

**TESTIMONY CONCERNING LESSONS FROM THE
2010 TENNESSEE FLOOD**

HEARING
BEFORE A
SUBCOMMITTEE OF THE
COMMITTEE ON APPROPRIATIONS
UNITED STATES SENATE
ONE HUNDRED ELEVENTH CONGRESS
SECOND SESSION

SPECIAL HEARING
JULY 22, 2010—WASHINGTON, DC

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**TESTIMONY CONCERNING LESSONS FROM
THE 2010 TENNESSEE FLOOD**

THURSDAY, JULY 22, 2010

U.S. SENATE,
SUBCOMMITTEE ON ENERGY AND WATER DEVELOPMENT,
COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 9:33 a.m., in room SD-192, Dirksen Senate Office Building, Hon. Byron L. Dorgan (chairman) presiding.

Present: Senators Dorgan, Bennett, and Alexander.

OPENING STATEMENT OF SENATOR BYRON L. DORGAN

Senator DORGAN. We're going to call the hearing to order. This is a hearing of the Energy and Water Appropriations Subcommittee. I very much appreciate all of you being here. It's a testament to the importance of this hearing that we have a number of Members of Congress who wish to make statements at the outset of this hearing.

We're going to take testimony concerning the Cumberland River flooding that severely impacted Tennessee and surrounding States in May of this year.

We'll hear, among others, from Senator Bob Corker, from Tennessee; Congressman Lincoln Davis, from the Fourth District; Congressman Jim Cooper, from the Fifth District; Congresswoman Marcia Blackburn, from the Seventh District; and Congressman Steve Cohen, from the Ninth District.

We welcome all of you here.

I will tell all of you that Senator Lamar Alexander has talked to me at length, on numerous occasions, about what has happened and the need for this subcommittee to hold this hearing. I'm very pleased to do that, and Senator Bennett is pleased to be a part of this as the ranking member of this subcommittee.

I have to chair another committee hearing this morning at 10 o'clock, so Senator Bennett will chair in my stead when I have to leave.

After the statements by Members of Congress, we will receive testimony from two panels. The Panel 1 witnesses will include Major General John Peabody, who is the commander of the Great Lakes and Ohio River Division of the U.S. Army Corps of Engineers. We will receive testimony from Gary Carter, the director of the National Weather Service, and James Bassham, the director of the Tennessee Emergency Management Agencies.

The witnesses for our second panel will include The Honorable Karl Dean, mayor of the city of Nashville Tennessee; The Honorable Richard Hodges, mayor of the city of Millington, Tennessee; Whit Adamson, president of the Tennessee Association of Broadcasters; Bert Mathews, chairman of the board of directors of the National Chamber of Commerce.

We appreciate all of you traveling to Washington, DC today to appear before us. We have 16 speakers on the agenda, so I want to ask that your oral statements be limited to 5 minutes, and we will include all of the full statements as part of the permanent record.

As you are aware, one of the agencies that the Energy and Water Subcommittee funds is the U.S. Army Corps of Engineers. Their budget represents only about 15 percent of our overall energy and water bill, and yet the work they do touches virtually every State in this Nation, and a good many communities around the country, and a majority of our citizens.

The flood risk management navigation and environmental restoration projects that they study, construct, and operate, and maintain, are significant boosts to our national economy, and help maintain our standard of living. Although it may not seem like it after an event such as the type that you have just experienced, you are fortunate, in the Cumberland River Valley, to have a number of completed flood control projects to help manage flooding in the valley. Flooding is not the threat in the valley that it once was, but this year reminds us, flooding does remain a very serious threat.

We're not so lucky in the Red River Valley in North Dakota. In the Fargo area, the Red River has exceeded flood stage in 52 of the last 108 years, and we are working with the Corps of Engineers on that subject, as well.

I flew into Nashville the morning after the flood. It was just serendipitous, because the head of FEMA was in North Dakota the day before and I was going to fly back to Washington with the head of FEMA. So, I actually saw, the very next morning, the unbelievable flooding, from the window of an airplane landing in Nashville. It was extraordinary. I mean, it kind of defies your notion of what's possible when you see the massive amount of water that was in that area, and the damage that was done. I didn't see the damage close up, but I saw it from enough of a distance to understand the substantial damage.

You had very little warning. I know that in 36 hours you received 17 to 20 inches of rain, depending on the location. This is something like a third of your annual rainfall. I think all of us can agree that there's no system that really can contain that very effectively.

My heart goes out to all of those that have been disadvantaged and injured and have had their lives turned upside down because of this act of nature, and I want to do everything that we can. I know that Senator Alexander and others of you from your State have spoken to all of us repeatedly about what has happened and what needs to be done to respond to it.

So, I thank all of you for coming. As I indicated, I will have to leave to chair another committee hearing in about 20 minutes. Senator Bennett will then continue. I would like to call on the ranking

member, Senator Bennett, and then call on Senator Alexander for an opening statement, as well.

OPENING STATEMENT OF SENATOR ROBERT F. BENNETT

Senator BENNETT. Thank you very much, Mr. Chairman. I appreciate you holding the hearing.

And, like you, I reflect on the impact of floods. We've spent billions of dollars—Federal, State and local—to try to alleviate flooding in this country over the last 200-plus years. But, we still have significant flooding, and it almost always comes without any warning.

Even in my own home State of Utah, people say, "Utah is the desert. How can you have flooding in a desert?" Well, I can assure you that it happens, and it takes a lot less than 17 inches to do it. In 2005, we had a rain and snow combination in southwestern Utah and the southeastern part of Nevada, that caused significant flooding in the Santa Clara and Virgin Rivers in Washington County, near St. George. Pleasant little streams that people would wade across for recreation when they had water in them—a good part of the year they had none and were completely dry—suddenly became raging torrents that would pick up a home and carry it down the stream, ripping it off its foundation and sweeping it down by the currents. And it was the Army Corps of Engineers, along with the Natural Resources Conservation Service that helped us deal with that.

So, I have great understanding of how things can happen very rapidly, without any sort of warning. And the pictures that we have around the room just remind us of how powerful water can be, and how puny human efforts to try to hold it back can be, no matter how much money we spend.

So, we need to have this kind of hearing. We need to understand and do the best we can to prepare for future floods. I look forward to the statements of the Members of Congress as well as the testimony of the others who will be here.

Senator DORGAN. Senator Bennett, thank you very much.

And let me say, while Senator Alexander is a member of this subcommittee and has been pushing to create this hearing, and I'm happy to do that—Senator Corker, similarly, has been aggressive in making certain that we have these kinds of hearings, and making certain that we understand the needs of the State of Tennessee with respect to flood protection.

So, Senator Corker, thank you for your work, as well.
Senator Alexander.

STATEMENT OF SENATOR LAMAR ALEXANDER

Senator ALEXANDER. Thanks, Mr. Chairman.

I—first, I want to thank Senator Dorgan and Senator Bennett for focusing attention on the Nashville—on the Tennessee flood of 2010, and thank Senator Corker for his hard work here, and the Members of Congress, who will testify in just a moment, and the witnesses who've come from Tennessee, all of whom have busy jobs at home, and busy schedules. And so, we thank each of you for coming.

There are two reasons, in my view, for this hearing. The first is to remind ourselves, and the Nation, of what a disaster this was. This is the largest natural disaster in this country since President Obama took office. And it—and FEMA tells me that it's been 2008 since any disaster in this country has required as much money or attention as this one has. It's been overshadowed by the oil spill, which is tragic, and is not a natural disaster, but, I've heard from many people around the country, and I would say this to those who are here from Tennessee, about how proud the country is of the response Tennesseans have had to the flood. Instead of looting and complaining, Tennesseans have been cleaning up and helping each other and have made quite a name for themselves around this country, in terms of response to a tragedy.

The executive summary of the Corps of Engineers says it this way, that a 36-hour rainfall event on the first weekend in May of this year produced record flooding, in their words, "far greater than a 1,000-year rain event." They described the management of the waters as "dynamic and dangerous." And all of us from different perspectives, from Nashville to Millington, Clarksville, Ashland City, have seen the incredible results. These are the photographs from Nashville and Millington. Opryland Hotel had 10 feet of water shortly after 1,500 people were evacuated.

Senator Corker and I were in—and all the Members of Congress—were in various places, seeing what had happened.

Forty-six counties were declared a disaster area. Sixty-four thousand Tennesseans in just the last 2½ months have registered with FEMA to receive aid. The aid that has come to them has been nearly a quarter of a billion dollars. Many Tennesseans simply didn't ask for any aid. They just fixed their basements up, spent their own money, and went about their ways. There's a lot more remaining to be done.

We saw examples of heroism—for example, in Clarksville, where the soldiers took a day off and cleaned up three communities. Congressman Blackburn and I saw that. We were there on that day in Dyer County, in Millington, where Senator Corker and I visited in Memphis.

This is about Tennessee's flood in 2010, but, as Senator Dorgan and Senator Bennett said, flooding is a national phenomenon. Three out of four of the federally declared disasters in this country over the last 5 years have been floods, so it's what we work with when we talk about disasters. One of the unfortunate things is that many in the Nashville area didn't know about flood insurance. Many are eligible, very few had it. And that's one of the lessons that we need to work on.

The main goal of this hearing is to find out what happened on April 30, May 1, and May 2, and what lessons can be learned as we prepare for future floods. The Army Corps of Engineers after-action report will be presented for the first time today. We look forward to getting answers. Some of the questions that are likely to be asked are; could water levels have been lower at Old Hickory Dam? And, if they had been lower, would that have resulted in less water in downtown Nashville? Could there been better forecasts if the Corps of Engineers and the Weather Service had understood each other better? The after-action report very candidly says that

there's a lack of communication there, based upon a misunderstanding, or a lack of understanding, of each other's procedures. What was the effect of a lack of equipment? For 11 hours, the Internet was down during the height of the flood. And what difference did that make in letting people know what was coming, in terms of flood levels, so they might have saved valuable treasures, their homes, or even their lives?

