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OPERATOR: Thank you for your patience and welcome to today's National Wildlife Federation conference call hosted by Dr. Amanda Staudt, entitled National Wildlife Federation Midwest Flooding, Global Warming, and National Legislation. During the presentation all lines will be in a listen only mode. A question and answer session will follow the presentation and instructions for asking questions will be given at that time. Thank you for your attention, I would now like to turn the conference over to your host, Dr. Amanda Staudt.

AMANDA: Good morning everyone. I am Dr. Amanda Staudt, a Climate Scientist for the National Wildlife Federation. Welcome to this press conference on Midwest Flooding, Global Warming, and National Legislation. I will be serving as your host and moderator.

The purpose of this teleconference is to provide you with the latest science about those factors that are contributing to heightened flood risk in the Central United States, namely global warming and poor management of regional watersheds, rivers, and flood plains, along with some policy solutions.

Let me start by saying that our thoughts and prayers are with those families in Iowa, Illinois, Wisconsin, Missouri, and across the Midwest who have been dealing with the massive flooding of the last few weeks. The National Wildlife Federation website provides some information about charities that are helping those in harms way. Please visit www.nwf.org/news for more information. Again, that's www.nwf.org/news. At the same web address you'll also find a fact sheet which we are releasing today providing more information about global warming and other factors that make these floods more likely in the future. This is the first in a series of fact sheets that the National Wildlife Federation is producing on the link between global warming and extreme weather events, along with relevant policy options.

So the way we're going to proceed today is to start with 4 short presentations which will be followed by ample time to address any questions that you may have. I will be the first speaker today. National Wildlife Federation is the nation's largest conservation organization and our mission is to inspire Americans to protect wildlife for our children's future. I come to you, I hold a PhD in Atmospheric Sciences from Harvard University, and I will be summarizing the available climate research on extreme precipitation events.

I am pleased to also have 3 others with me on the call. The 2nd speaker will be Joe Wilkinson who is the President of the Iowa Wildlife Federation. Joe is a lifelong Iowan and a 20 year resident of Solan, which sits between the Iowa and Cedar Rivers. He is an information specialist with the Iowa Department of Natural Resources, although he is speaking today on behalf of the Iowa Wildlife Federation. Mr. Wilkinson will talk about his on the ground perspective on the flooding.

The 3rd speaker will be Professor Nicholas Pinter from the Department of Geology and the Environmental Resources and Policy Program at Southern Illinois University. Professor Pinter is an international authority in earth surface processes including flooding, river systems, hydrology, and natural hazards. His research focuses on changes in river systems, in particular human and natural alterations that make flooding more severe than it would otherwise be. Professor Pinter will talk about why flood levels have increased systematically through much of the Mississippi system and how new estimates appear to dramatically underestimate the actual modern frequency of large floods.

The final speaker will be David Conrad who's the Senior Water Resources Specialist with the National Wildlife Federation. Mr. Conrad is a Policy Analyst and Advocate for river and water resources protection. In recent years his major areas of activity have included the Water Resources Development Program of the Army Corps of Engineers, and Federal River Protection and Flood Plain Management Program. Mr. Conrad will talk about what needs to be fixed in national flood insurance legislation that is currently moving in Congress so that we don't make the situation even worse.

All right, now that we're done with the introductory remarks I will begin with my opening remarks in a summary of the latest science about how global warming is affecting heaving rainfall, specifically in the Central United States.

The picture is that global warming is making tragedies, like the severe Midwest flooding, more frequent and more intense. Although no single weather event can be attributed to global warming, it's critical to understand that a warming climate is supplying the very conditions that fuel these kinds of weather events. It is a law of physics that warmer air is able to carry more water. A report released just 2 weeks ago by NOAH and the climate change science program shows that we are experiencing trends towards more heavy precipitation events, especially in the Central United States during summer. In the upper Midwest the frequency of the most intense rainfall events has increased by 20% since the late 1960's. Another statistic, the number of days each year with precipitation greater than 4 inches has increased by 50% over the last century. These increases are accompanied by a corresponding increase in days with heavy stream flow in medium and large river basins in the Eastern United States.

As the climate continues to warm and we have even more moisture in the air, the trend towards increasingly intense precipitation events will continue. In the Midwest, big storms that historically would only be seen once every 20 years are projected to happen as much as every 4 to 6 years by the end of the 21st Century. So that 1 every 20 year storm will happen about once every 5 years if we continue emitting greenhouse gasses at the rate we've been doing. The great flood of 1993 which devastated communities along the Mississippi River and it's tributaries in 9 Midwestern states was one of the most costly disasters in the United States. A mere 15 years later were seeing another of these 500 year floods in the Midwest. With rainfall in May and June of this year about 2 to 3 times greater than the long term average, soybean planting is behind schedule and some crops may have to be replanted. This remarkably quick return of such severe flooding is what we should expect as global warming leads to more frequent and intense severe storms.

