

# Climate Change Adaptation for State and Local Governments Attracting Funding for Adaptation

Webcast Transcript

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## Contents

Webcast Agenda and Meeting Logistics.....	2
Poll Question #1.....	6
Funding Strategies for Adaptation: Examples from the Water Sector .....	7
Poll Question #2.....	13
Tracking Adaptation Efforts .....	14
Poll Question #3.....	17
Climate Change and Public Health Adaptation .....	18
Integrating Adaptation into Public Health: Case of CA Dept of Public Health .....	26
Poll Question #4.....	27
Integrating adaptation in hazard mitigation planning efforts.....	28
Poll Question #5.....	36
Questions and Answers.....	37

## Webcast Agenda and Meeting Logistics

### Slide 1 and 2: Introduction Slides

Operator: Good afternoon, my name is Rachael and I'll be your conference operator today. At this time I would like to welcome everyone to the "Attracting Funding for Adaptation" conference call.

All lines have been placed on mute to prevent any background noise. If you should need assistance during the call please press star then zero and an operator will come back online to assist you.

Ms. Zinsmeister, you may begin your conference.

Emma Zinsmeister: Thank you, thanks to everyone on the line for joining us today. My name is Emma Zinsmeister and I'm here with EPA's State and Local Climate and Energy Program.

Today's Webcast will be focusing on attracting funding for adaptation. This is the last of our three part series on climate change adaptation for state and local governments.

### Slide 3: How to Participate Today

Emma Zinsmeister: For today's Webcast you can participate by using your Go To Meeting control panel. You can open and close the panel by clicking on the orange arrow that points to the right. In order to hear the audio you do have to dial in today at the number listed.

Please note that all of our participants are on mute so if you have questions for our panelists as they give their presentations, please type those into the question pane on the control panel and hit submit to send them. Be sure to indicate which panelist you'd like to have respond to the question and we will direct them to the appropriate people during the question and answer session at the end of today's Webcast.

If you experience any technical difficulties with Go To Meeting, Lauren Pederson from ICF International is on the line assisting us and you can e-mail her at [lauren.pederson@icfi.com](mailto:lauren.pederson@icfi.com) and she can assist you.

### Slide 4: Adaptation Webcast Mini-Series

Emma Zinsmeister: As I mentioned today's Webcast is a conclusion of a series that we've been doing. In our previous calls we covered "Achieving Buy-in for Adaptation" and "Overcoming the Uncertainty Barrier to Adaptation". Audio recordings and copies of the presentations from all of these Webcast will be available online at the link listed below which takes you to our State and Local Climate and Energy Program Website.

### Slide 5: Webcast Agenda

Emma Zinsmeister: We have a full agenda today and before I go through the agenda I just want to mention really quickly that unfortunately our speaker Paul English from the California Department of Public Health will not be able to join us. Folks should have received a copy of his presentation in the materials that were circulated earlier. So, you will be able to see his content and hopefully we can get him on the line for a future presentation.

But for the agenda today I'll kick things off by providing a little bit of background information on the topic and some links to resources you may want to check out after the presentation. We'll then hear from Lynn Broaddus of the Johnson Foundation about developing funding strategies for adaptation focusing specifically on some examples from the water sector.

Scott Burgess from the Center for Climate and Energy Solutions will provide a quick demo of a new database tool that they're developing to help track what's going on with adaptation options at the city level. We'll then hear from Gino Marinucci from the Centers for Disease Control and Prevention about some of the resources that they're developing to help states and cities develop climate adaptation funds that focus on health.

And then we'll hear a case study from Alessandra Jerolleman and Kelly Klima of the Natural Hazard Mitigation Association about how adaptation can be integrated into hazard mitigation planning efforts. At the conclusion of our presentations we'll have a facilitated panel discussion with all of our speakers. And then we'll take questions from the audience.

And as we close today's Webcast and you exit Go To Meeting please note that you'll have the opportunity to respond to a brief questionnaire to provide us with feedback on ways in which EPA can help your community or states as you pursue adaptation. So, please take the opportunity to provide us with some feedback that helps us plan how we can further support your efforts.

#### Slide 6: Brief Background

Emma Zinsmeister: So, just as some brief background today, in the series we've been focusing specifically on climate change adaptation, which is distinct from mitigation. Mitigation efforts focus on reducing emissions of greenhouse gases in order to slow the rate of climate change. Whereas, adaptation efforts look at how society can respond to the impacts of climate change whether that's moderating the harm of negative impacts or capitalizing on opportunities presented by potentially positive impacts.

You're probably also familiar with the term hazard mitigation, which is what Alessandra and Kelly will be talking about later on. That falls into this adaptation bucket and they will provide some more distinction on that terminology during their presentation.

#### Slide 7: Example Adaptation Planning Process

Emma Zinsmeister: So, during our Webcast series we've been kind of running through different components of an adaptation planning framework. And as you can see during our first call we provided some information on strategies for communication to build support.

And on our April call we focused on planning and how information on climate change can be used even in the face of uncertainty about impacts. And we're completing our series by focusing on how we can fund this effort. As folks know, there're not a lot of explicit funds out there for adaptation and budgets are tight. So, we're really presenting how you can think about working across sectors so that you can get the most impact for the resources you have available.

Slide 8: Appendix of Resources & Contact Information

Slide 9: U.S. EPA's State and Local Climate and Energy Program

Emma Zinsmeister: So, I'm just going to close up by mentioning that there's an appendix of slides at the end of my presentation that includes links to a lot of resources that you'll want to check out in your own time after the call today. Just some background on the State and Local Climate Energy Program and what we have to offer.

Slide 10: Adaptation Funding Opportunities

Slide 11: Adaptation Funding Opportunities (cont)

Emma Zinsmeister: Some links to explicit sites that cover funding opportunities that maybe useful for you in your adaptation efforts. So, please check these out they will often post announcements of requests for proposals for grants that come out that maybe relevant to your work both at the federal level and more local sources.

Slide 12: U.S. EPA Adaptation Resources

Slide 13: Additional Adaptation Resources

Emma Zinsmeister: And then just some information on resources from EPA and other organizations that provide planning frameworks for adaptation, data on climate science, case studies and things that you may find useful.

Slide 14: Contact Information

Emma Zinsmeister: So, here's my contact information and I encourage folks to reach out if they have any questions about the resources or Webcasts that we've provided and I'm also interested in hearing from you about what your state or community is doing in terms of adaptation and how EPA can support those efforts.

Slide 15: Webcast Agenda

Emma Zinsmeister: So, please feel free to reach out to me and with that we'll be diving into the meat of our Webcast today.

## **Poll Question #1**

Emma Zinsmeister: We're going to start with a quick poll question to get a sense of who we have on the line. So, Lauren, if you wouldn't mind pulling up the first poll question?

Lauren Pederson: Sorry, and it's up on the screen. So, what is your level of experience or familiarity with climate change adaptation and please select one from the list.

Emma Zinsmeister: OK, hopefully that's enough time for folks to select their answers. If you wouldn't mind, Lauren, just giving us the results?

Lauren Pederson: Sure, the results are that 5 percent are not sure how adaptation is different from mitigation, 6 percent considered it but have not taken action since it's controversial, 32 percent considered it but have not taken action due to lack of resources, 36 percent have started to take action and identified that or initiated a project, and 22 percent have completed at least one project.

Emma Zinsmeister: Thank you, so it looks like folks on the line have some experience with adaptation implementation in their communities. Hopefully the presentations today will help clarify some of the distinctions between mitigation and adaptation, and how folks deal with the question of resources and come up with some strategies to maximize the opportunities that they do have available.

# Funding Strategies for Adaptation: Examples from the Water Sector

Slide 1: Title Slide

Emma Zinsmeister: So, with that we'll into our first presentation from Lynn Broaddus. Lynn joined the Johnson Foundation at Wingspread in December 2008 and she's responsible for shaping the Foundation's environmental programming with an emphasis on the fresh water crisis facing the United States. Much of Lynn's work is focused on leading a diverse set of stakeholders to issue a call to action on U.S. fresh water challenges.

Prior to joining the Johnson Foundation, Lynn served for six years as executive director of Milwaukee Riverkeeper. She also spent 12 years working for The Nature Conservancy and NatureServe, where her role of Director of U.S. Network Partnerships focused on negotiating data sharing agreements around the nation's Natural Heritage programs.

Lynn holds a Bachelor's degree in Environmental Science from the University of Virginia and a Master's in Business Administration from the University of Wisconsin-Milwaukee. She has a Doctorate in Botany and Genetics from Duke University. And she serves on the boards of Riverkeeper Network and the Nelson Institute for Environmental Studies at the University of Wisconsin-Madison. So with that, Lynn, I will turn it over to you for your presentation, thank you.