We've done a great job with forecasting tornados, and improving that forecast, the Weather Service and other agencies have, working with broadcasters, who are also here today. You can tell that a tornado—if you turn on the television, you can tell a tornado is coming down your street, and exactly what time it's going to hit your house. That wasn't true 10 years ago. There have been great advances not only in gathering accurate information, but providing it to people in a timely and accurate way so they can take action to prevent damage or save their lives. Can we do that same kind of thing with a different phenomenon, like rising water?

And then there are questions about personnel. This happened on a weekend in an agency that says it doesn't have very many staff members, to begin with, to deal with it, so they weren't there, some of them. Those who were, in some cases acted heroically. And some had a hard time getting back to do anything, because they were going through floodwaters.

So, what are the lessons that we can learn from this tragedy to make sure that when flooding comes again, as it surely will, that we can save more property and perhaps save more lives?

Mr. Chairman, those are the questions—some of the questions that we'll have. I'm grateful for everyone coming. We hope to conclude this by noon, because we have votes in the Senate. And so, I have a lot of questions I won't be able to ask, but I'll submit them to the witnesses who are here today. And, I know, Senator Bennett that we'll try to keep witnesses to a reasonable amount of time and still hear their stories so that we can get the full story on the record.

This would be, I'd say, Mr. Chairman, the first step in a straight-down-the-middle effort to find out what happened and what lessons can be learned for the future.

Senator DORGAN. Senator Alexander, thank you very much.

Let me call on Senator Corker, as the first witness, and then let me ask, Senator Alexander, if you would, to introduce the Members of Congress from your State as they are prepared to testify.

Let me emphasize, as well, because of the large number of witnesses, we really would like to stick to the 5-minute rule. Having served in the U.S. House previously, I know there's a 1-minute rule in the House, so they are much more practiced at this brevity than we are in the Senate.

Senator Corker, again, thank you for your work on this, and your continued focus on this issue. We welcome you here. You may proceed.

Senator CORKER. Thank you, Mr. Chairman, I very much appreciate you having this hearing. I'll certainly set the pace on brevity.

STATEMENT OF BOB CORKER, U.S. SENATOR FROM TENNESSEE

Senator CORKER. Senator Bennett, I thank you for having this hearing, also. And, as always, it's a great pleasure to serve with Senator Alexander. I really appreciate the way he has focused on this issue.

I'm proud to be here with colleagues from across our State. We enjoy working with each other, and I think our State actually sets a tone for the country in our ability to work together through crises and other problems, and I think that's why the State is why the way it is.

In the beginning of May, Tennessee, as Senator Alexander mentioned, had the greatest natural disaster during this administration, and Tennesseans acted the way I think we all expected them to act; they helped each other. It's amazing the way Tennesseans came together. And so many people were devastated, as you can see by the photos around the wall.

In that same vein, where Tennesseans, I think, set an example of the greatness of this country, we have with us today General Bassham, who's outstanding, he represents our Governor, who did such a marvelous job handling this crisis. We have Mayor Dean, Mayor Hodges, again, exemplifying the greatness of our State; Mr. Adamson, representing the broadcasters, and Bert Mathews, a private citizen that represents our chamber. And the reason that they're here today is, in the same way that Tennesseans helped each other, they're here to help our country.

As you mention, flooding takes place constantly across our country. In this particular episode, there were communication gaps, no doubt. There were things that could have been done better. And while many Tennesseans have been devastated as a result of some of those gaps, some of these things might not have occurred quite the same way. They're here to help us learn. And I thank all of those who are contributing to that. I know the Corps of Engineers is looking forward to making their presentation.

So, without further adieu, Mr. Chairman, I thank you for this. I'm proud to represent a State that conducts itself the way that it does.

And I thank all these Tennesseans who are here today to help our country navigate through future disasters and certainly learn from what just occurred.

Thank you very much.

Senator DORGAN. Senator Corker, thank you very much.

Senator Alexander, do you want to introduce the Members of Congress?

Senator ALEXANDER. Sure, and I'll do it briefly.

Senator Cooper—Representative Cooper represents Nashville, and has been—has just completed a series of three articles about the flood. I'm sure he'll talk about that.

Congressman Blackburn stayed in Tennessee for—from—she represents Tennessee from Memphis to Nashville, so virtually her entire district was flooded, and she was on the scene there that whole week. I saw her everywhere I went, and she was a lot of places I was.

And Congressman Davis is from the—a more eastern part, but much of the Cumberland River area lies in his district.

And, of course, Congressman Cohen represents the Memphis area. We've heard a lot about Nashville, but this flooding went all the way down to the Mississippi River to Dyersburg and to Millington. The Mayor of Millington is here, and we'll hear from him.

So, I thank the four of you for our working together and for being here.

Senator DORGAN. Congressman Cooper, you may proceed.

STATEMENT OF JIM COOPER, U.S. REPRESENTATIVE FROM TENNESSEE

Mr. COOPER. Thank you, Senator Dorgan, Senator Bennett, Senator Alexander, my friends. And I appreciate the chance to work with you on a bipartisan basis to solve this problem.

The national news media may have downplayed the 2010 flood, but the world looked on in admiration as Tennesseans banded together to rebuild. Neighbors helped neighbors, churches helped everybody. We all pulled together to lift ourselves from the flood. We did it without Government help at first, and then we were thankful for the Government assistance from FEMA and SBA and other agencies. People back home, as you know, are still volunteering, still donating, and still wearing the "We are Nashville" T-shirts to help everybody bounce back from the flood.

The sad truth, however, is that thousands of people are still hurting and that nothing we can do can make them whole.

One of the spookiest things about the flood was that cars were lost in driveways, trucks in terminals, buses in garages, because people had so little warning. Families went to bed at night, thinking they were safe, when they weren't. Who knew, for example, in advance, that parts of our interstate highway system were unsafe and would be flooded? And I just learned yesterday that one of our State's largest employers, A.O. Smith in Ashland City, a company that's used to dealing with the Cumberland River, lost 60,000 water heaters that were packed and ready for shipment.

I welcome the Corps' after-action report that was released yesterday. The Corps obviously worked hard on the document, and it is a good beginning to understanding what happened. The Corps itself, however, still has a lot to learn about what happened, because, for example, they claim, falsely, on page 29, that one of the major sections of Nashville flooded, when it, in fact, did not.

The best way, I think, to understand the Corps' report is to say that it puts a cheerful face on some really ugly facts. The Corps admits to no less than 27 categories of problems with their performance during the 2010 flood, so it's hard to see how the Corps could give itself any sort of passing grade. Probably the ugliest findings are on page 62 of the report when the Corps admits that, on the crucial day, the morning of Sunday, May 2, when an elderly couple in Nashville had already drowned trying to get to church, only then did the Nashville Corps take the flood seriously enough to establish emergency operations.

As the Corps admits, this key decision happened at least a day, and several lives, late. By then, the Cumberland River had already risen 15½ feet. As the Corps admits, they were so unprepared that they did not even have a standard operating procedure for 24/7

staffing, even though that's routine for TVA. The Corps had not read its Weather Service e-mails, determined who were essential or nonessential personnel, or even established a telephone tree. I know Boy Scout troops that are more prepared than this.

A second ugly finding is this. After the Corps finally declared the emergency, on the morning of Sunday, May 2, the Corps did not fully inform the Weather Service, and therefore the general public, until 11 o'clock that night. This is inexplicable, inexcusable, this 16-hour delay before the public could know that the Cumberland River was rising an additional 19 feet, just due to releases from one dam, the Old Hickory Dam, alone. Nineteen feet is the greater part of the devastating 32-foot rise in the Cumberland River, and hardly anyone knew it was happening. The release of such a flood of water from Old Hickory Dam was almost as if a water bomb were dropped on Nashville.

The Corps now admits, in its report, that it should have made clear to the Weather Service, and therefore to the public, by at least 1:30 on Sunday afternoon, almost 10 hours earlier, that the Cumberland River was rising as if the Old Hickory Dam had literally disappeared.

People downstream had a right to know this vital information. Of course, the Corps uses drier, more bureaucratic language to describe what happened. But, it states again, on page 62, that it, quote, "assumed that the Weather Service would run its river forecasting models as if the project, the dam, were no longer present." These are sometimes called free-flow or run-of-river conditions, similar to what would happen on the Cumberland River without any dams at all. The Corps still insists on calling this "technical information," but it can literally mean life or death for people downstream.

The Corps blames the Weather Service for not understanding hydraulics, but why on Earth couldn't the Corps warn them, and us, in plain English, of the worst disaster in modern Tennessee history? The Corps can't blame the breakdown of the Internet for this. The Corps was not able to explain the situation clearly while talking to the Weather Service on the telephone that afternoon.

To fix this staggering breakdown in communications, the Corps is promising such things as annual flood tabletop exercises with other agencies, and electronic updates for what river levels could be. But, in my opinion, that's not good enough to protect Nashville.

Thankfully, at least 3 hours before the Corps realized that the Weather Service had been relying on bad information from the Corps itself, alert managers at the Opryland Hotel, as Senator Alexander mentioned, had already evacuated their guests. This is the largest hotel in the world, outside of Las Vegas, and a huge part of Nashville's tourism industry. And only the eyeballs of alert hotel managers saved the day, not the Corps or the Weather Service.

There are dozens of other very serious questions raised by the report. There were multiple failures of communications, failures of management, as well as heroic efforts by some dedicated and experienced individuals.

The bottom line is, the report leaves no doubt that the Army Corps and the Weather Service could have, and should have, done

a much, much better job. Without such improvements, Tennessee is seriously at risk.