Floods and severe storms are among the most costly kinds of weather and climate disasters in the United States, together costing the country more than $115 billion from 1960 through 2005. The Midwest is hit disproportionately more than other parts of the country suffering about a quarter of these losses. Heavier rainfall events in the future could exacerbate these costs. One study estimates that flood related losses to US crops could double by 2030 due to increased frequency of excess soil moisture.

The other panelists with me today are going to speak in more detail about how we should reform watershed, river, and flood plain management to better prepare for future flooding events. But we also need to be taking steps to limit global warming and the potential impacts on communities and wildlife. We must reduce global warming pollution by 80% from today's levels by 2050 to avoid the worst impact. That's a reduction of 20% per decade, or just 2% per year. This target is achievable with technologies either available or under development, but we need to start taking action now if we're going to avoid the worst impact.

That concludes my opening remarks, at this point I'd like to turn it over to Joe Wilkinson who's the president of the Iowa Wildlife Federation. Bill?

BILL: Thanks Amanda. Just to get started as I'm sitting here this morning I can still see the backwaters, the floodwaters from the Iowa River where it turns into the Coralville Reservoir north of Iowa City, south of the Cedar Rapids area. And I live about 5 or 6 miles from the Cedar River, the one that really swamped Cedar Rapids, Waterloo, and that area. Those are the 2 rivers– and certainly not the only ones – that caused heavy flooding here, but the ones that got most of the attention and perhaps created most of the damage, and the economic damage as the inland streams went through Cedar Rapids, Waterloo, and Coralville, Iowa City on their way to the Mississippi River. Now while our house was spared, I've got friends, homeowners, business owners whose places were swamped up to 7 feet of water, and as well as neighbors, friends – even my wife is displaced from where they work because the places they work were inundated. I've talked with strangers who were flooded out of homes and apartments, lost everything but a few valuables that they had time to stack up high or on the 2nd floor, and then they got out with a plastic bag full of clothes.

Now the devastation really goes a lot deeper than the newspaper shops, the network video that showed a downtown underwater or evacuation boats on the streets with water up to the windows. With a flood you're left with all that it leaves behind. Now that the water's come down every drawer you open in that house, every mattress, chair cushion, toy, family keepsake is just filled with heavy, soiled, contaminated water. And after you empty out all the belongings then you have to deal with the carpets, the drywall, the insulation, the appliances – the floods ruin thousands of homes, but to add insult to injury the

people living in those homes now have to go in and clean it all up. A bunch of us, and it's certainly worth recognizing the thousands of Iowans and people from out of state who helped out and are still helping in the flood zones helping out where we could, sandbagging as the water rose, or in the emergency housing places. But now the heavy lifting and all the reconstruction as well as the paperwork are really just beginning. Now the flood victims have to go get the stuff out and proceed with the renovation, yet in some cases they can't even get in yet, or they can get in for just short periods of time. Now the cities and the authorities are doing a great job, but it's just the sheer volume of work slowing the whole system down.

Everywhere I've gone the last couple weeks, or the news accounts I hear repeated, its' people saying over and over I wasn't in the flood plain or I didn't qualify for flood insurance or I was told I didn't need flood insurance, until the floods came. Now thousands of people in Cedar Rapids and Coralville, Iowa City, Palow, Columbus Junction, Waterloo – their lives are really changed forever. And the talk is now turning the flood insurance, a closer look at zoning, and buyouts. As everybody rebuilds and re-plans though we need to recognize we can't just keep doing the same thing, there are causes for all this high water. A lot of it brought in by a very severe spring and moisture, some of it's brought on my construction, some by land use, and others increasingly linked now to the severe weather swing brought on – as we're seeing – by a change in climate. We need to recognize that rivers, especially during two 500 year floods in 15 years are bigger than us. They don't always go where we want them to go and it's time we really start paying attention to 21st Century science as a place to start.

So I'll turn things over now to Dr. Nicholas Pinter from Southern Illinois University.

NICHOLAS: Thank you Joe. Just a word of warning quickly, I'm calling in from the family cabin in Pennsylvania so I'm hoping that the phone won't kick out on me here, or there won't be any wildlife insurgence onto the porch.

I've been asked to talk today about some of my research. The focus of my research group for over 10 years now has been testing for long term trends in flood behavior, in particular on the Mississippi, Missouri and other major Midwestern rivers, others in Europe as well. Testing for trends, that is – are floods getting worse, or perhaps better, more frequent or less

frequent. When we've been able to identify significant trends in flooding the next important question is to determine mechanisms driving those trends. Mechanisms that are possible include climate change as Amanda was discussing, also land cover, land use changes over historical time periods may be significant. We've looked at the affects of river navigation construction and progressive levee construction over time, excluding the level border in the channel from the flood plains.

