

Climate Change Adaptation for State and Local Governments Part Three: Federal Resources and Support for Climate Change Adaptation

Webcast Transcript

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Webcast Agenda and Meeting Logistics

Slide 1: Introduction Slide

Operator: Welcome to the EPA conference call. Ms. Zinsmeister you may begin.

Slide 2: Title Slide

Emma Zinsmeister: Thank you. Thanks for joining us this afternoon and welcome to the U.S. Environmental Protection Agency's webcast on Climate Change Adaptation for State and Local Governments. This is the third installment of our special mini series that the State and Local Climate and Energy Program has been putting on. This has been jointly hosted by our state technical forum and our local climate and energy webcast series. Today's topic will be covering Federal Resources and Support for Climate Change Adaptation.

Slide 3: Webcast Agenda

Emma Zinsmeister: The previous two calls covered Climate Impacts and Risk Communication and then Climate Adaptation Planning and Implementation Strategies. The agenda for today's call will include how to use the web software, how you can ask questions during the webcast. We'll provide a brief overview of what the State and Local Climate and Energy Program has to offer in terms of resources related to adaptation and other climate interests you may have. My colleague Neelam Patel will introduce the Heat Island Reduction Program which will be useful to you in providing resources on the impacts, the heat and health impacts of climate change as you're developing your adaptation programs.

Our featured speakers today will include Allison Castellan from the White House Council on Environmental Quality who will speak a little bit about the Interagency Task Force and their recommendations for developing a national adaptation strategy. Steve Seidel from the Pew Center on Global Climate Change will provide an overview of what different federal agencies are doing related to adaptation and the resources they had to support your state and local efforts as you develop adaptation plans and implement them. And then we'll move into our case study today. And I'll provide a brief background introduction since our EPA Climate Ready Estuaries program was pretty much involved in the development of these workshops that Jen Pagach from the Connecticut Department of Environmental Protection will be speaking about.

There is a joint effort between the Climate Ready Estuaries program and ICLEI Local Governments for Sustainability to help Groton, Connecticut put on a series of workshops to kickoff their adaptation efforts. And it's a really great case study that we're looking forward to sharing and the model of how to facilitate federal, state and local collaboration on adaptation. And after all of our speaker presentations we'll move into a question and answer session, answer some of your questions.

Slide 4: GoTo Webinar Software Logistics

Emma Zinsmeister: So just a little bit more information about today's webcast. All of the participant lines have been muted just to minimize background noise and keep things going smoothly. However you will have the opportunities to make your questions in writing and I'll give you a little bit more information in just a minute in how to do that. The PDF files of all of the slides as well as MP3s of the recording of today will be available on our website within a few weeks at the web address listed here and you're also able to access the files from the first and second parts of the adaptation webcast series. And we encourage you to download the files and revisit them, often they have a lot of links to different reports and resources that you may want to access for more information, contact information from all of the speakers in case you have additional questions, and also you can share them with your colleagues and others who maybe interested.

If by any chance you run into some technical issues with GoTo Meeting software please feel free to contact Lauren Pederson who provides our technical support. Her email address is listed here and she should be able to help you out with any technical issues you may have.

Slide 5: Question (GoTo Meeting)

Emma Zinsmeister: So during the webcast today, you have the opportunity to ask questions of our speakers. You can see here and this is an image of what your control panel should look like. There is a section labeled questions. You can type in any questions that you have throughout the webcast.

We ask that you please identify which speaker you're addressing the question to you so that we can address it to that person appropriately. And we'll collect all of these questions and at the end read some of them off and get responses from our speakers. And if by chance we don't have the opportunity to cover your questions during the call today, we will record all of them and get answers in writing which we can post in PDF form to our website later on.

Slide 6: Optional Feedback (GoTo Meeting)

Emma Zinsmeister: And also once we end the session today and you close out your GoTo Meeting software, you'll see that there is an optional survey where we would like to get some feedback from you on what you think of our webcast, what kind of resources you need for adaptation efforts in your communities and what EPA can do to further assist you. So we really encourage you to provide us some of your thoughts and your interest here. It's a great opportunity to really give us some insight into what your needs are and we look forward to seeing your responses.

Slide 7: U.S. EPA State and Local Climate and Energy Program: What We Offer

Emma Zinsmeister: So just quickly a little background information on our program here the State and Local Climate and Energy program. We offer a variety of resources to help states and locals promote clean energy to help reduce the greenhouse gas emissions and criteria air pollutants and our comprehensive website here provides all sorts of informational resources, analytical tools and access to peer exchange opportunities.

Slide 8: Climate Change Impacts and Adaptation Resources from EPA

Emma Zinsmeister: So I really encourage you to take a look at it through the link here and access some of these resources and we're also growing component of our program that will focus on tribes. So this new material will be coming up over the next year or so.

Slide 9: Climate Change Impacts and Adaptation Resources from EPA (continued)

Emma Zinsmeister: So please take a look and just more specifically our resources that are focused on climate impacts and adaptation can be found on the state and local pages listed here. And this is also just a recap of our webcast series which has been the major resource that we've launched for adaptation.

We got a lot of interest in this series and a lot of requests for specific information on adaptation related to tribes. So we are planning on doing some additional webcast that will focus on tribal interest and we'll announce the dates for those webcasts sometime in late spring or summer of this year.

Slide 10: Additional Climate Change Impacts and Adaptation Resources

Emma Zinsmeister: And just briefly we have a number of other resources at EPA that maybe of interest to you, programs and documents that help you with your adaptation programs. And you'll certainly be hearing about a lot of other resources from federal agencies and other organizations from our speakers today. So I won't take up time to go through all of these but please know that you can access all of these through the files after the webcast today and also just some more from other agencies and other nongovernmental entities.

And we're going to take some time now. I'm going to turn it over to Neelam to talk about the Heat Island Reduction program which will certainly be of interest to folks with their adaptation works.

Overview of EPA's Heat Island Reduction Program

Slide 11: Title Slide

Neelam Patel: Thank you Emma. My name is Neelam Patel, the Heat Island Program Manager and I just wanted to provide an overview. So EPA's Heat Island Reduction program offers strategies that help communities mitigate greenhouse gases but they also help communities adapt the climate impacts such as heat and in some cases heavy precipitation over the long-term.

Slide 12: Trends in U.S and Global Temperatures

Neelam Patel: So to start, there is data showing that average temperatures both in the U.S. and globally have risen particularly in the last 30 years. This graph has been developed using data from NOAA and can be found in EPA's 2010 Climate Indicators Report. And this particular graph reflects, excuse me, U.S. data. So through analyses NOAA found and this was just released yesterday actually, NOAA found that 2010 was the 34th straight year that was warmer than average 20th century temperatures. So you can see that we have higher temperatures that we're dealing with in more recent years and this trend is continued to expect to continue according to the IPCC 2007 report.

Slide 13: The Heat Island Effect

Neelam Patel: So even though the magnitude of temperature varies across the U.S. there is both environmental and health reasons to begin reducing or adapting to these higher temperatures especially in cities where approximately 60 percent of the U.S. population lives. And so as you can see on this graph here densely built-up areas tend to have higher temperatures than the average increases that you saw in the last graph. And this phenomenon of higher temperatures and densely built-up areas is called the Heat Island Effect.

In these densely built-up areas, the temperature tends to be nine to 27 degrees higher than surrounding areas. And this is formed because of vegetation that has been replaced by urban infrastructure actually holds and absorbs heat in the area. And this is due to the materials used for roadways, for buildings, and this upper climbing temperatures are the only intensifying the Heat Island Effect and its impacts. So the graph you see here shows that there is increase in both day time and night time temperatures.