So thank you for calling this hearing, and I look forward to submitting additional points for the record.

Senator DORGAN. Representative Cooper, thank you very much. Next, we'll hear from Representative Blackburn.

STATEMENT OF MARSHA BLACKBURN, U.S. REPRESENTATIVE FROM TENNESSEE

Ms. BLACKBURN. Thank you, Mr. Chairman, Senator Alexander, thank you for calling the hearing today.

As my colleagues and I know, we, in Washington, spend far too much time Monday-morning quarterbacking, and too often the hearings that we have, on either the House or the Senate side, are focused on things that went wrong with the Federal response. And too many times, we try to learn lessons that are born out of failure or incompetence or poor coordination.

Tennessee's experience this spring, with the response to what occurred in this disaster, does offer a different type of lesson learned. And you're going to hear that from some of the local elected officials who are here today.

Tennessee's lesson to Congress is about, and includes, what went right, as well as what went wrong, and how others can learn and use that information in the future.

Mr. Chairman, I have a photo that is being put up on the dais right now. It's of a washed out road in my district, near Kingston Springs. It's the result of this 1,000-year flood event. The storms this May were stronger, and the waters higher and faster, than anyone could ever have predicted. Their like will probably not be seen again in our lifetime. The road you see in this picture was washed, not just a few yards, but a half a football field away from its original bed. It lies atop foundations that once were homes, homes that were found miles downriver.

Neighbors and local first responders acted quickly, pulling people from floodwaters, cars, and the ruin of their homes. Tennesseans acted heroically during the flood and in the weeks and months following it, and they deserve all the praise that this Congress can bestow on them.

For many, this was the first time in recent memory that citizens, trying to help in their response, were actually aided and not hindered by Federal authorities, who were working hard, working transparently, working with single purpose, and efficiently and effectively coordinating with one another at the State and Federal level. Indeed, as has already been said, Governor Bredesen and his team distinguished themselves, and yes, indeed, they deserve our praise.

Much of your focus today will be on devastation and loss in the metro-Nashville area. A good part of that is in the Seventh District portion of Davidson County. Much is also going to focus on Clarksville. As Senator Alexander stated, he and I walked those streets and met with those individuals.

Mr. Chairman, there are 15 counties in the Seventh Congressional District. I have been to every one of them to make certain that each county and local mayor has what he or she needs. Every

one of them, every single one of my counties, has been declared a Federal disaster area, which is a one-third of the 46 counties declared for individual assistance. Now, in those 15 counties, as of this week, over 51,000 families have registered for individual assistance, and more than \$220 million has been awarded to my constituents.

Allow me to highlight just Cheatham County, with a population of roughly 35,000 people. It ranks second in Tennessee, behind Davidson County, to receive maxed-out individual assistance from FEMA. To date, Cheatham County has reported a loss of approximately \$25 million in residential damages alone; 182 homes were seriously damaged below 50 percent, and hundreds upon hundreds more are beyond repair entirely. These are huge numbers in a rural area with limited resources, and sadly, these numbers are climbing every day.

We cannot lose sight of the fact that too many roadbeds in the rural counties look just like the one in the poster, and they're going to continue to look like that for some time.

We cannot let the proximity of our own homes in the metropolitan Nashville or Memphis areas allow us to lose sight of the compelling recovery needs in Cheatham, Hickman, Perry, and other rural counties. The road back for these communities will be a long road, thank you for your attention to the issue and I yield back my time.

Senator BENNETT [presiding]. Thank you very much.
Representative Davis.

STATEMENT OF LINCOLN DAVIS, U.S. REPRESENTATIVE FROM TENNESSEE

Mr. DAVIS. Ranking member, thanks very much for the opportunity to speak; my good friend, Senator Lamar Alexander, for putting together an opportunity for each of us who serve in Tennessee, in much there that was affected, to have an opportunity to also to come today and express our views and also to bring to the attention, I think, of those that—some of the damage that was done.

I live in the upper part of the Cumberland River. It's called the Upper Cumberland Plateau, where I was born and lived all of my life, basically. I can recall hearing my father and my grandfather discuss the huge floods that often came down those rivers, down the Wolf River to the Obey, and at the Cumberland River down through Nashville. Many times, that was the transportation route for the timber that would be cut on those hillsides that would often be floated down to the mills downstream. But, as I look at the tributaries of the Cumberland River, the Dale Hollow Dam that was built, Center Hill Lake in Percy Priest, I know that water was held back in those dams to prevent unbelievable flooding that could have gone beyond what we have observed in the Nashville area, because as I visited Dale Hollow Lake just a few days after the floods came, water was over some of the roads that I had never observed in my life. Even in areas where my three daughters and I would go fishing and we would launch a boat to fish, we could not have done that; we'd have had to launch off of the road itself.

So, as I observed the infrastructure that's been put in place over the last 60 or 70 years—not much the last 30 years, we've almost

decided that infrastructure is not very important to us anymore, seems here in Washington—but as we have made—as we made the investments in infrastructure, I saw what I believe prevented a much, much more devastating flood downstream. And then, as I look at the Cumberland River, the Cordell Hull, the Old Hickory, the Cheatham and Barkley Lakes, and then realize that Wolf Creek Dam, on the edge of Kentucky, almost to Tennessee, if that were to collapse, the unbelievable devastation that would occur downstream.

So, as we look at some failures of those, perhaps within different departments—and it appears that the Corps of Engineers are one of those who we're looking at—as we look at those, the question I have for them is, If these lakes were not built, how much more devastating would it have been? And if you had, in fact, had the perfect button to push each time that you saw the water rising over that 24-hour period, how much less flood would we have had if you had done it perfectly?

So the question I want answered as we go through this process today is that—how helpful were those lakes, how helpful was our forefathers' investment in infrastructure that prevented us from having a much more devastating occurrence? How important was that investment?

And then as we talk about the places that were harmed, I went through Cheatham and through Hickman County, small counties with small streams. Virtually every one of those little valleys had been occupied 150 to 200 years ago by families who knew how high the water was going to rise. Some say 17 inches in Nashville, some in the area that I represent say probably as much as 20-some inches. Those homes were washed away.

Lewis County, Williamson County, where I represent, and—with Congresswoman Blackburn—and Murray County and Lawrence—many of those counties received unbelievable floods, where there were no lakes to hold back the water. And when you go there, you don't see a failure of Corps of Engineers, you see God's hand at work.

As so, as we engage in these conversations, we need to be careful, as we look to pointing fingers, and be sure that whatever we do here, or whatever actions that we take, whoever we look at, that we make sure that we, collectively, together, as our emergency people did, as the first responders did, as the local sheriffs and police departments, as local radio stations continue to blurt out so and so and point to areas where the telephone service may not have been working, but at least point out areas where there was a dire need.

I have small radio stations with 3,000 watts or less. They're the ones who inform when there's a disaster such as this. Our TV stations in Nashville certainly did a great job. So, I applaud all of them.

But as we move through this process, we need to look at everything that happened so we can prevent, or at least control as much as we can, the devastation that could occur again.

Again, I thank you for allowing me to be here. And I definitely look forward to the hearing and to see the results when we have them.

Senator Alexander, thank you.

Senator BENNETT. Thank you very much, sir.
Representative Cohen.

STATEMENT OF STEVE COHEN, U.S. REPRESENTATIVE FROM TENNESSEE

Mr. COHEN. Thank you, Ranking Member Bennett, Senator Alexander and the members of the subcommittee.

First, I want to thank Senator Alexander for getting this program together. It's important that the Chairman, Mr. Dorgan, responded and had this hearing, which is so important.

I want to thank Senator Corker, who rightfully said that our delegation works together well, and we do, and also thank him for his brevity. It's something unusual in Washington.

I also want to thank Congressman Cooper for his insightful analysis of the Corps of Engineers. I was not aware of page 29; sounded like something from the manual that the folks that did the Deep-water Horizon had written about their plan to recover—some fiction in there—so it was interesting to hear about that.

The people of Tennessee, I think, did a grand job in responding. And it was a marvelous response. When I went up to Millington—my district covers—was—had certain floods in midtown north Memphis, in Frayser, but most of it was north of me, in Millington, in Shelby County, and it was devastating. The mayor, who's here, and the Millington civic forces, police and fire, did a great job. They were on the scene. And the citizens got together. There were churches that set up shelters, and it was truly the "Volunteer State" at its best.

I was impressed with what happened, and then President Obama declared it a disaster area promptly, with the urging of the delegation, working with the Governor, and sent several Cabinet members there immediately to observe and to try to help throughout the State. So, I thought the Government responded in a marvelous way. And I was quite pleased and proud. I was disappointed in what happened.

I would suggest for one thought, though—and I wish Chairman Dorgan was here. He said that we had little warning. And indeed, in certain ways, we did have little warning, but in other ways, we had a major warning, in a macro way. And that major warning came from Al Gore in his "Inconvenient Truth" book. It may be an inconvenient truth, and some people still don't believe there is climate change and global warming. But, I would submit that the book suggests—and, I think, in a very persuasive manner—that while one condition or one extreme doesn't necessarily prove or disprove climate change, that there will be great climate change, and includes rains and floods that result there from, because of what we have done to our Earth. And we need to heed that warning or we will continue to have these types of floods. And we can have better warning systems, and we can have better responses, but we'll continue to have more disastrous climatic changes if we don't get a grip on carbon emissions and pass a comprehensive bill that deals with this issue.

It's devastating what can happen. And I think this is part of it. I think it was a 1,000-year flood, but I think there's a reason for it.

We call these sometimes “acts of God.” I don’t know why we would attribute such a thing to God. It did give Noah his 15 minutes. But, I don’t know that they’re necessarily acts of God. They’re sometimes acts of God, and this one with a little help from man, for not being as attuned to Mother Earth as we should be. And I would urge us all to look in the macro aspects of this and to think about what we can do to try to help our climate and Earth in years to come.