Another major focus of our research has been flood probabilities. Joe mentioned the determination that this year's flood was a 500 year flood, also the 1993 flood – a number assigned to in many places 500 year flood. Where do those numbers come from? The current official calculations of flood probabilities for the upper Mississippi River system come from a study that was released a few years ago, I think it was 2004/2005 – the Upper Mississippi River System Flow Frequency Study. This was a roughly $10 million multi-year analysis headed by the Corps of Engineers and it re-analyzed in some places for the first time in 25 or more years the flood probabilities on the upper Mississippi, the Missouri River, the Illinois River. So we're looking at those, supposed to be the current state of the art. Again, that put the 1993 flood at about the 500 year level, this 2008 flood came in close to that or above it in a couple locations. Number 3 on the list at present is the 1973 flood which was estimated as the 100 year flood, and then even in between, 2001 we had almost 100 year flood levels according to that study at many locations. So here we have within the last 35 years, 4 events at near or above the 100 year level. What I'd like to emphasize is that is a contradiction in terms. That is an impossibility that those numbers can be correct, these are not random events, we're getting a systematic pattern of floods larger and/or more frequent than currently estimated by those calculations.

My research group did criticize the flow frequency study at the time it was released, and the main thing we pointed out is that that study and similar studies nationwide are based on what we say is a fundamentally flawed assumption. And that is that flood occurrence is stationary, that is non-changing over time. It is a bedrock assumption of how these numbers derived at present. That study in particular looked at the potential for changing flood occurrence over time in the form of climate change, and that study rejected that any form of climate change for the last century. It looked at the potential affects of land use change during the 20th Century and rejected those affects. There was no element of flood worsening from

progressive river navigation construction over that period of time.

The result we suggested following the release of that study was that flood probabilities are systematically underestimated in the upper Mississippi system as much as 4 and a half feet is the number we disseminated, that's the underestimation we came up with at the city of St. Louis on the Mississippi River. We suggest the current flood, sadly, is a confirmation that those conclusions were correct. That again a 500 year flood, at or near to that level, within 15 years – the 1993 event also up to a 500 year level – cannot be true, shows that these numbers are probably invalid, underestimating the actual occurrence of floods up and down this river system from a variety of different mechanisms.

So thank you and I'll pass this on to David Conrad, who is a Senior Water Resources Specialist with the National Wildlife Federation.

DAVID: Thank you Dr. Pinter. I want to address an issue here in Congress also that I think is relevant to our current situation. While the current Midwest flood is not as widespread as the previous record 1993 Midwest flood, it is still shaping up to be among the most damaging flood the nation has experienced. It has already been attributed with 24 deaths, some 14 injuries, nearly 40,000 homes and businesses evacuated, many experiencing huge amounts of damage, more than 3 dozen levies breached, and billions of dollars in agricultural damage from flood waters, saturation, and erosion. The National Wildlife Federation is deeply concerned that the Congress is currently poised to start a House/Senate conference on a 5 year reauthorization of the flood insurance program. Yet, neither bill addresses a number of the critical issues that already are arising out of this record flooding. Today the National Wildlife Federation has written Senators Christopher Dodd and Richard Shelby and Representatives Barney Frank and Spencer Dokiss, the Chairman and ranking members of the Senate Banking Committee and the House Financial Services Committee to urge their committees to hold immediate hearings and to take further legislative action to modify the bills in light of what we are learning from these new floods.

While the focus of these bills has been more on the financial precariousness of the flood insurance program and an enormous $17 billion debt to the treasury, it is clear that without significant changes and much greater focus on mitigation of

risks as a fundamental goal of the program, the nation will continue to see suffering and losses and little progress will be made on the financial situation. First the bills fail to adequately address climate change. Many Midwest communities have now experienced 3 of what have been termed 'greater than 100 year and as high as 500 year' floods, or .2% annual chance floods in 35 years. Many citizens are rightly angry and devastated that they are not being given accurate risk information. In addition, many areas have experienced failures of levies that they were led to believe would protect their property, but they were never designed for such magnitude floods. Congress has to direct FEMA and other federal agencies to take into account the factors of global warming, the potential for increased storm intensities and frequencies, sea level rise on the coast, and all aspects of flood insurance and flood protection programs. In addition, the bills fail to increase land use and building code standards to make risk mitigation and avoidance of risk a foundation of the flood insurance program. Both bills maintain the same minimal standards for community participation that were established with the program 40 years ago. For years government and professional reports have called on the flooding program and Congress to raise basic community standards to limit construction and fill in floodways and wetlands that are working to constrain flood conveyance and drive flood heights higher. Present rules continue to allow continued filling and levee-ing that exacerbate flooding elsewhere in flood plains. Both bills maintain the current low standard that a new or reconstructed building need only be elevated to the presently estimated 100 year or 1% chance flood elevation rather than setting building elevation standards considerably higher or requiring avoidance of the flood plains all together.