Lynn Broaddus: Great, thanks, Emma. The – the Johnson Foundation at Wingspread, which is where I work, we're here in Racine, Wisconsin. We focused much of our work over the last four or five years on – on U.S. fresh water sustainability issues.

Slide 2: What does adaptation mean in a water context?

Lynn Broaddus: And if there's one thing we've learned from this it's that water and climate change are inextricably linked. Some of the most concerning aspects and impacts of climate change are felt through water and many parts of the country are already experiencing these through more intense rainfall events, record flooding. It can also bring with that increased erosion and pollution, more sewer overflows, changes in water born disease patterns and this sort of thing.

We're also experiencing increased periods of drought, even in parts of the country where total participation isn't changing. And on top of that our electric grid is highly dependent on water, whether that's for cooling the thermoelectric power plants or driving hydropower plants. And peak electric use is likely to occur during heat waves at times when water resources are likely to be stretched at their limits.

So, it's entirely possible that the greatest need for electricity will happen when water is not available to – to – to run those power plants at their – at their maximum, which can lead to – to

quite a challenge with the picture that's up here in the top of this Power Point the – during a heat wave not having the electricity to run the air conditioners to take care of those who are really vulnerable.

### Slide 3: Green Infrastructure

Lynn Broaddus: The – so from a water perspective adaptation largely means slowing down the water as it falls, doing a better job of storing it and cleaning it for future use all at a time and a manner that uses less fossil fuel. So, in terms of what that means for adaptation in a water context that we tend to think in terms of green infrastructure and that includes everything from natural corridors and protecting our natural infrastructure, creating wetlands, or restoring wetlands to absorb rainwater.

It also includes beefing up our built environment so that it can mimic and recreate some of the natural infrastructure that was there originally, whether that be through green roofs or permeable pavement. This picture you see in the bottom right of the screen is from Harley Davidson here in Milwaukee, they have permeable pavement and grass pavers. Their museum is right along a river and so they've done a lot to help with stormwater absorption.

### Slide 4: Rainwater Harvesting

Lynn Broaddus: Much of this work is done for water quality purposes, not necessarily specifically being driven by concerns around adaptation but concerns with water quality. It also includes – adaptation also includes finding ways to capture water for future use.

That can be in rain barrels and cisterns but it can also include expediting ways for rain water to recharge subsurface aquifers. Ground water recharge can help in the general sense insuring base flow for urban rivers and streams during times of drought. Also through cooling the water before it enters the streams, that helps in terms of fisheries, habitats and water quality, but also can be absolutely critical to being able to cool thermo electric power plants.

In Los Angeles we're seeing pioneering efforts to capture that stormwater in a large scale to be able to use as part of their water supply. That is the picture you see in the center of the screen is an infiltration bed in Los Angeles where they're really trying to engineer and track the success of this and the ability to use their rain water for eventual water supply.

The Urban Ecology Center in the bottom left of this screen is one of a growing number of structures in the U.S. where they're going partly off-grid with water, capturing rain water to use for non-palatable use such as flushing toilets and outdoor water use.

### Slide 5: Balancing Act

Lynn Broaddus: But the question on the table today is really around how do we pay for this work? In the case of water adaptation, most of the work to date has not been driven by concerns about a change in climate but by concerns about compliance with the Clean Water Act. And here, you know, the six percent of the people who responded to the poll that they haven't yet



taken action because of the controversial nature of climate change. Doing water adaptation work is a great way to accomplish your adaptation needs and goals without having to raise any questions about climate change.

There are legal requirements to do this work, either to reduce sewer overflows or to – I’m sorry about this – to meet new stormwater regulations that are rolling out for municipalities. But the question is how to do it in a way that doesn’t break the bank?

Finding money to do this work is never easy but it has become more and more evident that the least cost way to meet Clean Water Act goals is with the use of green infrastructure, both engineered and natural. But paying for it – figuring out and paying for it is certainly a balancing act.

There are different phases of the work planning it, executing it, and maintaining it, and many times these are not clear boundaries between these things. There’s the issue of scale whether it’s at a very site specific project all the way up to state planning and of course everything in between.

As far as how to pay for it, one has to think both about the financing of it and then actually where the money is going to eventually come from in the long term. In terms of financing sometimes there are cash reserves, especially on the part of a water utility or a city. Generally not enough to pay for any kind of large scale project but this can be enough for planning or getting some of the initial work going.

Other routes are either through loans or sometimes through grants, either federal grants or private grants. How to pay for it in the long run? Certainly there are tax levies, whether that be property tax, sales tax, fixed districts, rate payer fees. They generally fall in one of three categories; water fees for, you know, drinking water; sewer fees or stormwater fees which more and more places have.

And then of course there’s, what I call, other people’s money. That includes foundation money but it also includes money from other agencies or other levels of government or even match money in terms of volunteer labor.

#### Slide 6: Getting Climate Smart

Lynn Broaddus: Now depending on, I don’t know if I’ll be able to get through all of the examples in the presentation, but if you have – put this resource out here as one stop shopping. It’s hot off the press. I wasn’t aware of it when we first started planning this Webinar, but this report was released by American Rivers and NRDC, and you can find it through either one of their Webpages. It’s an unbelievably comprehensive resource to walk you through planning.

But then it also has an appendix of funding resources, and as you see from the title it’s a guide for state action but it seems to be in my reading of it that it’s very applicable even if you’re working for a municipality or a watershed. No matter what your perspective I think this will be a really important resource.

But the – that – this long appendix has an incredible treasure trove of funding resources from federal and state governments for – and they break it out by different plan– whether you’re in the planning stage or the implementation stage for – for these projects. And I highly, highly recommend that report.

#### Slide 7: State Revolving Fund Loans

Lynn Broaddus: A typical way though to pay for some of this water infrastructure is with EPA State Revolving Fund loans, which are passed through to – in most cases passed through to the states and the water utility or a municipality can apply for these funds. In the – originally most water infrastructure was paid for with grants through the federal Clean Water Act. But in the last decades, the grant sources have really been cut up, for the most part these are low interest loans provided to the state that can be used for water infrastructure.

But in the last two years or so there’s been, largely through the work of – advocacy work of American Rivers and NRDC there’s been a fund set aside for green infrastructure which includes water efficiency and energy efficiency. So and I think in a – in a number of states those Green Reserve – the Green Reserve has not been fully utilized so that money is something to really look at for – as a source for funding.

#### Slide 8: Look to Foundations and NGO partners

Lynn Broaddus: You can certainly also look to foundations and private partners and NGO partners, the – you know, it takes some time to develop a relationship to access these funds. But there has been some really remarkable example of where foundations and NGO partners have played a really important role in the adaptation work.

Recently the Cleveland foundation awarded \$400,000 to Cleveland’s sewage district to help with their – the region’s sewer plan. The sewage district was allocating around \$3 million – \$3 billion rather for their work and the Cleveland Foundation gave – has given significant funding there to create the green aspects of that plan.

Foundations and NGO partners can also be really important in terms of convening and bringing people together to help get buy-in for the plan and help develop different aspects of the plan. The Nature Conservancy and NRDC have been doing some really monumental work in piloting novel ways to finance stormwater retrofits.

They focused on Philadelphia but the hope is that their concepts can go broader. And their idea – they’ve been working on ways to bring private dollars to do stormwater retrofit work on private property. Frequently the public dollars are not available to do this work and so I recommend that you take a look at that.

#### Slide 9: Stormwater Fees

Lynn Broaddus: In particular in stormwater fees in terms of, you know, to pay for this in the long run, municipalities who have looked at this in a way, not only how to pay for the stormwater, but how to drive incentives to treat stormwater on site. So that the – those who are doing a good job will just pay less.

Philadelphia has led the way in this work. They have gone from stormwater fees that were tied to how much water you use, so in other words a hospital would pay a lot and a used car lot with a huge impervious surface would pay very little.

They've switched it so that the fee structure is based on your impervious surface and other cities have looked at these kinds of models and found that they're a much fairer way to pay for stormwater in the long run, and drive the kind of behavior that they want.

You can go to this URL and learn more about how Philadelphia has done this. I know Lancaster, Pennsylvania is another place that's done some really thoughtful work in this area.

Slide 10: Partner with other agencies, share costs

Lynn Broaddus: Certainly partnering with other agencies, for instance transportation agencies, transportation surfaces takes up as much as 25 to – well more than that percent of the impervious area in a municipality or in a suburban area. And so being able to partner with transportation agencies to access some of their funds to pay for this work can be really important.