I thank Senator Alexander.

And, on a personal note, Senator Bennett, in our unusual political climate that we have, you, unfortunately, got a Purple Heart. I’ve heard nothing but wonderful things about you. And I thank you for your service to our country and regret that you got that Purple Heart.

I yield back the remainder of my time.

Senator BENNETT. Thank you very much, and I shall not comment on the personal comment, but I am grateful for your concern.

We appreciate your being here and we appreciate the solidarity of the Tennessee delegation—Republican and Democrat alike. And we will do our best at the hearing to get as deeply as we can into the problems that you’ve raised here.

Thank you so much for coming over here.

Senator ALEXANDER. Mr. Chairman, may I mention that Congressman Tanner and Congressman Gordon had other hearings today, but they have offered a statement, which I would ask to make a part of the record.

Senator BENNETT. Without objection, it shall be part of the record.

We now go to the first panel, which Chairman Dorgan has already introduced.

Gentlemen, we appreciate your being here. You’ve heard the testimony and comments of the members of the delegation, and we look forward to your response. Your prepared statements, if you have them, that exceed the time limit that we’ve laid down, will, of course, become part of the record and be available as part of the record to anyone who wants to examine them in detail. So, General Peabody, we will start with you, sir.

**STATEMENT OF MAJOR GENERAL JOHN PEABODY, COMMANDER,
GREAT LAKES AND OHIO RIVER DIVISION, CORPS OF ENGINEERS—CIVIL, DEPARTMENT OF THE ARMY, DEPARTMENT OF
DEFENSE—CIVIL**

General PEABODY. Good morning, Mr. Chairman, members of the subcommittee. I’m General John Peabody. I command the Great Lakes and Ohio River Division of the Corps of Engineers.

I appreciate the opportunity to testify about the Corps’ response to the Cumberland River Basin flood event. The Corps’ intent related to this flood has consistently been to objectively determine the facts, transparently communicate our findings, and work to improve our operations and processes for the future.

I want to emphasize three things up front. First, this rain event was unprecedented, far surpassing the forecast and the previous experiences of all Corps of Engineers professionals involved in dealing with it. Second, Nashville district professionals responded competently, adaptively, and in some cases heroically, to this extraor-

dinary event. Third, this event exposed some inadequacies in our system of flood response, for which I am responsible. We will correct these issues.

The weather forecast on April 28 predicted a significant rainfall event for the upcoming weekend. In response, the Corps took proactive measures to model and evaluate potential Cumberland Basin system impacts, reduce pool levels, and alert Corps emergency managers. However, the ensuing weather event resulted in total rainfall nearly three times the maximum predicted, and well beyond what we had modeled.

Within the Cumberland River Basin, approximately 56 percent of the watershed is located upstream of a Corps flood risk management project. The remaining 44 percent is what we call “uncontrolled drainage,” where the Corps cannot influence water flows. Unfortunately, the heaviest rainfall occurred in the southwest area of Nashville and drainage areas uncontrolled by flood risk management projects.

Eight of the 10 dams the Corps operates in the Cumberland Basin came into play during this event. Wolf Creek, Dale Hollow, Center Hill, and J. Percy Priest are authorized, designed, and operated primarily for flood risk management and had the greatest impact on reducing the flood crest in the river. Unfortunately, the Corps was not able to use the full storage capacity of three of these projects—Wolf Creek, Dale Hollow, and Center Hill—because the storm’s heaviest rainfall fell far to the southwest of them.

On May 3, the flood storage capacity at J. Percy Priest was exceeded, requiring operation of the spillway gates to avoid overtopping the dam, and causing a catastrophic failure of the project.

Three other projects—Cordell Hull, Old Hickory and Cheatham—are authorized, designed, and operated primarily for navigation and hydropower. These projects were not designed to provide flood storage capacity, and therefore, any discussion of Old Hickory storing or holding backwater, in the context of a storm like this, simply does not make sense.

The Cheatham navigation project was overtopped and went to uncontrolled flow on Saturday evening. Spillway gate operations were required at both Cordell Hull and Old Hickory, just as they were at J. Percy Priest, in order to prevent overtopping and loss of these projects.

Nashville district professionals responded proactively and adaptively to this rapidly evolving weather event. Many left their homes to be flooded while they worked to reduce flooding along the system. They managed water flow to within inches of overtopping the three Corps projects I mentioned, which is an extraordinarily dangerous situation, and provided sandbags, which prevented the loss of the Omohundro Water Treatment Plant.

Preliminary analysis indicates that Corps of Engineers efforts reduced the Cumberland River flood crest in Nashville by approximately 5 feet, an order of magnitude that would have left Nashville without clean water, and almost certainly would have overtopped the Metro Center levee.

The Corps was in communication and coordination with the National Weather Service and State and local emergency management officials before, during, and after this event. However, our previous

standard coordination procedures—with the National Weather Service, in particular—proved to be inadequate to the scale and intensity of this flood. Even though we increased the frequency of interagency calls on Saturday, a number of other issues contributed to fog and friction between our agencies, including the use of technical terms not commonly understood, unstated or unclear information requirements, the loss of the Corps' Internet, and a lack of redundant communication capabilities. These and other factors contributed to the lack of our ability to gain a clear, common operational picture over the weekend.

The Corps has already been implementing some flood management improvements prior to this event. This flood will cause us to refine and accelerate some of those measures, and to add others. Yesterday, as I discussed earlier, the Corps posted a comprehensive, but still draft, after-action review, which we have conducted, in consultation with our State and Federal partner agencies.

We look forward to comments received from the public and others in response to this report over the next 30 days. We will consider that input prior to finalizing our report, which we expect to do in the next 2 months.

PREPARED STATEMENT

Given the nature of this unprecedented weather event, flooding was unavoidable. A more aggressive interagency effort is needed to alert the public about the risks of flooding, as well as where and how to receive information, warnings, and predictions during an event.

Mr. Chairman, I thank you for this opportunity to testify, and I look forward to answering your questions.

[The statement follows:]

PREPARED STATEMENT OF MAJOR GENERAL JOHN PEABODY

INTRODUCTION

Mr. Chairman and members of the subcommittee, I am Major General John Peabody, Commander of the Great Lakes and Ohio River Division, U.S. Army Corps of Engineers. Thank you for the opportunity to testify about the Corps' response to the Cumberland River Basin flood event that occurred in May 2010. The Corps' intent has consistently been to objectively and dispassionately review the facts behind this event, transparently communicate our findings to the public, and work to improve our operations and processes for the future. One of the primary missions of the U.S. Army Corps of Engineers is to support flood risk management activities of communities in both urban and rural areas throughout the United States. To carry out this mission, the Corps operates projects that reduce flood risk and conducts emergency management activities. The Corps' priority during flooding is to protect human life and property. We perform this mission as part of an interagency team with our Federal, State, and municipal agency partners. The Corps is also responsible for providing timely, accurate flow release information from our flood risk management projects to the National Weather Service so that it can be used to make flood predictions and public notification.

WHAT HAPPENED

The weather forecast on April 28, 2010 predicted a significant rainfall event for the weekend of May 1–2, 2010. At that time, the Corps ran models that predicted the flood risk management projects in the Cumberland basin would minimize any flooding within their drainage areas. In order to increase confidence in our capacity to store stormwater runoff, the Corps proactively lowered pool levels at Cordell Hull and Old Hickory by one-half foot and Cheatham Lake by 1 foot. The massive rain

event over the next few days resulted in total rainfall nearly three times the maximum amount originally predicted and well beyond what we had modeled.

The historic and heavy rainfall was concentrated in the Nashville-Franklin area, with Nashville receiving more than 13 inches of rainfall in 36 hours, more than doubling the previous 2-day rainfall record. Some areas exceeded 17 inches of rain—the highest amount in over 140 years of record and estimated to be well above a 1,000-year rainfall event. The first round of storms on May 1 caused sharp rises in nearly all streams and rivers. The second round of storm activity on May 2 fell on already saturated ground and rapidly flowed into creeks and rivers already at flood stage, thereby causing large-scale severe flooding along the Cumberland and lower Tennessee Rivers and their tributaries.

Nashville District personnel responded proactively and in some cases heroically to this extremely dangerous weather event. Some personnel left their homes to be flooded while they worked to reduce flooding along the entire system. They managed water flow to within inches of overtopping three Corps projects—an extraordinarily dangerous situation, rapidly provided sandbags to prevent the loss of the Omohundro water treatment plant, and preliminary analysis indicates that operations of the Corps projects reduced the Cumberland River flood crest in Nashville by approximately 5 feet.

The Corps is responsible for 10 multi-purpose projects in the Cumberland River Basin. Two of these projects, Martins Fork and Laurel, are located on small tributaries upstream of Wolf Creek Dam and only provide flood risk management benefits locally. The remaining eight projects consist of four flood risk management projects, three navigation projects, and one hybrid project that provides both flood risk management and navigation benefits. Wolf Creek, Dale Hollow, Center Hill, and J. Percy Priest are congressionally authorized, designed and primarily operated for flood risk management and hydropower. Wolf Creek is on the Cumberland River whereas Dale Hollow, Center Hill and J. Percy Priest are on tributaries. The Corps flood risk management projects do not capture all of the drainage within the basin. The multi-purpose project at Barkley provides valuable flood risk management benefits for the lower Ohio and Mississippi Rivers. Basin wide, approximately 56 percent of the watershed is located upstream of a Corps flood control project. The remaining 44 percent is referred to as uncontrolled drainage. Cordell Hull, Old Hickory, and Cheatham are congressionally authorized, designed and primarily operated for navigation and hydropower. These projects cannot store large volumes of water and do not make a meaningful contribution to flood risk management. Their local drainage areas are uncontrolled. Barkley supports navigation and provides flood risk management benefits for the lower Ohio and Mississippi Rivers.