Slide 14: Heat Island Impacts

Neelam Patel: And the night time heating is actually linked to increase in heat-related illness. So in addition to the health impacts there are air quality impacts, for example, the higher – the warmer micro climate increases ozone formation and that higher temperature also increases energy use. So during peak periods, you are actually using more energy which puts more strain on the electric grid and the increase of energy also can potentially increase air pollution and greenhouse gas emissions.

Another impact is the water quality and because of these hardscapes in these urban environments there is more runoff which increases the amount of water going in the water waste. It increases the temperature of the water that's going into the water waste and also the amount of pollution that's part of this water. So there are many impacts and I already mentioned human health but another tidbit to recognize the impacts of heat is over the past 30 years, there have been approximately 6,000 deaths across the U.S. caused by heat-related illnesses and this does not cover existing health conditions that are exacerbated by heat such as heart attacks and respiratory illnesses.

Slide 15: Extreme Heat Events and Heavy Precipitation

Neelam Patel: So these environmental and health impacts from Heat Island are much more prevalent during extreme heat events and have a precipitation. The water quality issues really tie in to the precipitation in the increased runoff. But air quality, energy use and health is all related to the – it's all exacerbated during these extreme heat events. And so to address these trends we can implement Heat Island mitigation strategies to adapt to these weather and climate changes.

Slide 16: Long-term Planning Actions for Adapting to Urban Heat

Neelam Patel: So what I'd like to do is just talk to you about four mitigation strategies that help reduce the Heat Island Effect and therefore also helps protect public health in the long-term. And also help us some of our other environmental issues. So first I'll discuss the trees and vegetation. When trees are considerably placed around buildings they are able to increase the energy efficiency of buildings and also help reduce the overall atmospheric temperature within a region by increasing evapotranspiration. Green roofs have a similar effect but on rooftops. So now these green roofs are replacing hard roofs that hold in heat and instead the greenery is cooling the area through evapotranspiration and then this also helps us stop lot of mitigation.

Cool roofs are highly reflective roofs that reduce, excuse me, that increase energy, building energy efficiency and also reduce the overall Heat Island Effect by reflecting away heat into the atmosphere. And then the last mitigation strategy is cool pavements. By using permeable pores and reflective pavements you're able to reduce the Heat Island Effects but also make a more comfortable walking and driving environments.

Slide 17: U.S. EPA Heat Island Program Resources

Neelam Patel: So to give more information on these mitigation strategies to see how they can be used as part of your adaptation – your longer term adaptation plans, you can visit the EPA Heat Island website. And I'd like to just point out the compendium of strategies. This document actually goes through each mitigation strategy and provides back on information and some quantitative analysis as to what can be used in your communities. So thank you very much. I'll pass back to Emma.

Slide 18: Contact Information

Emma Zinsmeister: All right, thank you Neelam. So as you can see the urban heat island mitigation strategies offers a variety of benefits that will be of interest thinking about adaptation and dealing with long-term effects of increasing temperatures and the potential heat and health effects. So certainly do check those out. And here is just some of our contact information from our program, Julia Miller who focuses on state issues, myself and also Neelam from the Heat Island Reduction program. Please contact us directly if you have any questions on our resources or other programmatic materials. And also we do offer a Listserv where you can get monthly updates on new policies, resources that have come out, events that may of interest. So please do follow the link here to signup if you are interested.

Interagency Climate Change Adaptation Task Force 2010 Progress Report

Emma Zinsmeister: So now we'll turn it over to our speaker presentation. First off we have Allison Castellan, who is currently with the White House Council on Environmental Quality. Allison is a climate change adaptation specialist at the Council of Environmental Quality where she works with Interagency Climate Change Adaptation Task Force to improve federal government's response to climate change. She is on detail with CEQ from the National Oceanic and Atmospheric Administration's Office of its Ocean and Coastal Resource Management, OCRM where she has worked with the National Coastal Zone Management Program for the past eight years which is a federal state partnership that works to preserve, protect and responsibly develop the nations coastal areas. And Allison has a Masters in Environmental Management from Duke University.

Slide 1: Title Slide

Allison Castellan: Thanks Emma. And thank you very much for inviting me to participate today and speak with you all about the Interagency Climate Change Adaptation Task Force. As Emma mentioned, I am on detail to CEQ from NOAA's Office of Ocean and Coastal Resource Management where I work very closely with State Coastal Management program. So you know state and local governments are very near and dear to my heart. So I am very happy to be able to speak with all of you guys today.

Slide 2: Outline

Allison Castellan: First of all I just wanted to sort of give you an overview of what we are talking about. First of all I'd like to go over generally on what the Interagency Climate Change Adaptation Task Force is about and the role that federal government plays in climate change adaptation. And then I'll go onto the recommended actions that Task Force has put forward in the report they submitted to the President this past October. And then also talk about next steps of the Task Force to move forward with implementing those recommendations.

Slide 3: The Climate Change Adaptation Task Force

Allison Castellan: The Interagency Climate Change Adaptation Task Force was established in March 2009 to assess key steps needed to help the federal government and public and private sector decision makers in communities across the country to better understand, prepare for and adapt to impacts of climate change. The Task Force is co-chaired by the Council on Environmental Quality, the White House Office of Science and Technology Policy, and the National Oceanic and Atmospheric Administration. It also includes representatives from over 20 different departments and agencies throughout the federal government.

In October 2009, President Obama signed an executive order asking the Task Force to provide recommendations on how federal policies, programs and programs can better prepare the United States to respond to the climate change impacts. And he requested that the Task Force provide a

progress report with those recommendations to one year later which we just submitted this past October. So first of all, why did the President request this report? If you participated in any of the previous webinars during the series I am sure, it's no surprise to you that climate change is one of the greatest environmental and public health challenges we face in the modern world today.

Slide 5: What is Adaptation?

Allison Castellan: It impacts many aspects of our society including our livelihoods especially in coastal communities, or human health or water availability, food production and national security among other aspects of our lives. And because of these it's very important that we really do need to take action to address the growing threat of global warming and prepare the U.S. to adapt to the impacts of climate change.

Slide 6: Role of the Federal Government in Adaptation

Allison Castellan: Although a lot of adaptation occurred at the local level, the federal government does play an important role in preparing our nation to respond to climate change. The federal government provides data, tools and other resources to local state and private decision makers so that they can accurately assess climate impacts and risks in their own backyards, design and implement effective adaptation strategies and built a greater public awareness of the importance of adaptation.

The federal government also has a direct role in adaptation because climate change directly impacts federal services operations and assets across the country. Infrastructure such as federal roads for example may require additional resilience to extreme heat – extreme cold or more frequent or severe flooding (that you see in this picture). Public lands may need to be managed to take into account increases and drought and wild fires. And then by incorporating adaptation into the missions and operations of federal agencies, the federal government will help ensure that tax payer dollars are invested wisely and that the federal government services and operations do remain effective to benefit all American people as the climate continues to change.

While the federal government must play a critical role in climate change adaptation, we can't do this without the work of state and local government as well as public and private sector as well. What the direct say in many land use development and local service social service decisions, state and local governments are often on the front lines of adaptation. It's – also many state and local governments already are leaders in adaptation and the federal government is really looking to what's already going on at the state and local levels to learn from them to help us move forward as well as we continue to move forward with the adaptation.

And it's because we recognize the important role other stakeholders play in adaptation across the country that the Task Force is very much valued input from state, local, tribal thought leaders as well as the private sector and the general public as it moved forward with developing its recommendations. The Task Force held over 35 listening sessions, outreach meetings and other public events across the country to help provide opportunities for feedback. And then we also

received over 27,000 written comments to help inform the recommendations to Task Force put forward.