Because current methods of estimating flood levels and setting insurance rates look backwards and are based only on past flood histories rather than looking forward to anticipate future conditions from land development and other changing conditions, the program continues to result in more and more buildings and expanding flood prone areas and skyrocketing damages. With risks and frequency of serious flooding increasing, Congress needs to direct FEMA to adjust its standards, to reduce risk levels from future floods. After the Midwest there were significant buyouts but many flooded families and businesses also rebuilt in the flood plains and have again suffered enormous losses. Congress should not ignore the critical information coming from the recent floods and scientific reports. The House and Senate should immediately find the means to assure that the NFIP is

appropriately modernized and reformed and incorporated, and will incorporate the lessons of the 2008 Midwest flood, and to redirect the nations management of flood plains anticipating the impacts of climate change and changes in water sheds and the rivers to help communities be safe and improve overall environmental health.

Thank you, and I will turn this back to Amanda.

AMANDA: Thank you David. At this point I'd to open it up to questions, and the operator will give you some instructions now.

OPERATOR: Thank you. At this time we will begin with the question and answer session. If you have a question please press zero one on your touchtone phone. Questions will be answered in the order they are received. If you have a question please press zero one now. And we ask that you hold for a moment while our system compiles your responses.

And we have 6 questions in our queue. Our first question comes from Debra Zobrinko from Reuters.

DEBRA: That's Reuters, but that's okay. I'm going to try and shoehorn in 2. My first question is for Professor Pinter, what it sounds like you're saying is the Army Corps of Engineers numbers rejected any cause for these floods that might point directly back to human activity, do I have that about right?

NICHOLAS: Again, that study which was led by the Corps of Engineers was making future predictions in the occurrence of flooding based on past behavior. And what the study assumed or determined was that there was basically no change in the system over time. So that climate change, human or otherwise, was not influencing flood occurrence, that any land use changes within the contributing basis were not changing, that engineering of the rivers and their flood plans was not changing flood levels significantly. The one thing that was done is that the purported flood reduction benefits of large main stem dams on the Missouri River was included, the numbers were adjusted downwards, so we concluded at the time of the study was well when you reject anything that might make flooding worse and adjust the numbers for the one thing that might reduce flooding you end up with flood levels at some spots that are less than the previous analysis.

DEBRA: Okay. I think you've answered my question, I think you've understood. I have another one for you and/or Dr. Stout.

People who cover climate change or talk about climate change are always very cautious to say no one particular event can be directly attributed to climate change, they say well this is typical of what the predictions say. But at this point, are we getting to the point with this latest flood where the dots are getting so connected that you can pretty much walk right from climate change to this flood? Are we getting close to that point?

AMANDA: I can take a stab at that. The way I think about it is there is natural variability in the climate system that we're still going to see weather events and changes from year to year. But what global warming is doing is making the extremes more extreme. And so I think the climate science community is hesitant to say that a storm is entirely due to global warming but I think we're getting closer to the point of saying that global warming is a factor that's contributing to the level of severity of some of these events. I don't know if Dr. Pinter would like to add anything to that?

PINTER: I think Amanda covered it very well. These individual storms cannot be attributed to any one particular cause, but these causes or trends over time determine the long term probabilities which is really what – when you use the terms 100 year flood or 500 year flood or .2% probability flood that's what those refer to.

DEBRA: Okay, thank you.

AMANDA: Thank you.

OPERATOR: And our next question comes from Darren Goud.

DARREN: Yes hi, I was just curious whether there was any kind of feedback you've already received from anyone on The Hill about your request for language being added to the flood insurance bill, whether you've had any kind of interacting so far that would indicate that people are serious about possibly trying to make changes?

CONRAD: We have not heard back yet from the Senate Banking Committee or the House Financial Services Committee. One thing though I can say that we have begun to hear on The Hill from some of the top leaders and members from the Midwest too, that there … it's becoming more recognized that there is a need for oversight and probably hearings in order to better understand many of these issues that we're talking about here today on this

call. Clearly the science is coming forward rather rapidly and many of these factors were not considered in the past year or two while congress thought about some of these issues and so I think we are definitely hopeful that some additional oversight will come through, but we have not heard directly from the committees yet.

DARREN: Is there any indication that they might want to craft because of the recent floods that politically speaking we might want to move on finishing that bill more quickly than they would if they didn't have these type of oversight hearings and such, and did consider adopting new language? They're talking about doing the global warming bill next year, I'm just wondering whether this issue might get wrapped up in that bill rather than this reauthorization bill.

CONRAD: Well we don't know how that packaging might happen. The one thing we can say is that we think what has been contemplated is a 5 year reauthorization of the flood insurance program, and we think that that moving forward without addressing these issues is … particularly with the idea that we might not address these issues for up to another 5 years, would not be the right thing to do. These issues need to be brought into focus right now because this program is on the financial ropes, and I think this year is demonstrating once again that the costs associated with failing to focus on the standards, on management and reduction of risk, are likely to leave the program in as bad or worse shape and the changes contemplated might have no terribly positive effect unless these other factors are brought in quickly to be addressed.

DARREN: Okay, thank you.

OPERATOR: Thank you, and that was Darren Goud of Congress Daily. Our next question comes from Rayjean Shleffinger from WBBM Radio.