In fact, I've heard statistics from more than one municipality that if they do their retrofit work in conjunction with the Department of Transportation's work it cost them one-tenth what it would cost normally. And it's not because they're using transportation money it's because they're doing it in conjunction with – when streets are being ripped up.

But there are a number of other agencies that are involved in impervious surface management basically. And so whether it's HUD or Parks and Rec or working with schools these are places that by working jointly one can stretch the dollars and do things synergistically.

I put a link here to New York City's plan. I think that's one of the best examples of a municipality that has worked, you know, brought all these different agencies together in thinking through how to do this collectively.

Slide 11: Tax Incremental Financing District

Lynn Broaddus: An unusual example is the tax district that was done – put in place about ten years ago in Milwaukee. They had a large industrial – they have a large industrial valley that was being renovated. It takes up about two or four square miles in the city of Milwaukee.

And rather than asking each parcel to manage stormwater and rather than hooking this valley up to the deep tunnel, they created a tax incremental financing district for a shared stormwater park that these photos don't do justice to how beautiful it is down there. And that way the property

owners don't have to work on it individually. Now this is stormwater but it's also climate adaptation work.

#### Slide 12: Additional Resources

Lynn Broaddus: So, I'm leaving with a couple of other resources that you can turn to for how to pay for this work and things to think about as you're developing your plans. One of them is a report that we did here at the Johnson Foundation and is really around what kinds of things do you want to make sure are incorporated in the financing of water infrastructure to ensure sustainability.

The second bullet there, Ceres, a non-profit based in Boston, has done an increasing amount of work around how to ensure that there's transparency around the fee structures and financing and debt financing for water and sewer. And this is especially important relative to the changes coming with climate change. And this can – by using this framework I think it can help build citizen input for adaptation work and making sure that – that the utility is taking these kind of concerns into concern.

This third recommended report here is a treasure trove of cost comparisons for what green infrastructure would cost versus what the gray alternative would cost. And I think there have been a lot of concerns that green infrastructure where am I going to get the money.

But if you're being forced to do through, because of the Clean Water Act, to do these stormwater and a water system retrofit it pencils out that in the long run you'll get a life cycle analysis the green infrastructure is hands down, in almost every case, the least cost alternative. And that's without including carbon market concerns.

And – and then a link to this NRDC report that kind of creates private markets to bring private dollars into paying for green stormwater infrastructure. And I think I'll leave it at that and then be available for questions afterwards.

Emma Zinsmeister: Thank you, Lynn. Hopefully that presentation give folks some ideas of where they may form potential partnerships and some opportunities, particularly in the water sector. If anyone has any questions for Lynn please take a moment to type those in your Go To Meeting panel.

And I'll just take a second to point out that EPA's Climate Ready Water Utilities Program has a lot of great resources available to help drinking water and waste water facilities adapt to a changing climate. And they do have a great Webcast series about all their tools and resources. And I believe a few of those Webcasts are coming up in the near future. So I included a link to their program in my slides so you can certainly get to that material and I encourage folks to do so.

## **Poll Question #2**

Emma Zinsmeister: So before we turn to the demo from Scott Burgess we're going to pull up another poll question. So, if folks could take a minute to provide their responses. The question is what are the primary sources of funding that you have used for adaptation?

All right, Lauren, if we could pull up their responses?

All right, so it looks like about 37 percent have responded that they've not done any adaptation work yet, about 30 percent are focusing on state or local funds, 26 percent have used federal funds and about 11 percent each have used monies from NGOs or foundations or have realigned their internal budgets.

And certainly there are a lot of opportunities within all of these categories and strategies to kind of cobble together funding from different sources. And our presentations today should hopefully give folks a sense of where they can look for some of these opportunities.

# Tracking Adaptation Efforts

## Slide 1: Title Slide

Emma Zinsmeister: So, with that we're going to turn over to Scott Burgess. Scott works with the Center for Climate and Energy Solutions, known as C2ES to advance bipartisan climate and energy policies that are researching and analyzing state and local strategies.

Scott previously recruit for the Peace Corp after he served as a volunteer in South America where he integrated environmental education into a district school curriculum and engaged local government officials on sustainability initiatives. He holds a Master's of Public Policy from the University of Michigan and a Bachelor's of Arts degree in environmental biology and psychology from the University of Colorado at Boulder.

So with that I'm going to turn it over to Scott to share the new database with us.

Scott Burgess: Thanks, Emma, and thanks for everyone joining us today. Again, my name is Scott Burgess with the Center for Climate and Energy Solutions and I'm going to talk a little bit about our efforts and – and views of adaptation here at C2ES and give you again a little live demo of a initiative we've been working on.

## Slide 2: About Center for Climate and Energy Solutions

Scott Burgess: Let me see if I can change this here we go – if you are unfamiliar with C2ES we're an independent, non-partisan, non-profit organization and we used to be known as the Pews Center on Climate Change until a couple of years ago.

## Slide 3: State of Adaptation in the U.S.

Scott Burgess: So this slide I wanted to put up. I got this from a really great resource called the State of Adaptation in the United States, which was recently released by EcoAdapt and Georgetown Climate Center.

And this diagram really shows the state of adaptation in the U.S. It breaks down by federal, tribal, regional, state and local efforts, and then as you can see the darker colors show – show more activity and then the lighter colors less activity.

As you can see there's been a lot of work on planning and impacting investments. If I can turn your attention to implementation and monitoring and evaluation, there has been quite a bit less. And so, you know, from the resources we've seen there's a lot on helping, especially, local officials on developing their plans but – but less on implementing and monitoring and evaluating.

## Slide 4: C2ES State Tracking

Scott Burgess: So, what we do at C2ES is try to get a broad 30,000 foot view of policies in the United States and we do a lot of mapping to help show and compare, states for example, on their adaptation plans and also the different climate action plans. And so as you can see in the bottom right that's one of our old maps that shows which states have completed their adaptation plans, which are in progress, and which are part of the private actions plans and how adaptation relates in that.

We're developing to a new mapping platform right now that should be released within the next week or so, and I personally think it looks a lot nicer now. So, we're excited about that and as you can see in the top left it's going to give a little bit more detail and we're trying to hone down a little bit besides just focusing on state and federal and international actions, and also looking at some city actions.

#### Slide 5: C2ES City Tracking and Standardization

Scott Burgess: And so right now I'm going to give just a brief demo. Now if you guys look at this map and your screen is really small, you can click to enhance the Webinar screen to your full screen so you can see the full text of this while I do this demo.

And so what this is combined with our state adaptation plans map we've also included cities. And we wanted to do this to show and compare and get a big sort of general view of where cities are in the adaptation planning. And we divided up into types of adaptation policies, as you can see at the bottom here, and then we go into some highlighted climate action for each of the cities.

And we eventually want to compare, you know, a good portion of the cities in the United States, there're 19,500 municipal governments in the United States. So, it's – it's very difficult for any one organization to get details on all these – these municipalities compared to states which we've turned to before.

We can really get a good view of all of the 50 states and, you know, advice for our policy and advise stakeholders on what the states are doing. But to do that for cities it's really a lot more difficult just because of the sheer number and variation in their planning and action.

#### Slide 6: Proposed Activities

Scott Burgess: So, I think a big portion of the audience members do work in city and local government and I think what you can do to further the efforts is to really explore partnerships and collaborate. This is – this will really help with funding, I think a lot of funders, especially foundations are interested in this collaboration. And also exploring partnerships with non-profit organizations really, as Lynn said, helps with getting some free time and information resources on doing that.

We've also noticed that peer-to-peer support is really important in – in developing these plans. A concern that I've heard from a lot of city officials is that they – they go to some online resources and there's just so many out there it's really hard to tell what – what's the best practice to do that.

And – and so I think those peer-to-peer relationships can really help point out some of the vulnerabilities that are specific to your city or region and specific resources to help you do that.

If you're not a city official and you work with city officials I'd really encourage them to generate some of this material and upload it to existing database. There are a lot of existing databases out there like the one I just showed you that try to compare different city adaptation plans.

And really, like I said there're so many cities out there to get a big overall picture it's really helpful if city officials show what they've done well and show how far along they are in the process, and there's sort of these user inputs you can – you can do to help show your progress.

And then help us identify some knowledge gaps and show what needs to be done because we don't know coming from this 30,000 foot view. So, what we're planning to do is expand our platform and really work with other platforms to share content, and since a lot of this is user input oriented, we really like the idea of collaborating with different organizations and having those city plans and best practices shared.

So we can again get a good view of the overall policy, picture and advice for federal and state policy makers. We also plan to do some in-depth research and competitive analysis, quantitatively assess how each city is progressing towards its climate adaptation plan, and author and publish some specific case studies.