Slide 7: Themes from Public Outreach...

Allison Castellan: Some of the key themes that emerge during these public outreach sessions and public comment periods was first of all the need for broader stakeholder engagement and improved coordination between all of governmental and stakeholders also the need for a sustained funding for state and local adaptation and greater accessibility to science. There is also a call from (rural) federal guidance and leadership on climate change adaptation and also the need to review existing regulations and policies to ensure that they don't inadvertently increase the vulnerability of climate change.

And finally there was an emphasis on the importance of taking an ecosystem based approach to adaptation. The Task Force work has been guided by a strategic vision of a resilient healthy and prosperous nation in the space of a changing climate.

Slide 8: Guiding Principles

Allison Castellan: To achieve this vision the Task Force identified a set of eight guiding principle that public and private decision makers to consider in designing and implementing adaptation strategies.

While all eight guiding principles are very important I would like to first just emphasize the first four here. First of all the adaptation should be incorporated into core policies, planning, practices and programs wherever possible. Adaptation strategies should also help people, places and infrastructure that are most vulnerable to climate impacts and be designed and implemented with a meaningful involvement from all the parts of the society.

And third, the adaptation should be grounded and best available scientific understanding of the climate change risks, impacts and vulnerabilities. And then the fourth guiding principle is that adaptation requires coordination across multiple sectors and scales and should be built on the existing efforts and knowledge of a wide range of public and private stakeholders.

Slide 9: What does the report recommend?

Allison Castellan: The Task Force put forward five overarching recommendations for the federal government to build climate resilient and reduce the vulnerability of communities and places to impact the climate change. It also provided specific actions, recommended actions under each recommendation, unfortunately I don't have the time here to go through all of those specific recommendations but I do want to highlight what the five overarching recommendations are and take out a few specific actions within those that maybe of most interest to state and local governments.

First of all the Task Force recommended, noted the need to make adaptation a standard part of federal agency planning to ensure that federal resources are invested wisely and its services in operations remain effective in a changing climate.

Slide 10: What does the report recommend?

Allison Castellan: The report also noted the need to make scientific information about the impacts of climate change available to people in an acceptable and localized way so that they can build adaptation into their plans and activities.

Slide 11: What does the report recommend?

Allison Castellan: And third to align federal resources to respond to climate impacts that cut across agency jurisdictions and missions such as those that threaten public health communities, coast and water resources.

Slide 12: What does the report recommend?

Allison Castellan: Fourth, the Task Force noted the need to build strong partnerships to support local, state and tribal decision makers in improving how they manage places and infrastructure that are most likely to be impacted by climate change. This would allow for a sustained dialogue to identify how the federal government and specific agencies can most effectively engage with local, state and tribal governments on adaptation. It would also enable that federal government to increase its responsiveness to local state and tribal adaptation needs and be a way for the Task Force to communicate progress on implementing recommendations that made in the October 2010 progress report, sorry, yes.

And as part of the partnership efforts the Task Force recommended that federal agencies develop regional climate change adaptation consortia to better meet the needs of state, local and tribal and private sector decision makers in each region by improving regional collaboration and coordination federal efforts (as part of) adaptation.

Slide 13: What does the report recommend?

Allison Castellan: And then finally the fifth overarching recommendation the Task Force put forward was the need to develop a government, a federal government wide strategy to help developing countries reduce their vulnerability to climate change building on and strengthening existing bilateral and multilateral adaptation program.

Slide 14: Next Steps...

Allison Castellan: Yes, next slide. OK, there we go. Thanks. Now as the Task Force moves forward the federal government has already began to implement some of these recommendations and reports and will continue to do so over the next year as well as the years to come. Some of that activities that are planned are underway for this year include first of all federal agencies will begin to assess how climate change will impact their missions and integrate climate change

adaptation under the planning, operations, programs and policies. CEQ is actually – will be releasing in early February implementing instructions for federal agencies on how to best integrate adaptation planning into their programs and operations.

Allison Castellan: Some agencies have already begun to do this for example Department of Homeland Security has already began to invest – how climate change will impact migration patterns in the Southwest U.S. and identified ways. They just would need to adjust its operations and programs to respond. The Department of Transportation has launched a pilot program sponsored by the Federal Highway Administration designed to help transportation decision makers identify infrastructure assets that are most exposed to threats from climate change and the consequences that could result from those threats.

And this is pilot project they actually did in partnership with state DOTs as well as the metropolitan planning organizations. We've also heard requests from many local and state governments, the need for accessible and easily accessible one-stop clearing house for federal climate change data and adaptation resources. And we're beginning to explore options for compiling this and producing this at the federal level.

And also to improve coordination on cross-cutting issues, there are several interagency planning efforts that are underway for example the National Ocean Council is developing a strategic action plan to strengthen the resiliency of coastal communities and marine and great lakes environments to climate change. Another effort is being led by Department of Interior NOAA and CEQ to develop a National Fish, Wildlife, and Plants Climate Change Adaptation Strategy. And all these planning efforts will include opportunities for public input especially from state and local governments as the plans are developed and move forward.

And the Task Force is also working to strengthen and better coordinate adaptation efforts at the local and regional level for example we're looking at ways to build on existing regional efforts to support local, state and tribal adaptation including DOIs, Landscape Conservation Cooperatives and NOAA's Regional Integrated Sciences and Assessments as well as our climate – Regional Climate Services.

We're also looking at ways, we may be able to tap in to a variety of established network that supports state and local and tribal decision makers such as ICLEI, National Government Students Associations and various professional associations in state and local government and tribal groups. These forums will provide opportunities for state and local governments to provide continued input to the Task Force and federal agencies. And also we recognize there can be an often a stakeholder fatigue out there and we really do want to tap into existing conversation so we aren't creating yet another forum to do that.

And these forums will provide opportunities for continued input as I said. Finally, the Task Force have committed to producing another progress report next October to document the progress made in implementing the recommendations that Task Force put forward and also provide an opportunity to refine or provide additional recommendations as needed. And in closing I'd just like to note that the Task Force recommendations that they put forward in

October represent an initial but important steps in what must be a long-term interim process to ensure Americas communities and natural places are resilient to climate change.

This is an interim process, it's ongoing. And we really are open to your suggestions and ideas as we continue to think through the best ways to meet these recommendations as well as move forward with this process in general, especially opportunities for state and local governments. So thank you.

Slide 15: Contact Information

Allison Castellan: And for anyone who is interested in looking at the full Task Force report, you can find a link to the report from that website there and then feel free to contact myself Allison, I am Allison Castellan or Cathleen Kelly who is Deputy Associate Director at Climate Change Adaptation at CEQ.

Adapting to Climate Change: Federal Leadership

Emma Zinsmeister: Thank you Allison. As some of those efforts get underway like the information of clearing house, we'll certainly distribute that information and provide links through our Listserv so folks can get to these resources and access them as they become available. So thank you and if anyone has any questions for Allison please remember to type them in and we'll get to those at the end of the webcast today. Now we're going to move onto our presentation from Steve Seidel. Steve Seidel is a Vice President for Policy Analysis and General Counsel at the Pew Center on Global Climate Change. He directs the domestic analysis program including coordination and oversight of analyses, reports and workshops that focus on the climate policy initiatives of the legislative and executive branches of the federal government. He also oversees the Pew Center's science and environmental impacts and adaptation portfolio

Mr. Seidel has over 25 years of experience working on global environmental issues. Prior to joining the Pew Center, he managed EPA's Stratospheric Protection program including the development and implementation of the Montreal Protocol and the regulatory and voluntary partnership programs developed under Title VI of the Clean Air Act. Mr. Seidel has a degree in Economics and Urban Studies from Columbia University and a law degree and Masters in City Planning from Rutgers University. Thank you Stephen.