RAYJEAN: Good morning, isn't it true that there are – within the large sweep of history – that there are natural cycles of warming and cooling that are totally independent of any human activity? So isn't it possible that this is just something out of our control?

AMANDA: Absolutely. Over the long history there are major swings in our climate, but all the evidence and all the science is pointing to the fact that the recent changes – especially over the last few decades – have been outside of that natural

variability and can only be explained by the way that we're changing our climate by adding these greenhouse gases to the atmosphere.

RAYJEAN: Thank you.

OPERATOR: And our next question comes from Sue Lowe of South Bend Tribune.

SUE: Hi, we're up in Northern Indiana where the Mississippi River Basin and the Great Lakes, and specifically the Lake Michigan Basin run up against each other. We had some early spring flooding in both basins that were minor compared to what you guys have got, but how does this increase probability? Does this also apply to areas that are further away from the big rivers?

AMANDA: Increased probability of rainfall applies all across the Midwest. So I think yes, and I'm not entirely sure how it affects the stream flow for the smaller rivers, but definitely the rainfall changes that we're going to be seeing a greater frequency of heavy rainfall events is something that we would expect across the Midwest. I don't know if Dr. Pinter wants to say anything about the stream flow implications there.

PINTER: Well I would just add what Amanda mentioned, that the climate change – we expect that to be a regional signal across the Midwest. There are different signals elsewhere, for example it's a different picture in the Far West if you ask, and other spots in the world. In terms of the calculations, are they getting it right for long term trends, different bases and different histories. In the Midwest what we're looking at in particular is the widespread addition of tile drains over the 20th century, and then another influence seems to be what's happening on each river. And the major navigable rivers like the Mississippi is a big part of the picture there. For example, just to pull up some numbers, large scale structures were built for example just downstream of Hannibal Missouri, 39,000 linear feet of wing dykes walls put into the water within the 20th Century and those have a significant influence on the level or height of the floods. That's probably not an influence…

SUE: No, that wouldn't be an influence here but we certainly do have a lot of tile trains.

AMANDA: So did that answer your question Sue?

SUE: Yeah I think it does. I know the people here are sort of gee, are we going to have more, they're having more often there, are we going to have more here. So.

AMANDA: Right, yeah.

SUE: Thank you.

AMANDA: Thank you.

OPERATOR: And once again if you have a question please press zero one on your touchtone phone. At this time we have 5 other questions in the queue. Our next question comes from Brian Sullivan of Bloomberg News.

BRIAN: Dr. Pinter you rejected the characterizations of 500 year flood/100 year flood, how would you characterize these floods, and also do you have any predictions as to the occurrences of flooding in the next 20 to 50 years?

PINTER: Let me give you just one result. We focused a lot on St. Louis just because it's near and dear to our hearts. And at the time this flow frequency study was released rather than being the 1993 flood, rather than looking at that s the 200 or 500 year event at that location, we suggested that when you incorporate these long term trends that the 1993 flood looked more like the 90 year flood, less than the 100 year flood at that location, and that number would be even lower with continued construction within the river, continued climate change up to the present day.

BRIAN: Do you have an idea of how often these floods will continue then? If all things remain the same can you make any prediction?

PINTER: The easy answer is the floods will continue into the foreseeable future. The climate - I'll defer to Amanda, but my understanding is that the climate trends due to anthropogenic global warming will continue to drive the flood frequencies upward. That is, the floods will become more frequent and then the contribution from other factors depends on what we do. The contribution from river engineering, at least in some portions of these rivers, continues up to and including the present day.

AMANDA: I guess in terms of the climate contribution all the projections are that we will continue to see some global warming over the next century because of emissions that we have already

emitted, or pollution that we've already put into the atmosphere over the last century. And so I think I mentioned in my opening remarks that the current projections are if we continue on the same path of emissions that storms, the rainfall that we would expect only once every 20 years could happen as frequently as once every 5 years. So yes, they're definitely expected to continue, the rainfall trends. They're less… I haven't really seen any climate projections of the flooding exactly because there are so many other factors that contribute to a flood that those usually are not included in the climate projections. But the climate projections do focus on the changes in the precipitation pattern.

Does that answer your question Brian?

BRIAN: Yeah.

AMANDA: Okay, great.

OPERATOR: And our next question comes from Edward Houssar of the Quincy Harold Whig.

EDWARD: Hi, I'd like to address this to Dr. Pinter. I was wondering if your group or any group for that matter, has studied the impact of the development of so many large reservoirs along the upper Mississippi Valley, particularly in Iowa. It seemed that when these were developed that one of the reasons touted for their development was to help with flood control, but as I recall in 1993 and again this year as the flooding intensified water in great volumes was released from these reservoirs, and I was wondering if you could speak to the impact that these may be having on flooding on the river.

PINTER: My understanding is that there are reservoirs with a flood control component on the upper Mississippi, or their tributaries rather. But there's a relatively small capacity, reservoir capacity up there. There's a larger reservoir capacity in main stem dams in the Missouri River that chop off some of the top of floods, large floods, there. But you're getting relatively little help where you are there in Quincy.