Wolf Creek, Dale Hollow, Center Hill, and J. Percy Priest are the projects designed and operated for flood risk management that were able to have the greatest impact on reducing the flood crest. Unfortunately, the heaviest rainfall occurred in other drainage areas uncontrolled by flood risk management projects, where the Corps could not influence water flows. The Corps was not able to use the full storage capacity of Wolf Creek, Dale Hollow, and Center Hill because the storm's heaviest rainfall fell to the southwest of these projects. The reservoir at J. Percy Priest, located just upstream of Nashville, was completely filled during this event. On May 3, the flood storage capacity at J. Percy Priest was exceeded requiring operation of the spillway gates to avoid overtopping the dam and risking a catastrophic failure of the project.

Cordell Hull, Old Hickory, and Cheatham are designed and primarily operated for navigation. These projects were not designed to provide flood storage capacity. The Cheatham navigation project was overtopped and went to uncontrolled flow at 7 p.m. on May 1. Spillway gate operations were required at Cordell Hull and Old Hickory to prevent overtopping and losing control of water releases.

The Corps was in communication with and coordinated with the National Weather Service and State and local Emergency Management officials before, during and after this event.

AFTER ACTION REVIEW

The Corps recently conducted a comprehensive, internal after action review, in consultation with our partner agencies, including the NWS, USGS, TEMA, and TVA. The report highlights 28 issues categorized in three key areas: water management, emergency management, and communications.

WATER MANAGEMENT

The weather forecast alerted the Corps to the upcoming rainfall event, allowing our water management professionals to evaluate potential system impacts. As a re-

sult of this evaluation the Corps took proactive measures to reduce pool levels and to alert Corps emergency managers.

An unprecedented amount of rainfall fell during this event, and was met by necessary actions on the part of all agencies involved to protect life and property. The Corps continues to work progressively with the National Weather Service to improve joint operating models, implement new reservoir inflow forecasts, and capitalize on a long standing history of working together cooperatively, consistent with newer initiatives such as the Integrated Water Resources Science and Services (IWRSS). Project operations are guided by water control manuals which do not currently address our most extreme weather events. The enormous magnitude of this event has caused us to reconsider our worst case weather scenarios. The Corps will evaluate project operation plans for their capability to respond to such events. Specific to this flood event, the Corps is developing a post flood report designed to gain a comprehensive technical understanding of the engineering aspects of this flood.

EMERGENCY MANAGEMENT

The importance of communications and pre-event coordination with the Tennessee Emergency Management Agency cannot be overstated for this or any natural disaster event. Under Corps Authority, Public Law 84-99, pre-event staging of basic flood fight equipment such as sandbags, early identification of professional Corps personnel to provide technical assistance, coordination between the Corps and the Tennessee Emergency Management Agency (TEMA), and the well-timed deployment of a Nashville District Liaison to the State Emergency Operation Center, all combined to directly result in the efficient and effective response to all TEMA requests for flood fight assistance throughout the duration of this historic event.

COMMUNICATIONS

The Corps increased the frequency of interagency coordination calls to enable timely, disciplined, and documented contact during a rapidly changing event. Redundant communications systems between responding offices, projects and agencies are vital to an effective response. However, on Sunday, flood waters caused a loss of Internet service at the Nashville District headquarters necessitating telephonic communications, slowing information exchange. A lack of common understanding of operations and terminology between the Corps and the National Weather Service impeded our collective ability to coordinate some issues during this dynamic situation. As a result, we are continuing to work closely with our agency partners to improve our interagency processes and conduct periodic exercises so we are better prepared to act in a synchronized interagency manner. Given the nature of this unprecedented weather event, flooding was unavoidable. A more aggressive interagency effort is needed to educate the public about the risks of flooding as well as where and how to receive information, warnings, and predictions during an event. These are important lessons which the Corps will address, and in fact we are already moving forward to take corrective action.

CONCLUSION

Mr. Chairman, this concludes my remarks. Thank you again for allowing me to testify today. I look forward to answering any questions you or other members of the subcommittee may have.

Senator BENNETT. Thank you very much, sir.

Mr. Carter.

STATEMENT OF GARY M. CARTER, DIRECTOR, HYDROLOGIC DEVELOPMENT, NATIONAL WEATHER SERVICE, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, DEPARTMENT OF COMMERCE

Mr. CARTER. Thank you, Ranking Member Bennett, Senator Alexander, for this opportunity to testify about the devastating floods which occurred near Nashville, Tennessee, on May 1 through 3 of this year.

I'm Gary Carter, Director of the Office of Hydrologic Development in NOAA's National Weather Service. First, I would be remiss if I did not recognize the dedicated staff at the Nashville Weather Forecast Office and the Ohio River Forecast Center for

their performance during this extreme event. However, tragically, 26 people lost their lives, and our best wasn't good enough.

I will briefly describe the weather conditions that produced the heavy rain and then explain the services we provided.

As we have heard, an unprecedented amount of rain and flooding incurred in Tennessee from May 1 through 3. A stationary front interacted with very moist air from the Gulf of Mexico, setting the stage for record amount of rainfall, up to 18 to 20 inches in as little as 36 hours. The weather pattern produced nearly twice the amount of rainfall over 36 hours, as documented by 140 years of records at Nashville International Airport, and can be considered a 1-in-1,000-year event.

As a result, record flooding occurred along the Cumberland River, which flows through metropolitan Nashville. At 6 p.m. on May 3, the river rose to almost 52 feet. Flood stage at that location is 40 feet, and major flood stage is 45 feet. Since the construction of upstream dams, the record flood at Nashville was about 48 feet in 1975. The last time the Cumberland River at Nashville exceeded its 40-foot flood stage was 26 years ago.

Hydrologic forecasts provided by the National Weather Service are a coordinated effort between national scientific centers, regional forecast centers, and local forecast offices. The river forecast centers work with partner agencies, such as the Army Corps, that control the dams and reservoirs to account for projected dam releases into the river. NWS rainfall forecast and river-level forecast represent the current state of the science.

As early as Tuesday, April 27, NWS forecasters highlighted the threat of heavy rain for the upcoming weekend. Heavy rains began falling on Saturday, May 1. The NWS issued stream flow forecasts for major flooding at numerous locations along the Ohio and Cumberland Rivers. On Sunday morning, May 2, after coordinating with the Army Corps personnel, we updated the river level forecast and issued a flood warning for the Cumberland River at Nashville. On Sunday evening, we revised the river-level forecast and warnings to reflect the latest information. Forecasts called for a river level of 51.5 feet, which was issued 14 hours before the river crested.

We learned several important lessons from this event. And although the devastating flooding at Nashville could not have been prevented, the Federal partners understand it is necessary to improve our communications during these dangerous and life-threatening situations.

NWS forecasters predicted record rainfall amounts, however the flood forecast for the Cumberland River at Nashville was raised several times during the event. As a result, emergency managers, city officials, and the public were unable to comprehend how bad the flooding was going to be until it was well underway. In particular, the devastating levels and extent of the flood inundation was not conveyed in the clearest and most effective manner.

Recognizing the need for improved coordination and communication, we have already taken action with our partners. The early stages of improved collaboration are in place for the Cumberland River at Wolf Creek and the Caney Fork River at Center Hill in Tennessee. National Weather Service, Army Corps, and the U.S.

Geological Survey have conducted preliminary reviews and met several times to develop better lines of information flow. And a standing tri-agency team has been expanded to ensure the primary actions from these reviews are implemented during the next year. The NWS is conducting an assessment of our services, and we expect the report to be available in the early fall.

Looking to the future, NOAA is leading an interagency consortium called the Integrated Water Resources Science and Services, or IWRSS. The goal of IWRSS is to fuse advanced science and service delivery, produce improved river forecasts, establish inundation flood mapping, and deliver new summit-to-sea water-resource forecast services. This more robust and seamless system will provide the common operating picture required to limit the death and destruction caused by major floods.

In closing, I'd like to emphasize once again that this was an unprecedented event that pushed the limits of our science and technology, and stressed everyone to the max.

PREPARED STATEMENT

We will continue working with our partners in the Army Corps, the USGS, to improve communication and deliver better flood forecasting services to emergency managers, decisionmakers, and the public.

Thank you and I will be pleased to answer any questions you may have.

[The statement follows:]

PREPARED STATEMENT OF GARY M. CARTER

Thank you, Mr. Chairman and members of the subcommittee, for this opportunity to testify about the devastating flood that occurred in the Nashville, Tennessee area on May 1–3, 2010. I am Gary Carter, Director of Hydrologic Development in the National Weather Service (NWS). The National Weather Service is a line office of the National Oceanic and Atmospheric Administration (NOAA), within the Department of Commerce (DOC).

I will provide a brief overview of the event and describe the actions we have already put in place to enhance communications during similar situations in the future. I will also discuss our plans to lead and leverage an interagency Federal partnership to deliver more useful information to enable emergency managers and local officials to save lives and protect property during high impact flood events.

WEATHER CONDITIONS

A record-breaking rain and flood event occurred in the middle of Tennessee from May 1–3, 2010. Across the Cumberland and Tennessee Valleys, 26 people lost their lives, 11 of which were in the Nashville area. Damage estimates associated with this event are near \$2 billion. A very slow moving frontal boundary interacted with a very moist, warm airmass moving north from the Gulf of Mexico, which resulted in repeated heavy rainfall over central and western Kentucky and much of the western half of Tennessee. Widespread thunderstorms produced torrential rain and severe weather throughout the region on Saturday. After a break in precipitation Saturday night, another series of storms produced torrential rain over nearly the same area on Sunday. Record breaking rainfall occurred in Tennessee on Saturday May 1 and Sunday May 2. Rainfall amounts across western and middle Tennessee totaled 10–15 inches, with areas to the south and west of greater Nashville, along the Interstate 40 corridor, reaching 18–20 inches (Figure 1).

