publishers, 2013). In recent years, he has been invited to present papers about the politics of climate change at the International Conference on Culture, Politics & Climate Change at the University of Colorado, Boulder in 2012 and at the 2011 Dupont Summit in Washington, DC. In addition to

publishing and presenting papers in research outlets in the United States, Dr. Sussman has been invited to present papers at several international conferences including the 1st International Summit on Global Warming, Climate Change and Hurricanes, Crete, Greece in May 2007, the 2nd International Conference on European and International Political and Economic Affairs in Athens, Greece in May 2004, and the Berlin Conference on Human Dimensions of Global Environmental Change in Berlin, Germany in December 2001.

Janos Szonyegi

Colonel Szonyegi is the Strategic Analysis Branch Head at NATO Allied Command Transformation in Norfolk, VA. He has been working on NATO strategic level issues for 14 years. Previously, he filled positions both at the NATO HQ in Brussels as a national representative and in several national positions in the Hungarian Ministry of Defence. His current portfolio includes the development and implementation of the Strategic Foresight Analysis that embraces the challenges and opportunities members of the North Atlantic Alliance might face in 2030. The findings of this study identifies five major themes that will have primary impact on the future security environment ((1) Politics; (2) Technology; (3) Resources; (4) Human; (5) Environment and Climate), 15 trends and 34 defence and security implications. In addition to this work he has been involved in the analysis of energy security related issues. Colonel Szonyegi has a Master of Science degree from Budapest Technical University, a Master of Arts in Security Studies from the Naval Postgraduate School in Monterey, CA and is currently a PhD Student in International Studies at the Old Dominion University in Norfolk, VA.

Appendix F
List of Participants and Organizational Affiliation

First Name	Last Name	Organizational Affiliation
1. Jan	Andersson	Old Dominion University
2. Paul	Conway	Commonwealth of Virginia Legislature, Secure Commonwealth Panel
3. Eddie	Hill	Old Dominion University
4. Muge	Akpinar-Elci	Old Dominion University
5. Tom	Allen	East Carolina University
6. Jenifer	Alonzo	Old Dominion University
7. Larry	Atkinson	Old Dominion University
8. Carina	Barnett-Loro	Union of Concerned Scientists
9. Austin	Becker	University of Rhode Island
10. Okmyung	Bin	East Carolina University
11. Robyn	Bluhm	Old Dominion University
12. Joseph	Bouchard	Cox Communications
13. Kelly	Burks-Copes	U.S. Army Engineer Research and Development Center
14. Janine	Burns	Board of Supervisors, Mathews County
15. Carolyn	Caywood	League of Women Voters-South Hampton Roads
16. Carol	Considine	Old Dominion University
17. Gwynn	Crichton	The Nature Conservancy
18. Bill	Crow	Virginia Ship Repair Association
19. Jennifer	Cunningham	Old Dominion University
20. Charles	Davis	Joint Forces Staff College
21. Doug	Domenech	Commonwealth of Virginia
22. Prakash	Duraisamy	Old Dominion University
23. Scott	Duryea	Old Dominion University
24. David	Earnest	Old Dominion University
25. Bill	Eger	Old Dominion University
26. Emily	Egginton	Virginia Institute of Marine Science (VIMS)
27. John	Englander	Author, *High Tide on Main Street*
28. Tal	Ezer	Old Dominion University
29. Anthony	Farmer	Naval Facilities Mid-Atlantic
30. Dwight	Farmer	Hampton Roads Planning District Commission
31. Joanne	Fish	Old Dominion University
32. Timothy	Fortune	Newport News Shipbuilding
33. Mary Ann	Freeman	US Navy Fleet Forces Environmental Readiness
34. Maurizio	Geri	Old Dominion University
35. Stephen	Geusic	Naval Facilities Mid-Atlantic
36. Lisa	Granquist	Northeastern University, Law & Public Policy, PhD Candidate
37. Matthew	Hall	Old Dominion University
38. Maura	Hametz	Old Dominion University
39. Carl	Hershner	Virginia Institute of Marine Science (VIMS)
40. Karel	Heynert	Deltares
41. Diane	Horn	Birkbeck College, University of London
42. Shannon	Hulst	Wetlands Watch
43. Khan	Iftekharuddin	Old Dominion University
44. Eric	Jabs	Old Dominion University
45. Brian	Joyner	Moffatt & Nichol
46. Regina	Karp	Old Dominion University
47. CAPT John	Korka	Commanding Officer, Naval Facilities Mid-Atlantic
48. Julie	Lambert	Florida Atlantic University
49. Wiebke	Lamer	Old Dominion University
50. Craig	Landry	East Carolina University
51. WIL	LAVEIST	Old Dominion University
52. Joe	Lerch	Virginia Municipal League
53. Karen	Lewis	University of South Wales
54. Patrick	Long	East Carolina University
55. Poornima	Madhavan	Old Dominion University
56. Andria	McClellan	Hampton Roads Community Activist

57. Benjamin	McFarlane	Hampton Roads Planning District Commission
58. Lauren	McKee	Old Dominion University
59. Whitney	McNamara	City of Virginia Beach
60. Tom	McNeilan	Fugro Atlantic
61. Michael	McShane	Old Dominion University
62. Gero	Michel	Montpelier Re
63. Shep	Moon	Virginia Coastal Zone Management (CZM) Program
64. Mark	Nevitt	U.S. Navy
65. Leonard	Newcomb III	City of Norfolk, Planning
66. Robert	Nicholls	University of Southampton
67. Renee	Olander	Old Dominion University
68. Erica	Penn	Virginia Coastal Policy Clinic
69. Aaron	Phillips	Naval Facilities Mid-Atlantic
70. Hans-Peter	Plag	Old Dominion University
71. Beth	Polak	Virginia Coastal Zone Management (CZM) Program
72. Jim	Redick	Norfolk Emergency Preparedness and Response / Secure Commonwealth Panel Recurrent Flooding Sub-Panel
73. Jesse	Richman	Old Dominion University
74. Claudia	Risner	Old Dominion University
75. Daniel	Rizza	Climate Central
76. Nicole	Rovner	The Nature Conservancy
77. Aaron	Sander	Old Dominion University
78. Mary-Carson	Saunders	Virginia Coastal Policy Clinic
79. Gary	Schafran	Old Dominion University
80. Jurgen	Scheffran	University of Hamburg
81. Christina	Slentz	Old Dominion University
82. RADM Dixon	Smith	Commander, Navy Region Mid-Atlantic
83. Liz	Smith	Old Dominion University
84. Scott	Smith	City of Norfolk
85. Kenneth	Somerset	City of Poquoson
86. Tom	Steinfeldt	Georgetown Climate Center
87. Emily	Steinhilber	Virginia Coastal Coalition
88. Glen	Sussman	Old Dominion University
89. Janos	Szonyegi	NATO Allied Command Transformation
90. Robert	Tajan	City of Norfolk
91. David	Titley	Pennsylvania State University
92. Ray	Toll	Old Dominion University
93. Forbes	Tompkins	World Resources Institute
94. Timothy	Trainor	EQECAT
95. Robert	Tuleya	Old Dominion University
96. Teresa	Updyke	Old Dominion University
97. Lindsay	Usher	Old Dominion University
98. Eelco	van Beek	Deltares, Netherlands
99. Jantienne	van der Meij-Kranendonk	Royal Netherlands Embassy
100. Ron	Williams	City of Norfolk
101. Heather	Wood	Virginia Port Authority
102. Wie	Yusuf	Old Dominion University