#### Slide 7: Additional Resources

Scott Burgess: Additional resources that are available, you guys might already know of these are really popular ones; ICLEI Local Government for sustainability has a really great network of cities all around the world and some in the United States too. That really can get you a broad picture of, you know, best practices and where some tools and case studies of local municipalities are.

CAKE by EcoAdapt, they have a great database where you can input your plans, actions, and look to municipalities that have similar vulnerabilities and access their tools. And then Georgetown Climate Center has an adaptation clearing house with similar resources in papers and access to organizations. So, with that I think I'll leave it, I just want to give a brief demo and I'll be happy to answer questions at the end of the program, thanks.

Emma Zinsmeister: Great, thank you, Scott. And if anyone does have questions for Scott, please type them into the go-to-meeting pane. And we're happy to have Scott here to share the database because as he mentioned today the database is going live shortly. And he provided a lot of great examples for folks that will give some ideas on potential actions that you may want to pursue in your community as well as strategies for partnerships and funding if you develop those.

If you have information that you think would be important to this database please feel free to reach out to Scott and share that and also check out some of the resources that he mentioned.



## Poll Question #3

Emma Zinsmeister: So, before we go on to our next presentation we're going to pull up another poll question. So, at which stage of the adaptation process is your organization? And we'll give folks just a moment to respond to this question.

All right, Lauren, you want to pull up the results? Thank you. So, it looks like about 38 percent of folks have been assessing impacts and doing vulnerability assessments, which is a key first step for adaptation planning. The next most popular answer at 32 percent is planning and capacity building, and about 20 percent of folks are developing resources and tools.

And considerably less responded that they are focusing on implementation at 7 percent and monitoring and evaluation at 4 percent. Which I think definitely reflect what Scott just mentioned that C2ES is seeing in their survey of local adaptation efforts. So, hopefully sharing information through databases like the one that Scott's group is organizing will help to boost implementation and monitoring.

# Climate Change and Public Health Adaptation

Slide 1: Title Slide

Emma Zinsmeister: So, with that we're going to turn to our next featured presentation from Gino Marinucci. Gino is a strategy and policy advisor for the Climate and Health Program at the U.S. Center for Disease Control and Prevention. In this role Gino advising the CDC leadership on long-term strategies to mitigate the harmful health impacts associated with climate change, and international, national, state and local health leaders on planning for and responding to the health impacts of climate change.

Gino's work history spans public health action and environmental health, communicable diseases, immunization and chronic disease prevention in Australia the United Kingdom and the United States. He has worked in state and federal and non-governmental organizations as an advisor to the Western Australian Minister for the Environment.

Gino is a graduate of CDC's Environmental Public Health Leadership Institute and he holds a Master's of Public Health from the University of Western Australia, a post graduate diploma in Ecological Public Health Policy from Murdoch University, as well as a Bachelor's of Science degree in Environmental Health from the Curtin University of Technology.

So with that I will turn it over to Gino. Thank you, Gino.

Gino Marinucci: Thanks – thanks very much for the invitation to participate. So, I'm going to talk about how climate change affects public health and how health departments are approaching climate change just in general as an issue.

Let me just make sure my slides are changing. My screen seems to be paused for a second. Sorry for the delay I'm just trying to – there we go. Hopefully you'll see my slides have changed.

Slide 2: Weather, climate and health: The link

Gino Marinucci: So, first of all, this – weather and climate has always had a big influence on human health. So, irrespective of climate change weather and health have always been a factor for public health to worry about. So, direct exposure to the elements, things like heat, cold, rain snow, or exposure to heavy winds, or by providing conditions or supporting habitats that are the helpful hand of the spread of disease.

For example, conditions that support bacterial or viral growth, conditions that lend themselves to food spoilage or drinking water contamination, or climate and weather conditions that support habitats and biological process for things like mosquitoes, ticks or the disease agents that they carry, incubate and transmit. So we expect this influence will likely increase with climate

change with weather patterns becoming a little more extreme, and some of these impacts likely be very severe.

So in the course of this, patterns of disease that are influenced by environmental conditions are also likely to be impacted. And we expect to see diseases appearing in places they haven't before and other diseases may reemerge after they have been previously eradicated from an area. So, you might find diseases reemerging in some locations.

Slide 3: Chart

Gino Marinucci: So, here's a chart of, you know, how ideally things would work with, you know, a massive amount of resources in climate change research and development on one end of the spectrum, and then a lot of activity and a lot of investment in public health research and development, and then on the far end of the scale a lot of work going on at the state and local level in public health practice and response.

And you can see I've highlighted, you know, the piece that's kind of really not working as well or haven't worked as well that we're trying to work on, and that's the translation of all of this climate change information for public health use. And it's really complex stuff and it's really difficult for public health people to utilize.

So that's what basically one of our goals in the CDC is to actually try to bridge that gap between climate change projections and models and actually being able to apply that to use in other public health research and development.

Slide 4: The Climate and Health Program's 3 critical roles:

Gino Marinucci: So, talking about where I work at the CDC Climate and Health Program, we play three critical roles which are in line with the chart you just saw. So, we're working to try to analyze and translate the latest findings and climate signs for public health folks to understand and use.

Also, looking to try to apply what we learn about climate change by creating decision support tools that will assist with state and local public health response. So, things like vulnerability maps or surveillance tools, communication tools and that sort of thing.

And then lastly we're working to try to connect the public health sector with the climate change action going on around us. So, by working – we're working to try to ensure the public health concerns are represented in climate change adaptation and mitigation strategies across the board. And really to try to create linkages between what's going on in public health and the climate change mitigation and adaptation efforts going on in other sectors.

Slide 5: CDC Climate Ready States and Cities Initiative

Gino Marinucci: And that's why this is a good forum for us to actually be, kind of talking about public health so let's say you guys in other sectors may be able to understand health issues and

concerns. So, the flagship initiative for our program at CDC is the Climate Ready States and Cities Initiative.

So this works – there's a couple of tiers to it, but CDC funds and supports the work of 16 states and two cities basically to do what amounts to really advance practice work trying to develop the methodologies that can be adopted by health departments around the country.

So, CDC provides a lot of the guidance and a lot of the technical support and many of the tools, while our state and city partners that you'll see highlighted on this map are adapting the theory and really trying to apply it and see how it works in real life conditions and in the real context of the environment where they work.

So, the emphasis of the Climate Ready Initiative is really to build and test the methodologies to really critique the message employed and capture them while disseminating the case studies and the findings, so that the rest of the public health community and in the U.S. or beyond can actually learn from that experience and start to apply through techniques that they haven't done before.

#### Slide 6: Building Resilience Against Climate Effects (BRACE)

Gino Marinucci: So, the primary framework by which the Climate Ready grantees are working is called the BRACE framework and this stands for building resilience against climate effects. And the history behind the BRACE framework is that we found that, you know, when trying to tackle climate change as an issue, health departments didn't necessarily have the skills or capabilities to actually interpret complex climate data or climate projections and to be able to use that and incorporate it into their traditional planning process.

So, they were making a lot of assumptions and they weren't able to actually navigate the science that really would have added a lot of value to what they were doing. So, BRACE is a step for those activities that're designed to ensure that these climate projections are able to be used as key inputs in the longer range public health planning.

So, we want these climate models to ultimately inform the public health response where they can. So, I mentioned it was designed – it's also designed to prompt longer term planning that public health agencies are used to. Public health agencies usually plan for maybe three year cycles but community health plan maybe three years. A public health preparedness plan maybe about three years.

And you know, if you're preparing for a flu epidemic you're really looking at the next season or the next year at the most. So, public health agencies don't have a lot of experience at really doing long-term planning because – because, you know, that's just not the way it's worked in the past.

So, we're actually looking to help try and change that paradigm by connecting some of these long range climate change projections as inputs. So that health departments are able to use that

information and start doing a lot longer range planning and understanding how to use their investments and actually more efficiently, and get the most out of their long range planning.

Slide 7: BRACE diagram

Gino Marinucci: So, now you'll see a I guess a diagram – diagrammatical representation of the BRACE frameworks. So, there're five steps within BRACE and I'll, you know, I could talk about that for a longtime. So I will just briefly talk about the five steps.

So, step one is really about identifying the range of climate impacts. So, you know, what – you know, understanding the climate models and what they're telling you over certain time frames within your jurisdiction of interest.

And then it's about understanding the associated potential health outcomes that you'll see based on those climate change projections. And then in the same process it's about understanding who and what are vulnerable. So, what populations are vulnerable, what systems are vulnerable, what are the key locations that confer the most vulnerability. So, really understanding the background of what climate change is likely to bring.

Step two is a lot more of that kind of the calculus type step. It's about estimating and quantifying the additional burden of health impact that comes due to climate change. So, it's about estimating the change in the magnitude for each disease, the health outcome that we'll be experienced at a set timeframe in the future that you have data for.