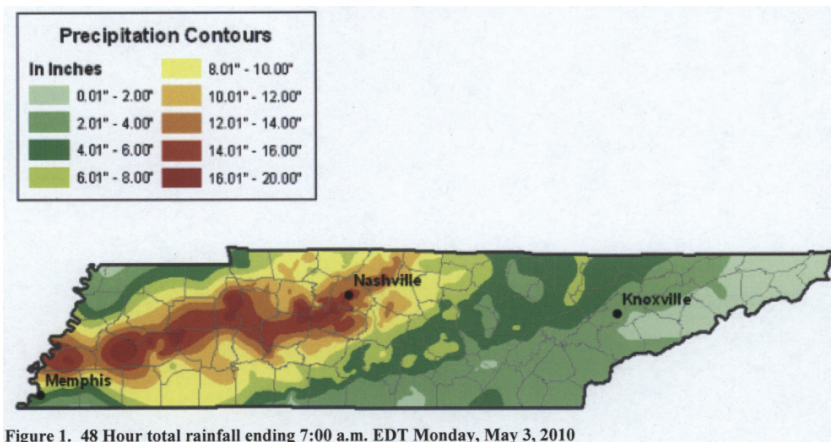


Figure 1. 48 Hour total rainfall ending 7:00 a.m. EDT Monday, May 3, 2010

As measured at Nashville International Airport, Saturday May 1 was the third wettest 24-hour period on record for that area. More notably, the next day, Sunday, proved to be the city's rainiest day since records began in 1871. The resulting 2-day total of 13.57 inches nearly doubled the previous 2-day rainfall record of 6.88 inches. Most of this record breaking rainfall occurred in only a 36-hour period. The likelihood of a 48-hour storm of this magnitude occurring in this region is less than 0.1 percent in any given year. This was a very rare event.

This record-breaking precipitation resulted in catastrophic flooding. Flash flooding in middle Tennessee including the Nashville area occurred Saturday, while unprecedented flooding along the Cumberland River, which flows through metropolitan Nashville, occurred on Sunday May 2 and Monday May 3. The Cumberland River at Nashville rose to a flood stage of 51.86 feet at 6 p.m. May 3. The flood stage (the stream stage at which a flowing body of water threatens lives, property, or commerce) of the Cumberland River at that location is 40 feet, and the major flood stage (the stream stage at which extensive inundation of structures and roads is expected and significant evacuations of people and/or transfer of property to higher elevations are necessary) is 45 feet. The flood of record for the regulated system at Nashville was 47.64 feet in 1975. The Cumberland River at Nashville last exceeded its 40-foot flood stage 26 years ago when it hit 45.3 feet on May 9, 1984, also exceeding its major flood stage.

NOAA NWS SERVICES

Hydrologic forecasts provided by the NWS are a coordinated effort between national scientific centers, regional river forecast centers, and local weather forecast offices. The national Hydrometeorological Prediction Center provides forecasts of rainfall amounts out to 5 days into the future. This information is used by each of the 13 regional River Forecast Centers. Generally, River Forecast Center areas of responsibility are delineated along natural river drainages. Each river center runs regionally tailored models to provide river and stream forecasts. As part of the forecast process, River Forecast Centers work with partner agencies that control dams and reservoirs to incorporate projected dam releases into the river forecasts. NWS rainfall forecasts and river level forecasts represent the current state of the science.

A number of NWS offices were involved in providing services for this event. Specifically for the Cumberland River and Nashville Metropolitan area, river and streamflow forecasts were provided by the Ohio River Forecast Center (OHRFC). The OHRFC is responsible for a large area that includes fast, moderate, and slow responding rivers with over 100 dams and reservoirs managed in different ways by the U.S. Army Corps of Engineers (USACE) as well as State and local organizations. The Nashville Weather Forecast Office (WFO) provided flood related watches and warnings in addition to severe and hazardous weather information associated with the event.

The weather pattern favorable for producing locally heavy rainfall in the Cumberland and Tennessee Valleys was recognized early on by NWS forecasters. As early as Tuesday, April 27, forecasters highlighted the threat of heavy rain for the upcoming weekend in their Hazardous Weather Outlook. On April 29, a Flood Po-

tential Outlook was issued emphasizing the likelihood of heavy rain for the weekend. Additionally, OHRFC identified the possibility of streams and rivers exceeding flood stages. A Flash Flood Watch for the Nashville area was issued on the afternoon of April 30. Meanwhile, other WFOs issued Flash Flood Watches for adjacent portions of Tennessee and Kentucky.

Heavy rainfall began on Saturday May 1. In the morning, the Nashville WFO issued an Areal Flood Advisory, which included Greater Nashville, then upgraded the Advisory to an Areal Flood Warning that afternoon covering a large area of middle Tennessee. The NWS provided streamflow forecasts indicating major flooding for locations in the Ohio River Valley and the Cumberland Valley. NWS updated the river level forecasts and issued a Flood Warning for the Cumberland River at Nashville at 9:50 a.m. Sunday May 2. Over the next 2 days, NWS and USACE worked closely to continue to provide updated forecasts during this unprecedented event. Through repeated coordination between NWS and USACE, NWS continued to update the river forecasts and warnings using the latest release information from USACE dams.

At 4 p.m. Sunday May 2, NWS revised river level forecasts and warnings based on the latest observed rainfall and to reflect the latest release information from Old Hickory Dam. Forecasts called for a crest of 48 feet for the Cumberland River at Nashville—8 feet above flood stage and 3 feet above major flood stage. Following a subsequent discussion between NWS and USACE that same evening, and based on the latest information provided by USACE, the river level forecast was raised to 50.3 feet. Later Sunday night, forecasters monitoring the river levels noticed that it was higher than anticipated. After further coordination with the USACE and confirming a higher release rate from the dam, the forecast river level was raised to 51.5 feet. The Cumberland River crested at 51.86 feet at 6 p.m. Monday May 3 (Figure 2). The NWS forecast of 51.5 feet was issued 14 hours before the river crested.

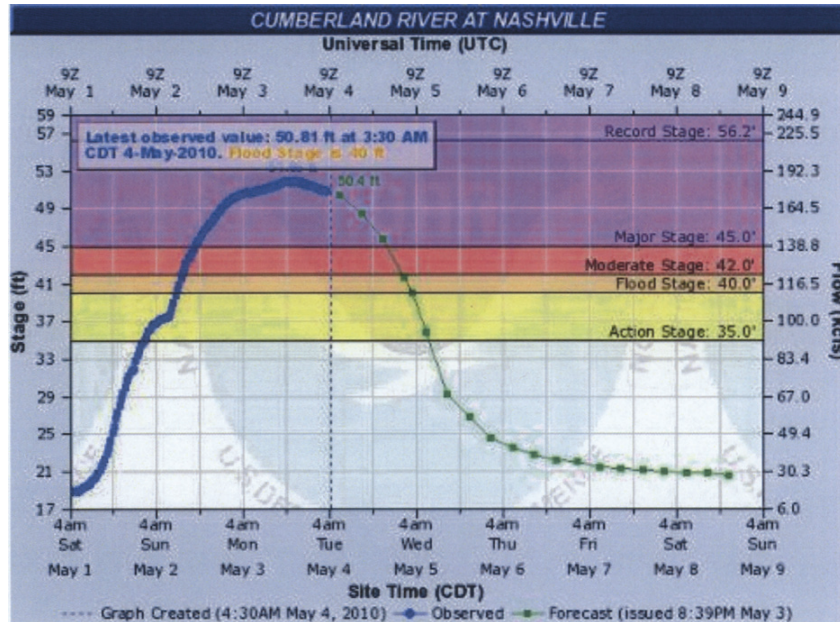


Figure 2. Observed (blue) and predicted (green) level of the Cumberland River at Nashville.

COMMUNICATION CHALLENGES

Although the devastating flooding of Nashville could not have been prevented, the Federal partners understand it is necessary to improve our communications during these dangerous and life threatening events. If the USACE had not controlled the water releases from their projects, the resulting devastation would have been much worse. Although NWS forecasts and warnings were issued and updated throughout

the event; the forecast for the Cumberland River at Nashville was raised several times during the event. As a result, emergency managers, city officials, and the public were unable to comprehend the potential severity of the event until it was well underway. In particular, the devastating levels and extent of the flood inundation was not conveyed in a clear and effective manner.

Recognizing the need for improved coordination and communication, the NWS, the USACE, and the U.S. Geological Survey (USGS) have conducted preliminary reviews and have met several times to develop improved lines of information flow. As one example, a Tri-Agency Fusion team which was created in 2008 to address Upper Mississippi River flooding has been expanded in response to this event. The Fusion team will ensure the primary actions from these assessments are implemented during the next year.

While the NWS has a vigorous outreach and education program spearheaded by the local Warning Coordination Meteorologist, clearly more can be done to ensure the public is informed about flood and weather impacts, and to ensure the NWS communicates flood impacts in a clear and effective manner. Flood inundation maps are required for emergency managers and local officials to assess risk and make appropriate decisions. NWS is working to expand the development of model-based GIS inundation map products in the United States, which would greatly enhance the ability of emergency responders by allowing a graphical depiction of the potential extent of the flood.

Another idea for improvement is for the USACE and NWS to work together to take advantage of tools currently in use or under development at NWS to prepare project inflow forecasts based on the latest predicted rainfall amounts. The hydrology modeling will be performed by NWS and provided to the USACE for evaluation. The early stages of such collaboration are currently in place, with NWS providing a daily update of inflows to Cumberland River at the Wolf Creek Dam in Russell County, Kentucky, and the Caney Fork River at the Center Hill Dam in DeKalb County, Tennessee.