Slide 1: Title Slide

Steve Seidel: And thank you Emma and thanks for putting on this webinar and thank you all for attending. The level of interest is really quite exceptional and shows that we're making really good progress in terms of beginning to address the adaptation needs for our state and local governments across our nation. I am going to really pickup where Allison left off and focus most of my remarks on the specifics across different federal agencies in terms of their initial efforts to begin adapting to climate change and also to provide the resources and tools to help state and local governments in their efforts.

Slide 2: About the Pew Center

Steve Seidel: But first a word about the Pew Center, we've been around little over a dozen years. Many of you probably heard of us or viewed some of the materials we've prepared. We are fiercely independent and very much nonprofit and definitely nonpartisan, focused on research and analysis, work very closely with both Republicans and Democrats cross Congress but we also work very closely with the business community and that makes a little different than a lot of other nongovernmental organization.

We are advised by 46, mostly fortune 500 companies all of whom are very much committed to addressing climate change. Most of our work at the Pew Center over the years and like most of the work that's been done related to climate change is focused on reducing emissions or mitigation but I think this phrase avoiding the unmanageable and managing the unavoidable does a good job of capturing the need for both mitigation and adaptation.

Slide 3: A two-headed approach to climate change

Steve Seidel: We need to avoid the unmanageable to mitigate by reducing emissions or we're going to end up with doubled CO₂ levels and well beyond what will be harmful to our society. But at the same time we know that given the emissions that have occurred to-date that changes are already occurring and therefore unavoidable and we've got to adapt to those changes. And we also know that even with the best efforts to reduce emissions in the near-term that there will be additional climate change that would be unavoidable.

Slide 4: The Role of Federal Government

Steve Seidel: So really we need a combination of both approaches in moving forward. Picking up specifically on the role of the federal government, I want to build on what Allison talked about before and that is that if you think about that all adaptation is local and what role really should the federal government play. Well the federal government has a direct role in terms of the vast assets that it is in charge of managing approximately 30 percent of the U.S. land areas is directly or indirectly managed by the U.S. government or at least in a stewardship relationship.

There are almost 500,000 structures, bridges, roads and so forth and the U.S. is also a huge landholder either through leases or direct ownership of property of critical infrastructure. But from the perspective of many of you and the state and local governments that you work for, the federal government's role is more in terms of setting standards and program guidelines much of what they do directly or indirectly impacts what you can or can't do. There is also a lot in terms of financial and technical resources that flow through the federal government. And then finally the federal government has a critical role to play in terms of bringing together different jurisdictions across different sectors and so forth.

Slide 5: A Call for Federal Leadership

Steve Seidel: And the first report we did at the Pew Center was Adapting to Climate Change, A Call for Federal Leadership. And this really set the stage for essentially saying that the federal government has really got to tie in what we termed sort of mainstream adaptation across federal programs. And I think that the Climate Change Interagency Adaptation Task Force that we've setup and the executive order on sustainability that President Obama put out has really jump start the program in a very positive way across the federal government. And you've seen just enormous activity in the last two years that you really haven't seen before across the federal government. And you know it really is just the beginning but it's a very good and important beginning that's occurred.

Slide 6: What Federal Agencies are Doing

Steve Seidel: And we've looked specifically of what federal agencies are doing in our second report which is the link is provided here and I would encourage you if you want more specific information that you can go to this to our pewclimate.org website or click on this link and look more at the specifics.

Slide 7: What Federal Agencies are Doing

Steve Seidel: Our report looks across 10 departments and 20 agencies within those departments and also across the executive office of the federal government. And you can see sort of the list of agencies on the right hand side of your screen. Within each we've tried to identify what major initiatives or strategies have been developed by the agency, what programs and institutional mechanisms have they been focusing on, and what tools and resources are they making available. And I would think the tools and the resources would be the things of most interest to you.

Just to highlight a couple of them here and then I'll go into more detail over the next couple of slides but for instance the Department of Energy is looking closely at the relationship between water availability and energy production. And that's certainly important not just from hydropower perspective but also in terms of fossil fuel, electrical generation, steam-based electrical generation and certainly nuclear power also. The Department of Defense is taking a close look at the Arctic particularly given the ice melting that's occurred there in the opening up of the Arctic waterways that's occurred over time, but they are also looking at the impact of climate change on some of their basic missions and the potential for environmental refuges as more extreme weather events occur throughout the world.

And then finally they also have vast installations about surprising the navy in particular, will be impacted by sea level rise but across the board the DoD is looking at their installations and the impacts of the various changes on those installations and what they can do to adapt to the changes. And then Health and Human Services is looking in working closely with the public health community to begin looking at heat stress impacts and early warning systems that might be developed and also the spread of disease vectors.

Slide 8: NOAA Initiatives

Steve Seidel: But now I want to look in more detail in just a few of these and I think a good place to start is some of the NOAA initiatives. And really why this is a good place to start is because in developing adaptation plans, one of the first questions that is often raised is well what are we adapting to, what types of changes are going to be critical to my community, I need to understand what those changes are in order to begin looking at where the vulnerabilities might be.

And NOAA has come forward with a proposal to develop something that they call Climate Services. And Climate Services was really this effort to provide the types of basic kind of data, products and information that the user community needs to begin looking at adapting to climate change. It has designed a new website, that's climate.gov that is meant to be sort of the go to website for that information. And over time they hope to expand the types of resources that they are providing and make them in a user friendly way. In addition to Climate Services and the website that they have been developing, they've also developed something called a Regional Integrated Sciences and Assessment team that Allison mentioned briefly.

Slide 9: NOAA Initiatives

Steve Seidel: And there are 11 of them now across the country which is shown on this map. And they are university based typically interdisciplinary research groups that have really focused on dealing with regional issues and analyzing the impacts on resource management planning and policy decisions that are most important to those regions. And I know probably some of you have been working with experts at the research and you know if you haven't, I would encourage you to get in touch and see if they have resources that might be useful for your particular needs.

Slide 10: NOAA – Coastal Adaptation Resources

Steve Seidel: In addition because both Allison and Jen, one of our later presenters are focused on some of NOAA's coastal efforts, I wanted to also just mentioned the Coastal Adaptation Resources that NOAA has up on their website and is very much working closely with the coastal – with communities on the coast that are impacted by sea level rise and changes in extreme weather and this is also very important resource that might be of use to you.

Slide 11: Army Corps Initiatives

Steve Seidel: Moving on now next to the Army Corp of Engineers, they play a critical role in probably most of your jurisdictions in one form or another. They are responsible for 11 million acres of public lands, 900 ports and harbors, 12,000 miles of commercial inland waterways, three percent of the electricity that's produced through hydropower. So very significant resources across our country. Their initiatives in the area of adaptation began with an interagency working group which was focused on water resources and they've come up with a report, a link on part of this presentation on climate change considerations and how they can be incorporated into water resource issues.

Like many agencies they are moving forward through the use of pilot projects and they are looking in a range of situations, reservoir resiliency, back bay flooding protection, and shoreline protection feasibility. It's really identified in those case studies what are the information tools that are required, what are the policies that either work or need to be modified. And then branching out from those pilot projects begin to developed new resources, new tools, new polices and guidelines that would be more broadly applicable. And then finally they also they also had developed guidance from incorporating sea level change projections into design and planning.