So, you know, it's really a – you know, step one is to prioritize a little bit so step two gives you a really, you know, a better sense of the magnitude of how each disease will change, which then kind of informs step three.

So, step three is about identifying, you know, what you can do about it. What are the most suitable health interventions and adaptations that you can do to reduce the harmful impact? In this step you can say things like the resources and capabilities that you have, the level of evidence for the different types of interventions, cost effectiveness of taking a different type of course of action, and also the political will and, you know, the partnerships that you have at your disposal. So, at the end of step three hopefully you've looked at what different interventions you can do and work out what are the ones most suitable for your area.

And then that leads you to step four which is basically like a traditional adaptation planning process. So, it's about developing and implementing an adaptation plan that introduces some program changes for the health system. And that will hopefully address the health impact for climate change.

The last step is evaluation. And that's about establishing process outcome and impact metrics and really, you know, making sure that you're doing things the right way and using the information, the findings to try to improve the quality and reliability of the work going forward.

And in reality step five is – should be happening throughout all of the steps of BRACE framework. So, that’s a quick snapshot of, you know, the framework the public health people are using and – and the way they’re going about doing adaptation work.

Slide 8: Application of the BRACE framework

Gino Marinucci: So, we’ve got some examples from our Climate Ready grantees about their use of BRACE and I’ll briefly highlight.

Slide 9: Application of the BRACE framework

Gino Marinucci: So, for example, we had one of our grantees is in Maine and the Health Department in Maine is able to provide new information to the Department of Education regarding children’s vulnerability to anticipated extreme heat events that they expect to see in the future.

So, this is now allowing the Department of Education in Maine to really consider their long range – their long term investments in measures that will help mitigate the task. Things like air conditioning and shade covering and other activities or other things that they consider investing in.

In New York state we saw that they used climate change projections and ecological modeling of ticks carrying Lyme disease and – and this has really allowed the Health Department to better tie up vulnerable and unprepared communities with much better organization and much more targeted education on how to reduce their risk of being infected.

But it has also enabled more targeted education of clinicians in the area of concern. So that they’re able to better diagnose Lyme disease and they’re having a better understanding of how widespread Lyme disease is in their area.

In New York City, we’re seeing them – we’ve seen them use climate models to develop a far more sensitive and customized warning system to better protect the New Yorkers during heat waves. So they studied retrospective hospitalization and mortality data, which the health department already had at their disposal.

And using projections for relevant climate conditions in New York City, things like temperature and humidity, and then they’ll look at some localized modeling of the urban heat island effect. And putting all that information together they’re able to actually really tailor a heat warning system specific to New Yorker rather than something that may have been more universal but less sensitive for them.

Slide 10: Application of the BRACE Framework

Gino Marinucci: A couple of other examples in North Carolina we’re seeing them use storm search predictions to really try to map their local location of critical infrastructure. And that’s

infrastructure of public health significance. So they used inundation estimates of half a meter, one meter and two meters.

And the Health Departments been able to really – to determine the location of vulnerable drinking water sources and drinking water treatment at water treatment facilities that'd be adversely affected. And they began to develop plans to try to mitigate these risks.

And then the last example I'll mention is in Massachusetts, where in Massachusetts each district has a designated school that acts as an evacuation site in the event of an emergency. So, after identifying a need for finding infrastructure to protect vulnerable citizens during a heat wave, the Massachusetts Health Department is now working with the state's Department of Education to secure funds to install air conditioning in these schools so they can be used as cooling shelters during extreme heat events.

So, they're already evacuation sites, so just by adding air conditioning they can double as a cooling shelter during a heat wave. So there're some of the examples of the work going on from BRACE.

#### Slide 11: Public Health Prevention Model

Gino Marinucci: Now the last area that I was asked to discuss is the difference in how health departments think about tackling these types of issues and the fact that much of their approach is synonymous with the terms climate change mitigation and adaptation. However, from a public health person's perspective those terms can really be thought of as jargon from another sector and they can be a little daunting, the public health people.

So, here is the dominate frame for thinking about tackling disease and injury in public health, it's called a public health prevention model. And it generally has three tiers. So the first tier, primary prevention, is really about preventing the hazard or preventing the disease and you can see a couple of examples on the slide of that sort of thing.

The secondary prevention here is really preventing unsafe exposure to a hazard or identifying an illness early enough so that you can actually intervene and stop it from – stop it long-term or stop them from getting serious damage. And then third – there's the tertiary prevention interventions which is really all about keeping the person alive and trying to aid their recovery.

So the key feature to consider as you look – as you move down the tiers is, you know, the concentration of activities becomes more focused on smaller cohorts and – and undertaking a smaller scales as you go down the different interventions. So, primary prevention caters to everyone in a community whereas secondary is targeted those at risk and tertiary focus on intervening for those being significantly affected.

So, there're really different economies of scale and different efficiencies depending on where you want to intervene. So, I'll try and explain, just in a way that makes it relevant for climate sensitive health issues.

## Slide 12: Public health prevention model: Heat

Gino Marinucci: So, let's look at heat as a public health exposure of concern. So, extreme heat is an issue of concern for public health people for a number of reasons and these include direct exposure causing things like hypothermia, but also the fact that heat is a risk factor for acute episodes for respiratory disease and cardiovascular disease.

They contribute to things like asthma attacks and heart attacks, so that's – you know, that's why we're concerned about them. And that's just a small snapshot of the reasons we're concerned about excessive heat.

We're using the example of heat from a traditional public health reference point. We consider the type of activities that you see on the screen, you know, filling in those tiers within a public health prevention model. So, primary prevention we see things like there are trees and green roofs to bring down the ambient temperature.

From a secondary intervention point of view we're looking at having cooling shelters and having AC available to protect people from exposure to high temperature. And from a tertiary point of view – we think about finally having enough equipment and resources on hand to treat people that are affected in the event of a heat wave.

Now to keep them alive and to help them recover from the exposure. Now at the bottom I've added in a new kink to kind of show – and this is more for public health people, to show them that they can go further upstream than they may have considered before.

So, action can be taken, or as you see, as hazard by taking action to prevent what's causing the increase in temperature. So in this model we call it primordial primary prevention. So it's further upstream than what you talk – you normally talk about for primary prevention.

## Slide 13: Public health prevention model: Heat and climate change

Gino Marinucci: Now this is important when I show you the next slide. So, on this slide that's – it's using the public health prevention model but it's – it's the same issue being addressed heat for example. But it's really, there's a slight change in the frame of reference.

So in this slide we consider increasing frequency and intensity of extreme heat as the hazard of concern rather than just looking generically at it as exposure to heat. So, now the timeframe is forward looking and much longer range than in the previous slide.

So, the measures to be taken are basically the same but the seeking about where the interventions take place really changes. So, the state intervention that you saw in the previous slide and the measures for each tier have kind of moved. So everything's moved down a tier.

So, recalling what I said earlier, looking at the scale of interventions you now see the primary prevention activities could be considered on a global scale rather than the community scale just



by a slight change in reference point. And that really, you know, is same with what you call mitigation – climate change mitigation.

So, I just wanted to show you this as a different way of thinking about how you work in climate change and how it could be considered from a public health intervention point of view. And I wanted to bring it up because it may be helpful when we bring public health people on board as allies in your work. And it may be a lot of co-benefits and a lot of efficiencies that you can gain by working with people in the public health community.

Slide 14: CDC Tools and Resources

Gino Marinucci: So, lastly I'll just refer people to CDC's Climate and Health Website. There you'll find a lot of information and resources about climate change and how it's a public health issue, different ways of going about dealing with it. We have a number of resources archived, Webinars and just some general good information. So you can see that right there.

Slide 15: Contact Information

Gino Marinucci: And that's it, I think I'll just stop there and thanks very much for listening.

Emma Zinsmeister: OK. Thank you, Gino. If anyone has any questions for Gino on his presentation or CDC's resources, please go ahead and type those into the Go To Meeting panel. It was a great presentation demonstrating how folks working on adaptation issues can consider a public health perspective to develop partnerships and activities with multiple benefits that can leverage existing resources out there.

## **Integrating Adaptation into Public Health: Case of California Department of Public Health**

Emma Zinsmeister: And, Paul English's presentation from the California Department of Public Health provides some more detail on activities that California has undertaken, partnerships that they developed and specific sources of funding that they have leveraged. So I encourage folks to take a look at that presentation copy of the slides that were sent out early today, and we're sorry that Paul couldn't be here today to give that presentation sort of in person on the line.