NATIONAL INTEGRATED WATER RESOURCES SCIENCE AND SERVICES

Many regions of our Nation are experiencing critical problems associated with too much, too little, and poor quality water. These challenges, combined with increased demand, aging water infrastructure and the uncertainties of future climate, pose what is now considered to be one of the greatest threats to our society in the 21st century. Water resource issues profoundly affect our Nation's economy, policies, and regulatory frameworks. To address the growing water challenges and guide critical decisions, NOAA is leading an interagency consortium called Integrated Water Resources Science and Services (IWRSS) to develop and deliver the new and improved information needed by stakeholders and decisionmakers. The USGS and USACE are core partners in this endeavor. Since no single agency has all of the capabilities and resources needed to tackle these complex issues, IWRSS provides the paradigm needed to facilitate working together in new ways based on the following three pillars outlined below.

The technical pillar of IWRSS is a common operating framework, enabled by making our key systems interoperable, synchronizing data exchange, and implementing spatial visualization tools. These same technical advances will enable one-stop shopping by State and local water managers for Federal water information, which is a critical need nationwide.

The second pillar involves the identification and implementation of advanced water science and technology. Across NOAA, other Federal agencies, and academia, there is a wealth of relevant scientific research to support water resources information needs; what is missing is an integrative framework to move these science advances into operational production. The IWRSS strategy calls for the formation of a national water support center to perform the necessary integration of research and technology, and to serve as a proving ground to test new capabilities before delivery to regional and national operations.

The third pillar involves the human dimension; the IWRSS strategy identifies the social science and stakeholder interactions necessary to provide the information and tools to make a difference in water resources decisionmaking.

The goal of IWRSS is to integrate services and service delivery through more effective communications, improved river and flood forecasts and mapping, and new "summit-to-sea" water resources forecast information. Such an integrated system, will foster better communication and provide the common operating picture required to mitigate the death and destruction caused by major floods.

CONCLUSION

The flooding catastrophe in Nashville resulted from the alignment of many unfortunate circumstances. The enormity of unprecedented 2-day rainfall amounts, changing river levels, and lack of public awareness of the potential impacts of the forecast river levels (due in large part to the fact that city residents have not experienced a significant flood in over 25 years), were all contributing factors. NOAA will continue working with our partners in USACE and USGS to improve our coordination and communication of potential flooding situations and to deliver enhanced flood services. In particular, an IWRSS team will be formed to identify long-term options for developing and delivering forecasted flood area inundation maps. Another team will be formed to optimize system interoperability and data synchronization among NWS, USACE, and USGS.

I thank the subcommittee for the opportunity to speak about this challenge and will answer any questions you may have.

Senator BENNETT. Thank you very much, sir.
Mr. Bassham.

STATEMENT OF JAMES H. BASSHAM, DIRECTOR, TENNESSEE EMERGENCY MANAGEMENT AGENCY

Mr. BASSHAM. Mr. Chairman, Senator Alexander, I appreciate this opportunity to appear before the subcommittee.

Governor Phil Bredesen asked that I convey his personal thanks to you for your interest in the State of Tennessee's perspective of this historic flooding event during May.

I'd like to brief you on the sequence of events that took place in Tennessee, and the resulting response and recovery efforts. And I will tell you that the recovery efforts really are just now starting in Tennessee. That's going to be a long, long grind for us.

In the evening of April 30 through May 2, more than 22 inches of rain fell in the western and the middle portion of Tennessee. More than one-half of the State had reports of flooding damage and about a dozen tornados, and the storm touched down in many locations. Twenty-four citizens were killed statewide, primarily by rushing water from flash flooding and by rising water.

The Tennessee Emergency Management Agency—TEMA—is a division of the military department. The agency has a mission to coordinate emergency management response and recovery, to reduce loss of life and property in the State of Tennessee. TEMA is empowered by State law and by the Governor's executive authority to perform its mission of protecting the public during emergencies and during disasters.

TEMA is organized into two branches: response and preparedness. The preparedness branch handles the planning, training, exercise, mitigation, and various grants and program offices, as well as the recovery process, which is ongoing now. The response branch has a responsibility for both TEMA's operations sections, including the State's 24-hour warning point, the agency's communication networks, which is statewide, and the regional offices with TEMA's area coordinators. The area coordinators are the field response personnel that work closely with their assigned counties. County emergency management agencies are responsible, under the county mayor's legal authority, for controlling the response to the emergencies in their jurisdiction. And we're pleased to have two of the county mayors with us today.

TEMA's operations watch-point element is the focal point for receiving warnings, making notifications to local government and the

counties, and arranging for initial response actions, 24 hours a day, 7 days a week. With the limited manpower inside TEMA, the importance of the State's Emergency Service Coordinators, known as ESCs, cannot be understated. There are more than 120 primary or alternate ESCs representing all State agencies and departments. These critical leadership positions report to the State Emergency Operations Center during an emergency, and are empowered by State law with the full authority of their commissioners.

During an emergency, TEMA and the ESCs manage the State's many resources and coordinate response using those assets to support local incident commanders at the local government level.

The following departments have assigned to TEMA full-time embedded ESCs for enhanced coordination, planning, and response purposes. The National Guard, the Department of Safety, the Department of Transportation, and the Department of Human Service have embedded ESCs in our organization.

In addition to the ESCs, TEMA relies on individual liaisons from outside partners to provide support. These liaisons include non-governmental organizations, such as the American Red Cross and the Tennessee Volunteer Agencies Active in Disasters, known as VOAD; the private-sector partners, such as FedEx and Walmart; telecommunications providers, such as AT&T and Verizon; and various Federal agencies, such as FEMA, the Civil Air Patrol, and the U.S. Army Corps of Engineers.

As a result of the May flooding, as many as 10,000 individuals were displaced and more than 1,500 homes were destroyed in Tennessee. Around the State, 102 bridges, 239 roads, and 19 water treatment plants were impacted or damaged.

Governor Bredesen has been very pleased with the Federal response to the flooding. Within 24 hours of the floods, several administration officials, including Secretary Napolitano, had called to ensure that we were receiving the needed assistance, and Administrator Fugate has made several trips to Tennessee.

Since then, more than 65,000 individuals have registered for FEMA assistance. To date, more than \$269 million for FEMA assistance has been provided to individuals in Tennessee. As a result of the storms and flooding, 49 counties received presidential disaster declarations for some kind of Federal assistance.

PREPARED STATEMENT

Regardless of how these numbers rank, this was a tremendous event for Tennessee. In spite of the fact that 24 lives were lost, the death toll for this flooding event was remarkably low, due primarily to the great response from local emergency responders, the police, the fire departments, the rescue squads that came from across the State that we were able to move in from the east to the west and the—just the volunteer citizens that went out and took care of each other.

My time is up, and I will be glad to answer questions, and I appreciate very much the opportunity, Senator Alexander, to be here with this group today.

Thank you.

[The statement follows:]

PREPARED STATEMENT OF JAMES H. BASSHAM

Mr. Chairman and Distinguished Senators: I appreciate the opportunity to appear before the subcommittee. Governor Phil Bredesen has asked that I convey his personal thanks for your interest in the State of Tennessee's perspective of the Presidential Declared Disaster resulting from historic flooding during May of this year.

I would like to brief you on the sequence of events that took place in Tennessee and the resulting response and recovery efforts, which are still on-going.

In the evenings of April 30 through May 2, more than 22-inches of rain fell in the western portion of Tennessee. More than one-half of the State had reports of flooding damage and about a dozen tornadoes in the storm touched down in many locations. Twenty-four citizens were killed statewide, primarily by rushing water from flash flooding. Fed by massive rainfall and run-off from creeks and streams, our large rivers in the affected regions attained record crests.

At this time, I'd like to explain the nature of the State's response role during emergencies of this or any nature.

The Tennessee Emergency Management Agency (TEMA) is a division of the State's Military Department. The agency has the mission to coordinate emergency management response and recovery to reduce loss of life and property in the State of Tennessee. TEMA is empowered by State law and by the Governor's executive authority to perform its mission of protecting the public during emergencies and disasters. During a state of emergency, TEMA performs as an extension of the Governor's staff to ensure that the orders of the Governor are implemented and enforced.

TEMA is divided into two branches: Response and Preparedness. The Preparedness branch handles the planning, training, exercise, mitigation and various grants and programs offices, as well as the recovery process.

The Response branch has responsibility for both TEMA's Operations Section, including the State's 24-hour warning point, the agency's Communications networks and the regional offices with TEMA's area coordinators, who are the field response personnel that work closely with their assigned counties. Each area coordinator is responsible for coordinating directly with approximately 6 of the State's total of 95 counties. County emergency management agencies are responsible under the county mayor's legal authority for controlling the response to emergencies in their jurisdiction.

TEMA's operations watch-point element is the focal point for receiving warnings, making notifications to local governments in the counties, and arranging for initial response actions 24 hours a day, 7 days a week. There are two or more operations officers on duty at all times.

At the time of the May Flooding, TEMA had only 88 positions statewide, which includes all field personnel, administrative and headquarters staff.

With the limited manpower inside TEMA, the importance of the State's Emergency Service Coordinator (ESC) program cannot be understated. There are more than 120 primary or alternate ESCs representing all State agencies and departments. These crucial leadership positions report to the State Emergency Operations Center during an emergency and are empowered by State law with the full authority of their Commissioner. During an emergency, TEMA and the ESCs manage the State's many resources and coordinate responses using those assets to support incident commanders at the local government level.

These State ESCs attend regular monthly training meetings with TEMA and participate in full-scale exercises. The following departments have assigned to TEMA full-time embedded ESCs for enhanced coordination, planning and response purposes: Military (National Guard), Safety (Highway Patrol), Transportation and Human Services.