Slide 12: Department of the Interior

Steve Seidel: Next I want to talk about the Department of Interior. I think Allison maybe briefly mentioned the Climate Science Centers. These are an off shoot within USGS at their wildlife and climate center. There are now Climate Science Centers established in Alaska, Southwest, Southeast, Northwest and North central. The goal at least initially is to have a total eight of these regional centers to provide the type of climate science information critical with the focus because this is the Department of Interior on natural resource issues including managing the land, water, fish, wildlife and cultural heritage resources.

The Department of Interior is also developing a series of other I believe they are called Landscape Conservation Centers where they are working very closely with the user communities

to try to bridge the needs of the user communities with the climate science and information needs to begin addressing regional, again natural resource issues in those communities. And then in the Department of Transportation, they've developed and I think is a very useful clearing house which identifies potential impacts on transportation, infrastructure and they've developed working with state and local planning efforts, ways to better integrate climate change consideration into the transportation decision making process.

Slide 13: Department of Transportation

Steve Seidel: The Federal Highway Administration is also using this pilot project approach to look at developing risk assessment models which then could be used more broadly in evaluating what needs to be done to better adapt highway administration programs to climate change. Overall I'd say we've got a really good beginning but far more needs to be done importantly the work that you are doing at the state and the local level needs to inform the federal government as it moves from its first steps to its second and third steps in developing its adaptation programs.

Slide 14: For More Information

Steve Seidel: So I would just encourage you as I am sure you already have been doing but to make sure that your needs are clearly communicated to the federal program areas that you are working with. And over time I can say this developing in a way where more of those needs are met and the federal programs become you know better able to meet those needs. So here is our website for you to find out more information and please feel free to email me with any questions that you may have. And I thank you for your time and pass it back to Emma.

Climate Change Adaptation and the National Estuary Program

Emma Zinsmeister: Thank you Steve. And so folks who know that presentation had a lot of live web links in it. So when you have the opportunity to download a copy, please go ahead and refer to some of the resources that Steve mentioned. There is a wealth of information that's been embedded and we really encourage you to take a look to get some more details on some of those programs that may be of use to you. Now before I pass it over to Jen Pagach to give our case study presentation, I just want to do a small introduction. EPA was involved in the series of workshops that she will be describing to you that took place in Groton, Connecticut over the past year.

Slide 1: Title Slide

Emma Zinsmeister: EPA's Climate Ready Estuaries Program along with ICLEI Local Governments for Sustainability helped to coordinate these efforts. And although I am not a representative of the Climate Ready Estuaries Program, I am authorized to give you a little bit of background information since our colleague wasn't able to make it today. So I am just going to take a couple of minutes because I want the majority of time to be available for Jen, but just as background in case folks aren't necessarily familiar with the program.

Slide 2: Mission

Emma Zinsmeister: The Climate Ready Estuaries Program works with in from the National Estuary Programs to help provide assistance and thinking about adapting to the impacts of climate change.

Slide 3: CRE's local NEP partners (FY08-10)

Emma Zinsmeister: And as you can see here the map that just shows the 15 different, the CRE partners within the 28 National Estuary Programs. And this just sort of depicts the extent of the various watersheds related to estuaries that they are partnering with.

Slide 4: CRE funded projects, FY08-10

Emma Zinsmeister: And it's a type of work that the estuary programs funds tends to be vulnerability assessment, planning exercises, outreach and education with stakeholders and monitoring and indicators. And the work with the Groton project that you'll be hearing about, I just want to provide a little bit of background from the federal and EPA perspective is to why we were interesting in getting involved to the project and what we really saw as some of the opportunities here.

Slide 5: Background on Groton Project

Emma Zinsmeister: So the project that took place in Groton, known as the Long Island Sound Study was one that was well designed in terms of the collaboration and features between

different levels of government and stakeholders both within government and outside of governments.

Slide 6: Outcomes/Lessons Learned

Emma Zinsmeister: So it presented a good recipe for success building on that collaboration and starting at a small scale level with specific places and resources as the focus of the project and then looking towards the future to extend that work into a possible model or template that could be used in other communities across the state, across the northeast and potentially across the country. And you'll hear from Jen a little bit about their future plans to expand on the lessons learned from this project. And so the objectives of the work was essentially to provide a model of effective municipal level adaptation planning.

Like I mentioned that could be applied elsewhere. And EPA was involved to a extent that we did have one of our regional contacts (Noah Miller pushed the page a lot) in helping to engage in the discussions and want some technical expertise and support and a lot of some logistical work was also supported by ICLEI as I mentioned previously. And there are a number of successes and lessons learned that came out of this exercise and I won't go through all of this in detail here but just to point out the bullets that are sort of highlighted there with little arrows just really emphasize the point that a lot of adaptation work can be integrated into the processes which you already have going on at your state and local levels.

There are already been using comprehensive planning processes through which adaptation can be integrated just by simply asking the climate question and thinking about what climate change impacts may eventually have for implications for your operations. And so this exercise really emphasized that and also sort of hit home that everything is really local. The impacts that we'll be showing from climate change will be felt at the community level and the decisions and actions that need to be immediately taken to respond to those impacts are also very local.

Slide 7: Next Steps

Emma Zinsmeister: But it will take coordinated support from state level, the regional level and the federal level to really have a comprehensive approach to ensuring that communities remain resilient and healthy in spite of those impacts. So in terms of next step for as a result of this project, EPA is certainly continuing to work with other estuaries through the Climate Ready Estuaries Program. And we'll look at implementing some of the lessons learned from this project but excitingly enough the CRE program will be funding additional (working and Groton to) help to provide a toolkit that other communities can be using and we'll certainly hear more about that from Jen. And she will be continuing to work on that along with Missy Stults from ICLEI who is their Adaptation Manager to fill a lot of tremendous effort into this exercise, which is really going to serve to the great case study that I think you will all enjoy and benefit hearing from.

Slide 8: Contact Information

Emma Zinsmeister: So just quickly here is some contact information for folks who were involved in this effort that you may want to reach out to if you have questions, Michael Craghan is from the Climate Ready Estuaries Program, so is Jeremy Martinich, Jen who you will be hearing from, Missy from ICLEI and then Norm who was our regional contact.

Climate Change Adaptation Efforts in Connecticut and Beyond

Emma Zinsmeister: So that was just a brief introduction and now I will introduce Jen. Jennifer Pagach holds an undergraduate honors degrees in Geology and Philosophy and a Masters of Science in Geology with a graduate certification in GIS from the University of Connecticut. Her past position include, she was an environmental youth program coordinator in drinking water regulator at the Department of Public Health and she currently is at the Department of Environmental Protection and is responsible for climate change and the Long Island Sound Programs where she leads many climate efforts including the monitoring and State Climate Networks in Connecticut.

And as a public speaker on diverse environmental topics, she is also an adjunct professor of science and engineering for multiple colleges. So I would like to turn it over to Jen.

Slide 1: Title Slide

Jennifer Pagach: Thank you very much Emma and I can't begin to talk to that thanking everyone because I feel very grateful to be here today able to share with you this stuff, it has just been my efforts, it's really made possible from so many folks on the state, federal and local level, and I can't even begin so thank you all but I think you all know who you are. So hopefully some of you were tuning in and know that you appreciated for all that you do.