EDWARD: Thank you.

OPERATOR: And our next question comes from Lindsay Shurer of US News and World Report.

LINDSAY: Hi, this is a question for anyone who might be able to answer it. I'm wondering if we were to plot a map of the Midwest what cities would be in the foreseeable future the ones at greatest risk for flooding and other major events attributed to global warming?

AMANDA: That's an interesting question Lindsay. Dr. Pinter do you have some thoughts on that?

PINTER: It's a hard question. The threat is really a regional one that any of these river cities are located at risk. Some more than others just based simply on their relationship with the local rivers. The climate change impact is a regional one. Amanda do you have more of a local pattern or suggestion or projection for the future?

AMANDA: No, typically the climate projections at this point can only get to a regional scale. We don't have the capabilities to do more specific than that. So I'm not sure I can really pinpoint specific cities that are at the greatest risk right now. I'm actually looking at a map right now thinking now what might they be, but I don't think I could do that at this point.

LINDSAY: Okay, thank you.

AMANDA: Thanks Lindsay.

OPERATOR: And our next question comes from Erica Martinson of Walter Policy Report.

ERICA: Hi, I have 2 questions really. The first is for Mr. Conrad, as far as Congress goes you've mentioned what you guys want out of the current bill, but do you have any… is there any push for any changes to maybe WARDA as they're collecting projects for WARDA 2008 as to how the Corps deals with… and you said there were a lot of levies that were compromised, or land use changes that need to be taken into account – do you want different types of projects to be taken up by the Corp to prevent flooding?

CONRAD: Angela is that right?

AMANDA: Erica.

CONRAD: Erica, sorry Erica. Yes, that's a good question. Yes, I believe that the range of experiences that we are currently having also dictate that the flood control and flood damage

reduction programs of the Army Corps of Engineers need to be reviewed in light of both the climate issues and the land use and building standards issues, and under what circumstances do we need change in our levee policies. Some of these issues were brought up but only tangentially dealt with in the word of 2007. There was a provision that established the beginnings of a levee program, or levee inventory program for the Corps of Engineers and we're still, nationally, we're still in the process of identifying where levees are. There are thousands and thousands of miles of levees across the country. They are not all, certainly not all federal levees and even whether they're federal or not they're in a variety of states of repair and various design levels and we don't have uniformity in those areas. So we need to review our reliance on levees and in many cases where we're heavily reliant and levees are potentially inadequate we need to make sure they are made adequate, and in other instances particularly regarding the idea of new levees, I think the current experience is casting great doubt on the wisdom of establishing a lot of new levees given what we're seeing with flooding levels and the phenomenon of warmer air being able to deliver higher amounts of moisture both on a short term and on a seasonal level. So the next WARDA needs to address these issues absolutely.

ERICA: What would you suggest instead of creating new levees?

CONRAD: Well the Corp of Engineers even has some authorities that allow them to participate in voluntary buy outs and relocations, but those authorities have never been used, or are seldom – I'm sorry, let me say that are seldom used and the most recent one that was authorized in 1999 has not received any funding at all. The… I think what is suggested is a reconsideration of the traditional reliance on structural approaches and a need to place greater reliance on giving the rivers, in fact in Europe they call it giving rivers room to move. And a great deal of effort was made after the great Midwest flood of 1993, more than 10,000 homes and businesses that were in deep flood plains in the Midwest were bought out and relocated on a voluntary basis, and many of the communities that participated in those have had less flooding certainly than they would have in the current floods. But in other places communities went back in and rebuilt in these areas, and those are the policies that we need to look at more carefully to figure out how best to proceed.

PINTER: If I could just jump in for a second. Your answer actually gives us the answer to the previous caller whom we

didn't really give a satisfactory response to, which communities are most threatened in the future. Again, the climate change signal is a regional one, we can't predict where the next major flood is. But maybe the answer really lies in levees, or reliance upon levees. That the places to watch, the places that need to be most concerned into the future are the places with a large reliance on levees, levees built on an underestimated flood risk, underestimated flood levels, and particularly those spots which are now having structural concerns or problems. And David you might disagree, but I would say the one place with a great big bull's-eye painted on it right now is East St. Louis which has all of those problems.

CONRAD: No, I don't disagree with that at all. I am concerned, in fact the levees along the Eastern side of the Mississippi River there at East St. Louis were recently decertified as being inadequate to protect from a 100 year storm, and the current 1% chance flood which I think we all believe will eventually be recalculated. So no, I agree. Communities that are currently heavily reliant on levees need to pay a great deal of attention to the levees, their maintenance, and to make sure that they are adequate and will actually perform in major floods.

ERICA: And just real quick not to take up too much time, but a follow up to the earlier discussion about projecting floods for Dr. Pinter, I understand a lot of different agencies are dealing with problems with historically have always projected based on past action. Is there a need for new science to be able to project floods in the future or is this something that the Army Corps has just chosen not to do when they could?