## **Poll Question #4**

Emma Zinsmeister: So, with that we're going to move into another poll questions for folks. Lauren, if you could pull up the poll? So the question is how is your organization approaching the public health impacts of climate change? And if folks could just take a moment to provide a response we would appreciate it?

All right, let's go ahead and pull up the results. So, it looks like over half of the folks on the line are not yet considering the public health impacts of climate change. So, there's a lot of opportunity there to think about the resources that Gino has presented in ways in which folks might partner with their public health departments.

About 31 percent are currently integrating public health into other sector plans. So looking at ways in which other activities and other sectors in their jurisdiction have impacts on health.

And about nine percent are using an approach to public health adaptation that is different from the BRACE framework. And about seven percent are actively using the BRACE framework.

So, thank you for your responses to that question.

# **Integrating Adaptation in Hazard Mitigation Planning Efforts**

Slide 1: Title Slide

Emma Zinsmeister: Now we're going to take a look at the hazard mitigation sector and we'll be hearing from both Alessandra Jerolleman and Kelly Klima.

Kelly Klima is a research scientist at the Department of Engineering and Public Policy of Carnegie Mellon University, focusing on climate, extreme weather, energy, communications and outreach. She serves on the American Geophysical Union Executive Council and the Natural Hazard Mitigation Association Board of Directors.

In addition to research, she founded the SuCCEED Program which is the Summer Center for Climate Energy and Environment Decision Making. It's a program designed to complement ninth grade student education and provide them with opportunities to expand their understanding of energy and environment and how those relate to climate change.

Kelly has a doctorate in Engineering and Public Policy from Carnegie Mellon University, a Master's in Earth Atmospheric and Planetary Science, and a Master's in Aeronautics and Astronautics from the Massachusetts Institute of Technology, and a Bachelors in Mechanical Engineering from Caltech.

We'll also be hearing from Alessandra Jerolleman who is the founder and executive director of the Natural Hazard Mitigation Association. She also owns a consulting practice specializing in building resilience, hazard mitigation and training.

Her work experience includes serving as a program specialist in the Gulf Coast with Save the Children U.S.A, working on a resilience initiative around children needs and emergencies, hazard mitigation planning at the local, state and campus level, and community education and outreach regarding mitigation measures and preparedness.

Alessandra currently serves as one of the tri-chairs for the Natural Hazard Mitigation Collaborative Alliance and she sits on the board of the Greater New Orleans Disaster Recovery Partnership. She's currently a doctoral candidate at the University of New Orleans. So, with that I will turn things over to Kelly and Alessandra for their presentation.

Slide 2: Agenda

Kelly Klima: Thanks, and today we're going to talk a bit about integrating adaptation and hazard mitigation planning efforts. And first we'll talk a little bit about what is a natural hazard mitigation association. And then we'll double check, you know, what is hazard mitigation, what are challenges to successful hazard mitigation, and we'll take a look at some examples from state and local levels, places that are integrating hazard mitigation and climate adaptation and start planning, and some funding resources that can be leveraged.

### Slide 3: NHMA

Kelly Klima: NHMA was founded in 2008 to bring together the various individuals and organizations working in the field of hazard mitigation and to us this also includes climate adaptation.

### Slide 4: NHMA

Kelly Klima: We believe through sharing approaches and tools we can work together to build a safer, more sustainable society. And here's a picture of the founding members of our Resilient Neighbors Network, which we'll share a bit more about shortly.

### Slide 4: Untitled

Kelly Klima: And it's no news to everyone on this call but we face risks every day. And alone we just can't protect ourselves. We are already having troubles dealing with current hazards, such as super storm Sandy shown here, and projected climate change impact will further tap our skills and tax our available resources. We really need to work together to take this window of opportunity or any window of opportunity that arises and educate policy makers ways to build a safer more sustainable society.

### Slide 5: Untitled

Kelly Klima: Two groups with a lot in common are hazard mitigation adaptation professionals. Here's one of the definitions you might see for risk, with a hazard, for instance a thunderstorm or hurricane, times the exposure – the number of people in the storms way, times the vulnerability. How likely the buildings and people are to break is a little more complicated but the general functionality will work.

And we see that the definitions of hazard mitigation and adaptation are very similar, hazard mitigation reduces exposure and vulnerability as informed by past events. Adaptation on the other hand reduces exposure and vulnerability and this is formed by future projections. And the Natural Hazard Mitigation Association really works to foster collaboration between these two communities, which have so much in common.

### Slide 6: What is Hazard Mitigation

Kelly Klima: So a little more basic, what is hazard mitigation, hazard is any sort of natural, manmade, or technological problem, and in this we are a little bit different than adaptation which tends to look more at climate than natural problems. And mitigation is reducing, relieving, or alleviating something.

So FEMA's definition is that hazard mitigation is any cost effective action taken to eliminate or reduce the long term risk to life and property from natural and technological hazards. So, potential hazard mitigation will break the cycle of destruction, rebuilding, and destruction again.

Slide 7: Successful Hazard Mitigation Breaks the Cycle of Destruction, Rebuilding, and Destruction Again

Kelly Klima: Here's a picture of Miami Beach in 1926 after a big hurricane and Miami Beach again in 2006. And we're really looking at different ways to reduce the damages to break the cycle and prevent this reoccurring reconstruction which is often more expensive as the years go by.

Slide 8: Hazard mitigation addresses short and long term

Kelly Klima: Hazard mitigation addresses both short and long term. It can do anything from your firefighters, emergency first response to things all the way down from building codes, emergency planning and coastal zone management. And hazard mitigation also benefits stakeholders in multiple ways.

Slide 9: Hazard mitigation benefits stakeholders in multiple ways

Kelly Klima: It helps reduce the life of lost property, essential services, facilitates and economic hardship, and it'll reduce short term and long term recovery and reconstruction costs. And will also help increase cooperation and communication across the community and increase the potential for state and federal funding for recovery and reconstruction projects. You can see a lot of this is very similar to what climate adaptation professionals think about need and benefit from.

Slide 10: Who can practice hazard mitigation? Everyone!

Kelly Klima: So, who can practice hazard mitigation? Well there are a ton of different mitigation activities that can be done by individuals, businesses, government, you know, we have smoky the bear "only you can prevent forest fires", the three little pigs and they're a little cartoonish perhaps. But you can be part of the solution to break the disaster cycle by being aware of the hazards that affect you and your community, and become active in your community's hazard mitigation planning process.

Slide 11: Hazard mitigation plans using only past events; as safe as driving 80mph using rear view mirrors only!

Kelly Klima: And really hazard mitigation, the big thing with it is that it plans really only using past events at this point in time. And as our president Ed Thomas would say that's about as safe as driving down a highway 80 miles an hour using your rear view mirrors only, not so safe. Adaptation on the other hand requires us to look forward as well.

Slide 12: Untitled

Kelly Klima: Unfortunately there are a bunch of institutional, policy, and communication barriers.

### Slide 13: Challenge #1: Externalities

Kelly Klima: One of the big ones is externalities, one example is a park bench, when one group pays to maintain or replace it, and then you have a different person uses it. And we see in disaster assistance this is another classic example of an externality.

Some of the ways that we can solve this are looking at some of the programs moving forward for instance NFIP, especially through the community rating service system, has made a good start at solving this problem but alone NFIP will not be enough.

### Slide 14: Challenge #2: Fear of a “taking”

Kelly Klima: A second possibility is fear of a “taking” or a regulation that effectively results in the government exercising eminent domain without actually taking your property.

And here we see this hazard mitigation does have a strong legal basis and there’re a lot of things you can do, phase development, low impact development, water resource management that are legal, equitable, practical and defensible in court.

And so the regulations that are clearly based on hazard prevention and it fairly applied to all, are almost never, ever successfully held to be a taking. So it’s not something we should worry about as much.

### Slide 15: Challenge #3: Some public officials believe they are immune to lawsuits for the consequences of actions they take which harm others.

Kelly Klima: Another challenge is that some public officials believe they’re immune to lawsuits for the consequences or actions that harm others.

Many flood plain managers have told NHMA that such an attitude is making their jobs of course much more difficult. And moving forward including public officials in workshops and speeches and just communicating with them more will help decrease the likelihood of this problem occurring. When you have the chance to reach out and they understand a little better where you’re coming from, this challenge can more easily be surmounted.

### Slide 16: Challenge #4: Climate change will worsen hazards, yet many have a fervent belief that climate change is hoey or a plot.

Kelly Klima: And of course some folks sincerely and most definitely believe they know exactly what climate change is. They think that it’s a vast left wing conspiracy involving government seizure of private property or some sort of attempt through the U.N. to destroy America’s private enterprise system and eventually destroy the United States. Basically, fervent belief that it’s whoey or some sort of plot.