Certainly the big things, the EPA the Climate Ready Estuary Program that Emma, and I'll just shout out to Allison Castellan on because we are lucky enough in Connecticut to have her in our Coastal Zone Management Program working with us. So very, very lucky indeed. And so thank you all. We're going to start. I am telling you I talk really fast so if you need to put up on the screen slowdown Jen, please I can do that but I want to make sure we keep on time today. We've got lot to cover and I am going to start with Climate Change Adaptation Efforts in Connecticut and Beyond. This is actually a photo of the moon by my house. I think it's important for us to realize that there are bigger things that impact us locally and I hope this presentation if you're thinking about it and thinking about all the things that you can do for your community.

Slide 2: Tentative Agenda

Jennifer Pagach: So we're going to talk about you know I'll talk about some of the efforts that I've done in Connecticut and that other folks have been involved in and then of course the Groton project engaging all layers of government. I'll talk about challenges, opportunities and lessons learned and as well as resources and more to come.

Slide 3: Great Wave of Groton

Jennifer Pagach: So the great wave of Groton as I like to call it. I don't know how many of you are familiar with this, it's actually the first of the series of 36 years of Mount Fuji but most of all barely know that there is Mount Fuji in the background there, so I think that's in the state of climate change, there is things that seem big before we may kind of forget about.

And you'll notice that the way you've actually take that majority of the picture there is a three little boats here rolling with people in there bearing down. I'd like to think of that as state, federal and local governments trying to figure out how they are going to deal with this big issue, what are we going to do in the great force of nature. Are we going to calmly row coordinated or is there going to be chaos? So we get to create that ending.

Slide 4: Theory Behind Groton Project

Jennifer Pagach: So the theory behind the Groton process is really one of the different levels of government and how they interact, how does adaptation look on the ground especially in the coastal community, and you'll see that the work that we did was a benefit to any community but with the issues sea level rise that's really something that the coastal communities have to consider. What the local government really need, I think a lot of us lot of times thinking about what they need but do we really know what can we do meet those needs and can this much government coordination really occur. There is a lot going on and I'll speak to that later.

Slide 5: Spheres of Influence

Jennifer Pagach: So in Connecticut and other places there are also certainly different spheres of influence. Of course local government and state governments at the federal and national level as well as the residents. So sometimes we overlap, sometimes we don't overlap as much as we should and so we'll talk about that.

Slide 6: At the State Level: CT Adaptation

Jennifer Pagach: The state level in Connecticut we have, you know there was law that was passed that formed an adaptation subcommittee under the governor's steering committee on climate change. So like many states that are probably tuning in, we have high level state efforts going on. So its four adaptation subcommittees are agriculture and natural resources, infrastructure and public health. And a lot of their co-chairs attended the Groton workshop and have done amazing work.

Historically in Connecticut communication and adaptation have kind of been done separate. My agency and some of the other agencies the folks tend to kind of do their own things but you'll hear about the adaptation resource toolkit in the Connecticut climate networks are these other projects that Missy and I are getting off the ground in the next phase of funding. And so we're really trying to merge adaptation and mitigation in these efforts. And we're also including all towns in Connecticut and beyond and not just the coastal communities. So if you want to see the amount of information that Connecticut has, we do have a website, climatechange.com and you can contact myself and I'll point you in the right direction and some other folks that maintain that website and do some amazing stuff.

Slide 7: Why Groton?

Jennifer Pagach: So why Groton? Well, there is a lot of leadership and innovation that occurs in Groton. I've worked with them a lot when I wore my drinking water regulator hat and the research protection arena. They did a drinking water quality management plant. They have a climate taskforce. They have great GIS. They've had some flash modeling that they've done and we've worked on them on the CHAMP program which is coastal hazard and litigation planning projects. Groton is extremely politically complex when I refer to the town to Groton, I mean the town of Groton, the City of Groton, Groton, Long Point, and the Fire Districts which were yet for all kind of separate entities in one communities.

So if there was any place that we were going to, it was there just so that we'd never have to be that hard again. And also it's the southeastern economic hub, there is a lot of water dependent uses, tourism, there is a naval base, have an amazing history in Groton and it has a very great future. But I am sure a lot of you that have coastal areas really a lot of our economy is coastal and it is extremely at risk.

Slide 8: At the Local Level: Groton, CT

Jennifer Pagach: So on the local level, OK, as I mentioned we wanted to unite together federal state and local stakeholders to discuss strategies for increasing coastal resilience. We wanted to focus on the respective world of each agency can fill and provide recommendations on the next steps for all levels of governance. And then after those workshops we were going to have a presentation to the town council and a final report that would help share the lessons learned with other communities.

Slide 9: Groton Coastal Climate Change Adaptation Workshops

Jennifer Pagach: So throughout the process, we had over 95 state, federal and local government representatives, folks from academia, folks from nongovernmental organizations and the Groton Climate Task Force. It was really amazing how many people came. We were really honored at all of the interest. The first workshop really focused on the science, the second on how we're vulnerable and then the third was really on the strategies enrolled plus we gave out conference call homework because Missy and I are mean like that. We also showed the coastal hazards website CHAMP and inundation scenario, new UCONN Surge modeling. We had guest speakers from Rhode Island as they have laws that actually require buffers and are now recognizing the sea level rise range and that range to be revisited.

And also we're extremely fortunate to have some folks do financial modeling about our patients and then also New England Financial Institute and Paul Kirshen from Battelle graciously came and volunteered their time and efforts to show us some modeling of adaptation efforts versus and those costs associated versus not doing anything. And so we were actually would have dollar amounts to the town and the town should be able to show people that there was actually a cause of not adopting. So it was really, really amazing. And as Emma mentioned, we had a lot of folks from federal government attended as well and the expertise in the room, it was just amazingly, we're really lucky.

Slide 10: Plans Always Change

Jennifer Pagach: Plans always change. So we had all these workshop based inline but Mother Nature had other plans. The first workshop was planned for December 9, we had a nor'easter. I headed to Tampa for those of you who are not from New England a nor'easter is a usually wicked snowstorm that occurs. And they were teasing me that I shouldn't be allowed to pick workshop dates any more but they still allowed me.

Slide 11: Workshop 2: March 30, 2010 500 year storm event

Jennifer Pagach: Now workshop two, we had a 500 year storm event, there was actually extreme flooding in the (upland), we still we later declared a disaster in several of the Connecticut counties and all throughout New England actually and coastal New England.

We still held the events. There were some delays, there were couple bridges washed out. The folks from Rhode Island had to stay home, I don't know why they didn't want to pass the unpassable bridge they could have come by boat but well gentlemen from CTDOT, John DeCastro, who was due to present that day some of the being from Department of Transportation he was going to present on some of the problem in rural areas in transportation issues in Groton. Well guess what, he got to go out do some amazing new photos and you can see one there. So there is really a clear message of how we're vulnerable.

Slide 12: Not Yet...

Jennifer Pagach: So this is my photo of why they did not let me take the third workshop because we could have some brand new combo of natural weather disasters occurring. So hopefully we don't have to worry about that.

Slide 13: Identified Vulnerabilities

Jennifer Pagach: So at the second workshop we really worked on identifying vulnerabilities. We had some of the major ones that were identified or more frequent coastal flooding, fewer overflows, lots of coastal habitats and resources, more coastal erosion, reduced drinking water quality and supply, not only from salt water infusion but flooding issues and released access to key areas.

So we came up with lot more than that, so I encourage you to always bring together the people that the (host) areas of expertise have multiple areas of expertise and really let – you know present them with the impact and potential sorry, present them with the potential climate impacts and really let them give you information about what got involved because you can really get far.

Slide 14: Challenges: Climate Change is the Great Aggravator

Jennifer Pagach: So challenges, I see climate change as the great aggravator, the folks from EPA tell me I should click at this patented this phrase. But we have so many challenges that we face.