PINTER: Well current flood levels are simply based on an assumption. That is flood occurrence doesn't change over time. That it is stationary. And what we've suggested all along is that rivers are dynamic systems and flood occurrence can change and has changed dramatically, significantly, and that simply needs to be reflected in new calculations.

ERICA: Is that something that's simple to do though?

PINTER: It is not… well it can be done relatively simply or it can be done with greater levels of sophistication.

ERICA: Okay.

CONRAD: I would add that the kinds of changes that go on around rivers include climate but they also include the impacts that we

have, that our human activities have on both the rivers and the landscapes. So the more we change the rivers, levees, jetty's, weirs, etc., the more impact that we have on the capacity of rivers to pass floods and to even handle droughts and low flow periods, but also we change the landscape for instance through plowing of fields, when we put drains underneath our fields and drain that water much more quickly into the smaller streams and tributaries, the accumulation of that water has a more pronounced affect further downstream. So all of those factors need to be taken into account when we are analyzing the water flows and flood frequencies. And a third one is just as we urbanize an area we do increase often the impervious land, we change from pastures and forest to parking lots and shopping centers, etc., when we make those changes we need to take those changes into account and what is not generally done today is having communities look into the future and say we know we are growing, we are building out into the landscape, we will change the flood regime, and we need to anticipate that more. Today when our flood insurance maps are put together they only look backward, they do not look forward. And it would… there are communities that have like Charlotte Meckenburg in North Carolina has mapped it's flood plains on the basis of future conditions which they can anticipate and are doing the best they can to anticipate all the factors that they can think of that are going to affect the future flood plains as a region.

AMANDA: Thank you David, I think we should probably move onto the next question.

OPERATOR: And our next question comes from Hooper Banks of KMXL Radio.

HOOPER: Yes, this one if I could assume it's for the whole panel basically regarding the frequency of these large flooding events. You mentioned that there's a strong possibility that they could become more frequent as we move forward, I was wondering what data had been collected in the past couple of centuries about the frequency of 100 year flooding events, or 90 year flooding, major flooding events. And this is for whoever can step forward and contribute to that.

AMANDA: Dr. Pinter do you want to talk about flooding events? I could talk about precipitation.

HOOPER: I figured Dr. Pinter would be the one to probably answer that question.

PINTER: Okay, well Amanda can talk about flood events in terms of the precipitation that causes them. What I can tell you is that there are wonderful, the US actually as we work world wide on these issues we've been impressed how good and what long duration data there is right here in the US. So there's systematic measurements of water level stages going back generally 75/100 or more years. 150 years at St. Louis for example. There's measurements of the flow that many hydrologists look at, and then there's very old flood data from waterlines or early measurements dating back hundreds of years on some of these river cities. So it's an excellent database on which to determine are there trends, and which way they're going.

AMANDA: And likewise we have the network of rain gauges and weather observing station that have long records, 50 to 100 years records and longer, of precipitation that we can rely on for estimating these trends in precipitation amounts.

CONRAD: I want to only add to this that in recent years many of the scientists have been concerned about the fact that just for budget reasons some of the stream gauges have had to be closed and when you lose that continuous data reading it weakens your ability to make predictions in the future. So there's been a very strong push in the Congress to increase that funding so that we can keep this data coming. That data is going to be critical to figure out our situation in the future.

HOOPER: I had a quick follow up to that, and this might be just hard to answer. With the data collection apparatus in place, and I understand that it is, can you identify, can you give some numbers as to perhaps what major flood frequency was prior to 40 or 50 years ago?

PINTER: I can say that I would hesitate to put a number on that, it's just not an intellectual exercise we've done, but I'll say this – it could be done.

HOOPER: Okay, thank you.

OPERATOR: Our next question comes from Karen Dillon of Kansas City Star.

KAREN: Yes, my question was actually the same as the reporter from KMXL radio. My experience here in Kansas City and in Iowa over the last many years – we've seen a lot of floods, and serious flooding and I was just curious what the frequency was,

even going back to say 1930 to present. We had the great flood of 1951 here in Kansas City, and then there was another one in 1963 or something like that in Kansas City. And obviously Iowa's been affected quite a bit by the Mississippi River flooding and things like that. So I didn't know if somebody had sat down and fed the frequency and looked at the dates of flooding on the Missouri River and on the Mississippi River. But from my understanding of your answer to the last question from KMXL I guess nobody's put those numbers together.

CONRAD: Dr. Pinter can you help with the issue between flows and stage? In helping folks sort that out.

PINTER: Yeah, I'll try not to indulge myself in going too much into that. Again, there's discussion of the flow or discharge, the trends in how much water, how many cubic feet per second is arriving at a particular spot, and there's a separate question of how high the floods go, which is a measurement of the stage. And I'm hesitating a little bit because I'm trying to pull up if I have anything for Kansas City here in the background.

AMANDA: I would add while you're looking is that it's pretty easy to find online lists of major floods that have happened over the 20th Century, and I'm sure we could send along some of those websites to you if that would be helpful Karen.