For these sets of folks who can’t really convince them that climate change actually exists, instead we need to speak to them in their language and that may mean that we never mention the word

climate, instead talk about things such as economic savings of green infrastructure over gray, as alluded to by one earlier presenter.

Slide 17: Many state and regional governments are beginning to incorporate hazard mitigation and climate adaptation plans

Kelly Klima: And any state and regional governments are beginning to incorporate hazard mitigation and climate adaptation plans. And a couple of the following examples are adaptive from the National Adaptation Forum presentation, given by Ryan Towell who's a project manager at Dewberry. I'd like to thank him for letting me use some of these slides.

Slide 18: Regionally, Maryland's 2011 Hazard Mitigation Plan includes adaptation.

Kelly Klima: Maryland for instance in 2008, their version of the Hazard Mitigation Plan had a limited mention of climate change. In 2011 with the state being so proactive it was time to start integrating climate change and state efforts underway. And so Maryland's 2011 Hazard Mitigation Plan includes adaptation and actually states a climate change is a potential amplifier of existing natural hazards. And the plan includes critical risk assessment and potential future impacts on hazards frequency, intensity and distribution.

Slide 19: As of April 2012, California has a draft framework for local and regional adaptation planning.

Kelly Klima: In California, 2010, the state Hazard Mitigation Plan added significant climate change elements where they were saying the climate change was a factor intensifying impacts of many natural hazards. As of April 2012 California now has a draft framework for local and regional adaptation planning.

Slide 20: Wisconsin begin to discuss issues regarding climate change

Kelly Klima: Wisconsin similarly has begun to discuss the issues regarding climate change and we see that in their FEMA Region Five Crosswalk suggestion, but the next plan update should include a more detailed risk assessment for climate change and more detailed treatment of mitigation strategies.

Slide 21: Locally, Santa Cruz integrated research and multiple existing plans into one hazard mitigation plan.

Kelly Klima: Locally, we see several examples as well; Santa Cruz has probably one of the most drastic changes from a typical hazard mitigation plan into one that includes a climate adaptation. They made an effort to create a very integrated plan including how climate change will impact different city operations. This includes climate action plan, a general plan, and emergency operation plan.

Slide 22: Lewes, DE has integrated climate change into existing hazard mitigation planning.



Kelly Klima: Additional Lewes, Delaware has integrated climate change into hazard mitigation, that's another famous example and one thing to take away from that is of course their biggest project challenge which was the nomenclature. Things like what does hazard mitigation mean, what does greenhouse gas mitigation mean, and climate adaptation? And we've discussed that a bit today. So, now I'll pass it over Alessandra for a bit on where we get the funding.

Slide 23: So, where do we get the funding?

Alessandra Jerolleman: I wanted to start off by talking about some things that I think has come up in pretty every presentation and it's what I would call multi-objective management. It's basically finding ways to work with others. With other stakeholders other interests and identifying the shared goals and the shared value spaces and there really are a lot of them; between hazard mitigation, climate adaptation, public health, water quality, parks and recreation, and the list goes on and on.

And in a time of shrinking resources the ability to leverage programs both in terms of funding and technical assistance, but also in terms of finding the way to take advantage of the opportunity presented, for example by a street that already needs to be repaired or in the aftermath of a disaster.

And so the following slides are really in that context of multi-objective management discussing developing projects and programs that have broad constituencies where it's possible to really build that interest for undertaking these sometimes challenging projects.

Slide 24: The Patchwork Quilt

Alessandra Jerolleman: NHMA has a guidebook called the Patchwork Quilt which is available on our Website and the Patchwork Quilt is really about the post disaster environment but it has a lot of applications and at the most basic the Patchwork Quilt is about multi-objective management.

It's about identifying community needs, wants, desires, and pulling together solutions essentially by creating a patchwork of resources, technical assistance, funding and otherwise to make things happen. And I think this is something that you might find useful and I'll say that I actually found a few additional references that we will be including in the future from the previous presentations.

Slide 25: Obtaining Technical Assistance

Alessandra Jerolleman: This slide, covers a little bit of information on technical assistance. Now it's a fine line between technical assistance and in funding because some of the programs that we'll talk about really do provide both.

Or at times technical assistance it takes the place of small amounts of funding and very targeted assistance, site visits, the bringing of staff resources to bear from agencies, departments, organizations, and at other times it's simply the availability of publications and other types of

resources that can be quite useful. Now it's pretty much impossible for me to cover even the range of organizations that we would interact with in the field of mitigation in the time that's allowable for this Webinar, but with this slide I wanted to just give you a feel for really how wide that range is.

And I chose to highlight planning for recovery because planning for recovery prior to an event, going through an exercise of saying what are some of the challenges that might arise if such and such were to happen. What might happen if there was another super storm Sandy, for example?

That is an opportunity to be prepared to take advantage of the opportunity that can arise following a large event. And that doesn't even have to be an event that takes place in your own community, it can be taking advantage of an event in a similar community as a means of opening the conversation or discussion.

But when a community is impacted, for better or worse, it does open the door to some additional resources and technical assistance. And so being prepared to take advantage of that on the front end having identified the ways in which some of the climate adaptation measures might fit into recovery to post disaster mitigation efforts is a good way of making sure that that can happen. Because otherwise your – your trying to push a rather large rock uphill when everybody is so very busy, overworked, going through recovery, including personal impact, that's a pretty difficult time to as we say in emergency management exchange business card.

So, the more of that that happens on the front end the better. And also as you can see there are a lot of agency's federal, state, local, regional authorities or community groups, there are businesses, universities, non-profit organizations, foundations, all of which are very active in providing technical assistance and resources. And sometimes it's too much. There's so much out there that navigating it is quite challenging.

But having a feel for what is out there is very useful and peer networking as well which I'll talk about in a little – in a little bit is one way for communities to help each other to navigate this process. The patchwork quilt as a concept is a way to make the best of a challenging process.

#### Slide 26: Obtaining funding

Alessandra Jerolleman: Because there really is so very much out there and what's useful out of it is sometimes rather piecemeal. And then talking about obtaining funding as I mentioned earlier, some of these same agencies that can provide technical assistance also provide funding. Now as everybody knows, funding from federal agencies is often dependent on appropriations, federal budget, it can be limited, it can be dependent on particular initiatives or project type. And so it's not always the answer but it's one piece of the solution.

One – excuse me – other sources of funding can be foundations and they can also be individual actions, actions by community members themselves. Actions by local businesses and education can play a key role in promoting some of those actions. And there are also several resources available as far as other ways of promoting individual actions.

Slide 27: Many groups are working on hazard mitigation and climate adaptation.

Alessandra Jerolleman: This next slide really just shows some of those groups that can be active in providing resources, a little lag on this slide; here it is you see the Army Corp of Engineers Silver Jacket Program that's very active in several states. You'll see some community organizations, some non-profits like Fire Wise that provide for example model ordinances and other information along those lines that can also be quite useful.

Slide 28: NHMA's Resilient Neighbors Network helps communities become disaster resilient.

Alessandra Jerolleman: And finally coming back to peer networking which I mentioned earlier there are several organizations that are working to build networks to help communities talk to each other about what's working, how they're overcoming challenges and help each other out. One of those is the Resilient Neighbors Network which NHMA manages and you can find more information on our Website some pilot communities that came together talk to each other, help each other out.

Again share information, and one thing that they've been able to do for each other as well is actually to leverage funding opportunities because when one community accesses technical assistance or participates in a program they can then share that information to the rest of the network. And so it magnifies the impact and helps them in seeking funding as well.

Slide 29: Contact Information

Alessandra Jerolleman: And with that you can see here contact information for Kelly and myself should anybody have any – any questions or comments in the future or any suggestions for additional resources for Patchwork Quilt which we are always looking for.

Emma Zinsmeister: Alright thank you, Kelly and Alessandra, for your presentation. If anyone has questions for either of them please feel free to enter them into the Go To Meeting panel. During their presentation they mentioned a couple of things that I wanted to highlight particularly thinking about and communicating with their stakeholders in a way that is effective and resonates.

I encourage folks to check out our files and recording from our first Webcast where we covered this topic in a lot of detail and there're some great strategies there. And so certainly the hazard mitigation community is an ideal partner for working on adaptation, there's also a connection to the public health community and hazard mitigation so some great ideas for our audience there.

## Poll Question #5

Emma Zinsmeister: We're going to quickly do a last poll question and then move into a combined session of panel questions, and questions received from the audience since we are a bit short on time and any questions that we aren't able to get to we will provide responses on our Website in writing.

So, very quickly for our last poll, which partners from which sectors may provide the most immediate opportunity to help see adaptation funding in your entity? So, who is your organization considering working with or looking at as an ideal partner for pursuing adaptation? So, if you could take a minute just to quickly respond to this, we'd like to get your input.