Connecticut is although different than other parts of the U.S. and that the land use decisions are really made locally. We have a (home rule states that the accounts) make the decisions the majority of the decisions regarding land use and other things. So they need our ear and our support because they don't always directly get from the state or federal government what they need. There is also many things, we don't control enough now and these issues are going to continue to be exacerbated through climate change. So vulnerable areas in the future are the problem areas now. And guess what, climate change is already costing us money. There are also social and economic issues. There are certain limits of adaptation, there is this hazard with perception that someone probably the government is going to come down now or it's not my job to think about this stuff or deal with this that would be taken care of.

So there really is a lot of issues in putting the time scale versus risk issue which is not in your political term or your lifetime or you perceive it not to be your immediate concern, you're not going to deal with it.

Slide 15: Lessons Learned

Jennifer Pagach: So some of the lessons learned was that these folks at our workshop really already knew about climate science, we were really impressed. We could have probably paired that down a little bit but they encourage you to first maybe survey your potential audience a little bit better just to make sure we'd had some issues at the public hearings on the state level. There was some climate skepticism so we anticipated we'd have some problems that we didn't have at all. These folks were amazing. Also as modeling, we realized that all we have these certainly different models that you can use and everybody developed what, now what we've realized is we already know what's vulnerable. It's what an issue now and it's just getting worse.

Another thing that's really, really humbling you know Missy and I have been putting this workshop together bought up and down flow of communication with what needed. We thought the federal and the state and the local and that was important but what we realized was before lot of communication was really needed to. Also there were some amazing things that came out of this I'll get to that later. Both federal and local discussions of support are so important and there were so many resources on the federal level that it's really amazing and to encourage people to tap into that.

And then it's really become a national interventional model because coordinating the government that's a crucial approach.

Slide 16: Pyramid Scheme

Jennifer Pagach: So this is where we have our – a cup of little last for the day. I want to talk to you about the whole idea of pyramids scheme. We realized that the conference call, I think that can help the homework assignments helped to coordinate within layers. Just in Connecticut we have so many different state agencies, Department of Transportation, Office of Policy and Management, Department of Insurance, Department of Public Health. And within my own agency of Department of Environmental Protection we had six different segments and four bureaus involved. So you can just imagine how much communication was or was non-occurring

before this that really should have been occurred or been occurring for climate adaptation to happen.

Slide 17: Pyramid of Communication Before...

Jennifer Pagach: So how can the federal government or even local reach all these folks up and down this pyramid scheme without a coordinate process? So I like to call it the pyramid of communication. Before the Groton project this was kind of a pyramid of communication before, now for those of you who can read Sanskrit, I cannot. So this was a mystery to me. How we were going to get all of this communication going?

Slide 18: ...During...

Jennifer Pagach: And then during I like to compare this with the food pyramid and now I realized that monthly to meet the things that you only want to eat you know it's only really a special treat is the federal government. Those are the people that you really only want to contact monthly, hold out for when you need a big favor, big grant money or some big level initiative because they are busy doing lots of important things.

Now as far as weekly those are the local and state folks that you're going to contact weekly. Probably I would say not just your state but other state agencies because there is some amazing work going on regionally and nationally. Also when you get down to the daily, those folks that we call daily are probably the academics, the nongovernmental organizations, some of the other regional folks, those (first) and not unintended are those other employees within my agency that I would to help doing for guest speakers or to help with the workshop. And then the project team that's probably the right stuff, six servings a day was – you know Missy and some of the other folks. You should probably add in a therapist here, I would recommend that if you're going to do a process such as this.

And then you have your daily physical activity, you better be beating your feet and occasionally I am not going to allow, you're going to beat your heat on the wall when you undertake a big project like this. Last when they say moderation but I am sorry.

Slide 19: ...and After!!

Jennifer Pagach: So anyways after though, after you go through a process such as this the communication or the pyramid of communication, you can actually make it work for you. So really those top – folks at the top of those federal government folks, those are the folks that you used sparingly but have amazing resources for you. The milk and meat group of those folks under some of those issues and maybe willing to work with us. The fruits and nuts are the people that are always work, already working with us knowingly because they have to be a little bit after you know a little bit nuts to help us out.

And the grains are those folks who were doing existing efforts that we can actually see an adaptation into. So believe it or not there is already a lot of these grain groups occurring that you can just kind of feed your efforts into and it will go a lot further.

Slide 20: Next Steps

Jennifer Pagach: So as far Groton, the next step and you'll see this in our report coming out, the challenge is going to continue to develop their adaptation work. In Connecticut, we're having a huge budget crisis I am sure that's not unfamiliar to people elsewhere. And what we've really realized was they may not be able to dedicate certain town staff or huge channel and efforts to do it but there is other things that they could feed into that they actually have in Connecticut for a program, a sustainability program with the community colleges and we've on a state level earmark some funding that we get to actually do internships.

So we can pay our community college student to actually work with a local community in Connecticut. They get internship credit and they get paid in the town actually get the climate project out of it. Well Groton is looking into doing something like that in place of not having staff that they can dedicate to this because actually had to cut some of their staff because of the budget issues. They are also going to work on conducting the timeline vulnerability assessment that might be well enhanced as they can do that. And also to integrate climate considerations into existing and future community plans, in Connecticut we have the state and then the local conservation and development which drives land use. So they are working on that.

Again that iterative process is so important. There are exploring opportunities for flood-proofing in existing structures and discouraging building in vulnerable locations. They are going to continue to refine their outreach strategy to continue sharing their experiences other communities and that we only had the joint council meeting to rollout the workshop results, it was really amazing, how many folks in the community came in, almost 40 people attend and they kept saying how we're going to share this with other communities. And we said well you tell us, we want to do that.

Slide 21: Groton Project Inspired Actions

Jennifer Pagach: So through the Groton process you know we inspired our own state agency, the DEPs and the state parks they've performed a vulnerability assessment in all their coastal properties. So I work in office of Long Island Sound programs, we started an internal climate change group where we could do a self inventory of policies.

Slide 22: The Wave of Interest

Jennifer Pagach: And that with respect to adaptation how those works. The Connecticut climate network that we launched and the adaptation –there was toolkit for Groton and beyond the Connecticut climate network just for communities to come and eat and talk about what they are doing and think of strategies and see what's available. And was featured as a case study success of having government steering committee report to the legislature just coming out at the end of this month. And then Groton is actually receiving adaptation that they are visiting mechanisms, some of which we already mentioned. And we've been highlighted it many, many workshops as a model. This is just a list of some of the places worldwide and within the U.S. and other places that has already been mentioned out.

Slide 23: High-Level Lessons Learned

Jennifer Pagach: Some of the high level lessons learned in critical support is so important. You have to integrate into existing planning efforts, you got to coordinate, think of what you already have and work incrementally, integrate with existing priority, timing matter, find the interest are, and find the nexus and build on that. Also don't underestimate people, you know some people think because what someone else is doing is completely different from them, maybe they're in public works, maybe they didn't know how to speak our environmental they won't understand or they won't care or that's really not true but don't value how difficult and challenging it is to find effective ways to build resilience because there is no silver bullet.

Slide 24: What have we learned all together?

Jennifer Pagach: We do have an opportunity to rise to the challenge but sometimes it changes, some processes can be a little bit slower than we think they should be. But we already do know a lot were vulnerable, we have a lot of partners and initiatives that can merge. And I mentioned the Connecticut Climate Network.

Slide 25: CT Climate Network

Jennifer Pagach: We're really working to pull the towns together, what could we all learn from each other. This will help us in next phase of funding when we develop the adaptation research toolkit.