KAREN: That would be great.

AMANDA: Why don't you just call – I'll give you some information about who to call after wards to get in touch with us.

KAREN: Okay.

OPERATOR: And our next question comes from MJ LePlay of Community Radio.

MJ: HI I'm calling from WORT in Madison and my question goes to Joe Wilkinson, I'd like to know what your friends and neighbors are thinking when they hear the science behind the flooding.

JOE: I don't know if they've even gotten to that point yet. Leading up to the floods we heard that it's going to crest, the Cedar River for instance the crest was changed several times, 19 feet, 21 feet, I think it finally crested at 30.3 or 31.3. They were just… I guess I'd go back to what I said earlier that they had no idea it was going to come this high, most of the people I

would talk to would say yeah in 1993 it didn't even touch me. Now my next door neighbors for example have a rental property in Cedar Rapids that we've been working on and the 1993 flood came absolutely nowhere near them and this time it filled the basement three and a half feet up to about the window level. I don't think they're worried about… the ones with damage are right now stuck with cleaning the place out and bleaching it and hopefully getting an okay to move back in. they're not really worried about at this point yet what the 500 year flood is, or what the current science is. I don't mean to sound flip about that, but they're just too busy getting the place cleaned up before they worry about when it's going to happen again, or whether their house is even going to be there. As I said, there's a lot of people – I don't personally know anyone involved in potential buy out but there's estimates of up to a couple thousand homes in Cedar Rapids might have to be leveled and maybe not nearly that number in the Iowa City/Coralville area, but people are worried about that right now instead of when the next one is going to come.

MJ: That's what I was trying to make the connection between is what's happening there from your on the ground perspective and us from calling from all over perspective, specifically about the flood insurance and living in flood plain areas.

JOE: I think the thing we hear more often is that it didn't even touch me in 1993, or I had no idea I was in the flood plain or there's no way it could have reached me, I'm too far away from the river. And again, most of that coming from the Cedar River. The Iowa River – that had some fairly serious flooding in 1993 as well, but the Cedar River was not, again not taken by surprise because they saw the crest coming, but the crest kept changing. And there were, as Dr. Pinter pointed out too, there were a couple of gauges that were not missing, that's certainly not the entire reason or the reason for the flooding but that probably could have helped too, having a couple of those gauges upstream that could have let them know hey it's coming, it's coming. But they just… no one had any idea that it was going to get anywhere near this high.

MJ: Well thank you very much.

JOE: Sure.

OPERATOR: And our next question comes from Rayjean Shleffinger from WBBM Radio.

RAYJEAN: Earlier but I also wanted to ask you, you're talking about the greater frequency with global warming of floods and these kinds of events. Is there any way to quantify how much more intense they'll become? You're talking, I assume you're also saying that they're becoming more intense.

AMANDA: Yes. I'm trying to think the best way to answer because what's basically we're seeing is a shift of the distribution of floods such that we have more floods in the long tail where they're more severe. So we'll see an increase in both in the severity and frequency of the heaviest rainfall events. I'm not sure if that quite answers your question.

RAYJEAN: I'm just wondering, are the floods that we get more frequently going to be worse even than the ones that we're seeing right now and in 1993?

AMANDA: I don't now. I think the message is that really we're going to get more of these sorts of really big floods. It's hard for me to say if we're going to get even worse ones, I suppose it's statistically possible but I don't know for sure. The fact that we're getting 2 of these 500 or as Dr. Pinter has told us today probably 100 year floods, in 15 years is – the 1993 one and then this one, that's the sort of thing that we're going to likely see is these more frequent really large ones.

RAYJEAN: Thank you.

AMANDA: Dr. Pinter did you want to add to that, or did I?

PINTER: Only maybe an additional comment that to a hydrologist magnitude and frequency are interchangeable up to some maximum imaginable flood. So I think the best statement is that you're going to get more frequently large floods.

AMANDA: I think that's exactly why I was struggling because it's hard to separate, so thank you for that clarification.

RAYJEAN: Thank you.

OPERATOR: And we have no further questions.

AMANDA: Great. Well thank you all. I just want to make a couple concluding remarks. I just want to close with a few items of business. If there are any additional questions though please do let us know. First I wanted to remind everyone that the fact sheet is now available at our website –

www.nwf.org/news and if you have any further questions please contact Mr. Aileo Weinmann using the information on the press release. That's Aileo Weinmann, available directly at 202-797-6801 or his email is weinmanna@nwf.org, again those are 202-797-6801 and weinmanna@nwf.org

Thank you for joining us today and that concludes…

CONRAD: I wanted also to say that I believe also on the website that you sited the recent letter that we sent to the Senate and House Banking Committee leaders is also posted.

AMANDA: Right, thank you, I forgot to mention that. It is there as well. And if there's nothing else I just wanted to thank everyone for joining us today, and this concludes our conference.

ALL: Thank you.

OPERATOR: Thank you, and this concludes today's conference, all participants may now disconnect.

(End of recording).