OK, we're going to have to poll the answers quickly here just to get a quick sense, so 51 percent water and utilities, 43 percent hazard mitigation or national security which is great, about a quarter folks looking public health, about a third transportation and 20 percent environmental services. And I imagine a lot of folks on the line today are from their environmental departments.

## Questions and Answers

Emma Zinsmeister: So, with that we're going to move into a very brief session of questions, combining the questions that we had set up for our panel session as well as ones we receive from the audience, and as I mentioned we'll provide written responses to any that we can't get to now, and so with that I will turn it over to Dana Spindler from ICF to facilitate the discussion. Thank you, Dana.

Dana Spindler: Thanks, Emma, and thanks to all the speakers for your presentation. This first question is for, Lynn, and the question is are there any case studies of small municipalities or water systems that can implement these types of water projects that you talked about today?

Lynn Broaddus: I'm happy to say that at this point in time there are a lot of them. There have been a lot of pioneering cities of all sizes out there. One of the smallest cities that comes to my mind is Edmonston, Maryland, a relatively poor town of about 1300 people I think and they've done a really impressive green streets initiative. And one of the neatest things about what they did was that they've open sourced all the plans for green infrastructure that they put in, so that other municipalities could kind of cut and paste what they had done rather than having to pay for all of the concept development costs and so those plans as I understand it are available online.

But there are lots of examples of cities of all sizes and perhaps the best resource out there is the American Society of Landscape Architects. If you put in ASLA and stormwater or stormwater case studies into a search engine I think you'll pretty quickly land, they have this amazing compendium of case studies and you can search it by state. And it's a really nice resource for anyone looking for examples that they can take to their city council or their planners and say hey I want something like this and it shows how they paid for it and everything.

Dana Spindler: Thank you, Lynn. This next question is for Gino and we've spent some time discussing how to take a multi sectorial or integrative approach to climate adaptation. What information and resources do public health decision makers need from partners to integrate adaptation? And conversely what resources do public health officials have to contribute to the process?

Gino Marinucci: Yes, thanks for the question. I mean as far as the information goes from a public health perspective, there are a few things that would be useful. Information on climate projections and any assistance to interpret this would be very useful and very helpful to the public health agencies.

And also information with data that provides more insight into vulnerability. So things like, you know, any demographic data, physical features, facial features, or even social features. You know, new data sets that can overlay that type of information that would enable a health department to work out who is at risk, how they're at risk and the way the environment is either protective or actually adds to the risk factors.

So that's all really helpful information. So if you have access to that kind of data you may find that a health department can actually use that, or you may be able to work with a health department to actually look at vulnerability.

And I guess the other major need is that of inclusion, so that a health department is included early on in the scoping of a policy or project or a program that may be taking place in another sector or in another agency. So you know by including public health folks, it can help to avoid any adverse or unintended harmful consequences or can be an opportunity to highlight how to gain new or really maximize already thought out co-benefits.

So things like, designing transportation, locating services, city planning, enhancing infrastructures. And, you know, a good example might be, if you're actually trying to increase green space or looking into parks and that sort of thing.

There're a lot of co-benefits to that but then your choice in trees may also add to, you know, allergies – the allergy loading and public health people want to be able to help with that and understanding allergies and just all the repercussions.

Whereas, you know, they can also be a champion and assist you by kind of championing the fact that, that extra green space will be better for air quality, will also provide environments where people can get some exercise, really good kind of social cohesion and social connection. So there are a number of ways that it may be helpful to include public health.

But, you know, it's really going to be done early so that the health department can kind of help with any tweaking of a design or an approach. And, you know, they have tools of doing that, like for health impact assessment. I think, yes, that probably answers the question. I don't know if anyone else wants to add anything.

Dana Spindler: I think that we just have a few more minutes left and I want to make sure that I get a question for all the speakers today. So thank you, Gino.

Our next question is for Scott and we've spent some time talking about how to fund climate adaptation using integrative decision making in health, water, and hazard planning.

Looking beyond these sectors where do you see opportunities for adaptation action? Do you have any recommendations, best practices, or lessons learned regarding how to identify opportunities for collaboration or integration?

Scott Burgess: Thanks, well for the first part of the question, I think besides health, water and hazard challenges, I think we've covered a few including adaptation planning, ecosystem services planning, and land use planning which could include building codes. And really, I think, you can integrate adaptation in any sort of planning efforts. Especially ecosystem services I think will be emerging in the upcoming years and play a vital role in the adaptation efforts.

The second part of the question, do I have any recommendations or best practices or lessons learned? You know, I think for the people who in the cities especially who haven't really started

planning yet for adaptation, I think there're some good ways to get caught up to speed. And one is attending events like this Webinar that you can really get a good rounded perspective of where the country and neighboring cities are on this effort.

Another is participating in a working group and I think having a collaborative working group that uses members outside of whatever organization you're working with is also a really good way to get caught up to speed and learn what the best practices are for that area.

There's a couple – there're conferences that I've been to that have been really good. The National Adaptation Forum in Denver, ran by EcoAdapt, was a really great way – it had about 500 people there, all sorts of officials, federal, state, local, tribal that really were interested in this area and could share practices and there were a couple working groups that emerged from that.

There're a couple other organizations, associations that I'd like to mention: the Association for Climate Change Officers and the American Society of Adaptation Professionals are both ways that you can become members and really share in their network and practices to get some lessons learned and get caught up to speed. Thanks.

Dana Spindler: Thank you, Scott. So one more question, I hope we can get in. I know that we're a minute or two over, but this question is for Alessandra. And regarding rebuilding homes in areas that are extremely vulnerable to hurricanes or flooding damage, or that have already been impacted by hurricanes or flooding, do you have any suggestions about how to deal with government or politician's resistance to say "no" to rebuilding in such vulnerable areas?

Alessandra Jerolleman: That really is a challenge that arises very often because when there's been an impact, there's tremendous pressure from the public and sometimes from all levels of government, as well, to really rebuild very quickly and to put things back the way they were.

And there's something about that post-disaster environment that makes everybody remember what used to be very, very fondly and everybody sort of idealizes what used to be normal. And that makes it very difficult for a politician or city official or anyone to say hey let's stop and think let's do this differently; maybe when we rebuild the community it's going to look a little different. Maybe there are some places where we can't rebuild, or where rebuilding safely is going to be so challenging that perhaps there are alternatives and – and that varies from community to community even.

And what I would say is that some things that can help with that are certainly preplanning, the more that conversation has happened ahead of time, I talked about pre-disaster recovery planning. It can help to speed things up. It can help to have buy-in ahead of time for the ways in which the community can become stronger and avoid experiencing the event again. And as much as people want things to go back to the way things used to be they also don't want to go through this again.

And the benefits of higher standards such as building with elevation or with free board, not just in terms of avoiding the event but also in terms of cost savings, especially now with Bigger Waters of Flood Reform Act. It can also be a powerful tool and a way for politicians and

community officials to say we're not trying to make your life harder, we're actually trying to help you be safer, we are trying to help reduce your flood insurance costs with free board and NHMA has some resources for that.

If you go to our Website <http://www.nhma.info/sandy>, you'll find a Nine Steps to Recovery document with some examples for an actual community and a nine step process that can help with this. And it has some information on communities that have successfully navigated the process. And you'll also find some information on building higher and incorporating free board and there's no easy answer to this but there are some resources that can perhaps help a bit.

Dana Spindler: Thank you, Alessandra. I'm going to pass it over to Emma to wrap us up. Thank you all for presenting and your answers to the questions.

Emma Zinsmeister: And thank you to everyone on the line for sticking on for just a few extra minutes with us, I know we're past the time that we had allotted.

Any questions that we didn't get to, we will certainly provide responses to those online and there's also a copy of Paul's presentation that's available so folks can see the content from his case study on what California's doing with adaptation and public health.

So, thank you again to all of our speakers for sharing their time and expertise. Hopefully this has provided folks on the line with a lot of great ideas and examples about how to form partnerships across different sectors and activities to leverage the funding and resources that are out there since, as we all know, adaptation is not necessarily something that's being funded explicitly, although it is getting more attention in the light of various storms and droughts, and budgets are certainly tight across the board.

So thank you again for your participation. And the files for this Webcast as well as the ones that we had focusing on getting buy-in and overcoming uncertainty will all be on our Website and I certainly encourage folks to check those out.

So, thanks again and please tune in to our newsletter. You can sign up for that at our Website to hear announcements about other upcoming Webcasts. So thanks again and join us again soon. Thank you.

Operator: This concludes today's conference call. You may now disconnect. Presenters please stay on the line.

**END**