Slide 26: For More information...

Jennifer Pagach: And for more information I've got a bunch of links here so you can look up at that later.

All the workshops are on the ICLEI and the Connecticut climate change website, the presentations and the videos. We've got an outlook of issues with that over I'll give an overview of all of the climate efforts lately than have been going on in Connecticut.

Slide 27-29: ICLEI website, CT Climate Change website, Sound Outlook website

Jennifer Pagach: This is the ICLEI website, this is the Connecticut climate change site, that's the (sound) outlook.

Slide 30-32: ArcUser Magazine Screenshot

And then Paul Cretien in modeling work was featured in our ArcUser Magazine so you can read about out that view those financial impacts.

Slide 33: In Closing

Jennifer Pagach: And in closing we have many resources, we have each other if we listen and coordinate. We can leverage our efforts and continuously add and adapt to adaptation. On a positive note that I am watching a show on I believe it was Nat Geo and they were talking about species variability with all the different species that we've evolved from and Homo habilis is actually what we've evolved from there was also Homo erectus and other species. And some inter colleges and scientists are looking back and they are realizing that the brain of Homo habilis is larger and very different than the other species. And all the other species eventually died out and they realized that Homo erectus and others live during a period of extremely moderate climate, it was very steady climate. Things were pretty much the same but Homo habilis actually was around in a period of extreme drought and then flooding and was extreme climate variability.

Slide 34: Questions?

Jennifer Pagach: So we're hypothesizing that. Human beings have actually evolved to adapt to changing conditions but that gives me hope in the work that we're doing. But I have to tell you that even though it's great now that everyone is realizing climate change really is a real. There is a lot of work to be done. So we've still have to shut up and paddle. So thank you very much.

Emma Zinsmeister: Thank you Jen. There is a lot of great resources associated with Groton case study. So I do encourage folks to go over the ICLEI website to go to the Connecticut climate change website and also to check back for when the final report is posted. And we can certainly share that with that folks when more materials come out.

Questions and Answers

Emma Zinsmeister: So thank you to Jen and to all of our speakers. I believe we have a few minutes left just to take a couple of questions and as I mentioned any questions that we are able to get to today we will get you answers in writing until this is on our website and we will of course announce when all the materials from the webcast are available. So I guess we'll go ahead and take some questions, Lauren, if you want to kick us off.

Lauren Pederson: Great, so Jennifer there were a couple of questions about financial modeling that you did, and the first question is the financial models that you mentioned publicly available? And the participant is referring to the financial models of adaptation from New England Environmental Finance Center and Paul Kirshen.

Jennifer Pagach: Yes, We I wouldn't personally – I do have copies of what they did but rather than me directly share them, you know in my presentation I have the link to the article and the (SRI) ArcUser magazine which is an ESRI publication that has a bunch of information there and if that's not enough I would encourage you to contact Sam directly. I know some of his research maybe he may not want to directly share but I am sure he'd be able to share with you how he kind of type down. And then if someone just wanted to know in general more about it they could feel free to call me, note that I gave my number but it's 8604243295 but I am sure Sam and Paul would be happy to talk to people directly as well.

And you can actually watch the webcast on the ICLEI (and CT) climatechange.com websites and see in their words how they did it.

Lauren Pederson: OK, great thanks. And then the next question is related to financial modeling. Can you provide some additional detail on what went into your assessment of cost to not (adopt things identified) potential climate impacts and did that economic assessment help to motivate action?

Jennifer Pagach: Well you know again I don't want to speak exactly to how it was done but I could – I'll give an overview. So basically what they did was they through our state GIS and through town of Groton GIS modeling and then knowing U.S. Army Corp of Engineer building damage they could super impose different events, so then we did 10 inches of sea level rise and our 10-year storm something like that. Then using the tax based fossil based data, the value of the properties they could get an estimation of how much damage would happen when one of those type of storms occurred. Again if you read the article and watch the presentations you can get so much more information that I am sharing but basically what we did is we worked with the talent and with the folks in the workshops to pick some areas that were vulnerable.

We picked downtown Mystic which is anybody that went to Connecticut has gone to Mystic Seaport and Mystic Village and gone to the – on the ships and all that so the huge downtown shopping and you know being a historic area. So that was one of the areas that we looked out that would be very vulnerable to flooding. We also picked a parcel that was undeveloped and we looked at what would be the issues involved value as a buffer.

And then we also looked at some other areas in the town. And then we had some folks come and actually talk to us about what some of the adaptation strategy could be to protect those areas and then during the workshop people kind of selective what the things they wanted to be see modeled where. And then they did some more crunching Merrill and his team talked with more crunching to figure out what the cost would be. So you could definitely take, if you didn't do anything, if you didn't put out any kind of barriers for the storms, you didn't do anything what would that storm cause a relatively amount of property damage versus if you did do something.

So this is actually – their project was actually funded by EPA. So I know that they've been working with some other communities that you can get more information from them as well. And Sam Merrill with the New England Financial Institute, it's actually out of Maine.

Emma Zinsmeister: And we're actually...Really close on time here. So I understand that folks on the line listening in may need to go. And if you do please consider taking a few minutes to fill out our optional survey at the end and tell us what resources you need and what challenges you are facing with adaptation. And if folks can stay on for just another couple of minutes, I think we have time we can probably do one more question per speaker and then we'll address the rest in writing.

Lauren Pederson: All right, the next question is Steve Seidel from the Pew Center. It sounds like there are a lot of great projects in different federal agencies but list of the projects you mentioned were not in the agencies. What kind of issues or information do you think are required for coordination between federal agencies?

Stephen Seidel: Yes, that's a really good question and clearly a lot of these areas cut across different agencies. The way we structured our reports, we list it by agency but when you get into the details when you actually look at the description you'll find that for the most part, a large number of these initiatives within agencies involved other agencies. So for example the Department of Interior and NOAA entered into an interagency agreement to make sure that they are fully coordinating the regional efforts on the part of NOAA with the Climate Science Centers, the regional efforts on the part of the Department of Interior.

So there really has been a great deal of interagency coordination even within the activities that have occurred to-date.

Lauren Pederson: OK, great. Thanks Steve. And then our last question for Allison. What progress has been made on the Federal Adaptation Task Force recommendation to develop a national climate service? Is it more than just the online data clearing house?

Allison Castellan: Yes, it is more than just a online data clearing house. And actually that's just one thing sort of aspect of that that I mentioned in our conversation today. But it is much broader and we're working on to sort of build off of Steve's response as far as improving coordination among all the federal agencies at the national level or beginning to have discussions on how to although a lot of – there is as Steve mentioned a lot of interagency coordination on service projects already going on. We're working to improve that further that will help feed into

creating much more of a united national approach to both the services we provide on climate change and climate change adaptation as well as improved science coordination as well. And then our continuing ongoing discussions related to that to move that forward.

Emma Zinsmeister: OK, I think that's all we have time for today. Thank you again to all of our speakers for your time and contributions, we're glad that you were able to come and share your expertise, knowledge and resources. And thank you to everyone on the line for tuning in. If you haven't been able to participate in parts one and two of the webcast, please do check out the files on our website, you can listen to the audio and hear the presentations there if you walkthrough the slides. And we'll certainly announce through our Listserv when the materials from this webcast will be available as well.

We hope that you will continue to join us on future webcasts. And please take a minute or two to look at our survey and let us know what you think about future topics and your needs and challenges that you're working on adaptation in your communities. So thank you. And we look forward to having you join us again soon.

Operator: This concludes today's conference. You may now disconnect.

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