In addition to the ESCs, TEMA relies on individual liaisons from outside partners to provide critical information as well as links back to their own agencies. These liaisons include: non-governmental organizations American Red Cross and the Tennessee Volunteer Agencies Active in Disaster; private sector partners FedEx and Walmart; telecommunications providers AT&T and Verizon; and various Federal agencies, such as FEMA, Civil Air Patrol and the U.S. Army Corps of Engineers.

As a result of the May flooding, as many as 10,000 individuals were displaced and more than 1,500 homes were destroyed in Tennessee. Around the State, 102 bridges, 239 roads, and 19 water treatment plans were impacted or damaged.

Governor Bredesen has been very pleased with the Federal response to the flooding. Within 24 hours of the floods, several administration officials, including Secretary Napolitano, had called to ensure we were receiving the needed assistance and Administrator Fugate has made several visits to Tennessee.

Since then, more than 65,000 individuals have registered for FEMA assistance. To date, more than \$269 million in FEMA assistance has been provided to individuals in Tennessee. As a result of the storms and flooding, 49 counties received Presidential Disaster Declarations for some kind of Federal assistance.

Regardless of how these numbers eventually rank it amongst other U.S. disasters, the May flooding was a tremendous event for Tennesseans. It is easily the largest disaster in recent memory with an unprecedented impact to infrastructure and the number of impacted citizens. The total cost to the public for this disaster may not be known accurately for some time, but I suspect the figure for combined Public and Individual Assistance programs will also be a mark unequalled in our State's previous experience.

In spite of the fact that 24 lives were lost, the death toll for this flooding event was remarkably low. I'd like to attribute that success to two factors.

First, the proactive nature of the communications of warnings made by TEMA, local authorities and our partners at the National Weather Service to make clear to the public the threat flash flooding and flooding posed to their safety. The other is the dedication of our local and State first responders, and spirit of our many local volunteers, who saved more than 850 lives by performing rescue operations at great peril to their own lives during the flooding.

On Thursday, April 29, prior to the emergency, TEMA and the National Weather Service engaged in our usual coordination for potentially severe weather by participating in joint teleconferences with forecasters and State and the local emergency managers in West and Middle Tennessee. TEMA had already placed the SEOC in an elevated posture for monitoring the situation, but notices also were made to key personnel to be aware that a potential existed for an emergency situation to develop.

TEMA sent the first of 171 warnings to the counties at 12 noon on Friday, as the storm struck in Memphis. During the next week, TEMA's Operations Center answered more than 4,000 calls with just 6 operations officers.

Overall, the SEOC handled 843 mission tasks relating to the flooding response. Those missions included receiving and distributing 2.5 million gallons of potable water to impacted communities, coordinating 3,000 State response personnel from 25 State departments and agencies, and 1,000 mutual aid responders from unaffected jurisdictions. In the State, more than 20,000 local jurisdiction personnel responded to the disaster, as well as the volunteers I mentioned earlier.

TEMA Operations also managed 17 new missions, 77 other incidents and 130 weather warnings that were in addition to the flooding events simultaneously underway.

The results achieved can be attributed to the fine men and women in TEMA and the contributions of many others inside government and within our communities.

This concludes my prepared remarks. I'd like to again thank the Senators for this opportunity to participate in this hearing.

Senator BENNETT. Thank you very much, sir.

General Peabody and Mr. Carter, you were here, and we heard what Congressman Cooper had to say. I'd like to give you both the opportunity to respond to that, talking about the coordination, or lack thereof, or other kinds of problems, to give us your perspective on the issues that he raised.

You can go in any order you want.

General PEABODY. Thank you, Senator.

I think several of the Congressman's criticisms are well-placed. I think the general conclusion that we need to improve, and the statement that we were not prepared for this event, is accurate. And that's exactly the point. This event was so extraordinary that all the procedures that we had in the past, which had proved adequate, going back as far as we can remember, both personally and institutionally, were simply overwhelmed.

Part of the problem, from the Corps' perspective, is that we rely on the Quantitative Precipitation Forecast, so-called QPF, which on April 28 indicated to us that we were going to have a significant storm event. The modeling that we did, both that day and in subsequent days leading up to the flood itself, indicated that there would be minor, and maybe moderate, flooding on some tributaries and

some uncontrolled areas, but that, in the basin itself, where we have flood damage reduction projects, that we would be able to manage the flow of water coming down, and we would be okay.

In this event, we know now, of course, that the forecast was off, which is rare. Actually, our normal experience is that the forecast usually over predicts the rainfall amount that we expect to get.

So, the procedures that we had in place, which were deliberate, daily, and perhaps twice-daily phone calls, were simply overwhelmed very quickly on Saturday, and the complicating factor on Sunday, when we lost our Internet capability, really made it extremely difficult. That added a tremendous amount of friction for our people. So, instead of being able to pass data automatically, and pull it off of Web sites, we were basically reduced to going back to the phone lines, which is functional, but a lot slower, especially when things are changing rapidly and we are changing our flow releases out of our dams quite frequently.

Senator BENNETT. Mr. Carter, do you have any further comment to make?

NEED FOR IMPROVED COMMUNICATIONS

Mr. CARTER. I would agree with General Peabody that the assessment that communication needs to be improved is absolutely accurate. Our QPF forecast from our weather models have improved over the years. We, in this case, did recognize the potential for extremely heavy rain over the weekend early in the week. Those forecasts were continually updated to the extent that, during Saturday, we produced forecasts in several places over Tennessee where flooding occurred of 8 to 12 inches, which were exceeding all previous records, and the most ever in a non-tropical storm situation.

There's work to do with these weather models in getting better data and science and capabilities, but the effort to improve those is ongoing, and they will continue to improve.

There are many other issues here of the coordination activities. I'd just like to stress the fact that a lot of the things you've heard here is because we were relying on people to call or share information on the Web. We really need to move this to a whole new level, do a dramatic improvement, using modern communication, IT technology, to produce interoperable data and systems, where, when we update a precipitation forecast, every one of our partners and the public see it instantly. When the USGS, which has the stream-gauge network that we rely on critically—and they're our primary partners, in terms of observed stream flow data—when they get a new report, we see it instantly, the Army Corps sees it instantly, the public officials and emergency managers have access to that data and information. And likewise, when the Corps changes its releases into the rivers, we are provided that automatically into our river forecast center. We can process the data and make the changes through our river forecast modeling system to produce better, more accurate forecasts.

Thank you.

Senator BENNETT. Thank you very much.

Senator Alexander.

Senator ALEXANDER. Thank you, Senator Bennett.

I want to thank the General and Mr. Carter and Mr. Bassham. Self-examination isn't always easy. Members of Congress know that we're not perfect, but it's very helpful to all of us to hear you say "These are the things we did well, and, in some cases, heroically, and these are the things that didn't work and that we should do better." And I appreciate your willingness to examine that weekend that way. And even though it reveals some defects, that's the point of the hearing, so we can do better the next time.

Now it seems to me, all this boils down—sort of two areas. One, was there anything that the Corps could have done better in managing this water flood, taking into account that nobody had ever seen anything like it before in our area? And second, could we have a better, and timelier, forecast communicated to everybody who needed to hear it, in a clearer way? It seems to me that that's where the two areas are.

So, General, you mentioned that that it didn't make sense to focus on Old Hickory Dam, but, in page 72 of your report, you go into some detail about Old Hickory lock and dam and spillway discharges and you point out that, had the pool climbed 6 inches higher—that's the lake, I guess—that if the lake had been 6 inches higher, it would have overtopped the stream lock wall, resulting in flooding of the powerhouse, requiring complete evacuation of the dam. It's been estimated such an event would have resulted in a flood crest 4 feet higher in Nashville than was actually experienced. So, what happens at Old Hickory isn't irrelevant to downtown Nashville's level of flooding.

What would have happened—and these are questions—I told the people of Tennessee to send me some questions, or I asked them to, and many did. Paula Rice, of Goodlettsville, Kenneth Buckmaster, of Hartsville, basically asked this question, what would have happened if the lake level in Old Hickory had been a foot lower—or 2 feet lower or 3 feet lower—on Friday? Would you have been able to hold more water, and would the water in downtown Nashville have been less?

General PEABODY. The short answer is, it would have held more water, but it would have been almost unnoticeable. Remember Old Hickory is not built to store water; it's built for navigation. Given its nature and the topography where it's built, it does have some storage capacity, but it is minimal. It accounts for about 3 percent of the overall storage capacity of all the dams that we operate in the Cumberland River system, 3 percent. So, we can get some storage capacity out of it. But, given the nature of this event, it filled up very rapidly. And once it fills up, as I discussed—we have three dams that were in danger of overtopping—we have to pass that water. The consequences of not passing the water would be even worse than passing it.

Senator ALEXANDER. Right. But, you wouldn't have that consequence in Old Hickory Dam if you'd had less water in it—in the lake.

General PEABODY. It would have probably, if we had—we did lower it—as I recall, it was either one-half a foot or a foot—I can't remember the precise amount—before the event, as a precautionary measure, even though our models told us that the fore-

cast would not cause flooding. But, we felt this was a prudent thing to do.

If we had lowered it, another foot or two, that would have added a small amount of storage. I can't tell you off the top of my head what that percentage would be, but it is probably a decimal point of 1 percent. And it would have slightly delayed, and may have reduced, the crest in the river, but it probably would have only been a few inches. And, Senator, I'll take that for the record and get back with the——

Senator ALEXANDER. Thank you.

General PEABODY [continuing]. Specifics——

Senator ALEXANDER. Thank you.

General PEABODY [continuing]. On those calculations for you.

[The information follows:]

The Corps simulated the flood under the scenario if Old Hickory had been at 442.5 feet (two feet below where it actually was). The simulation showed that the impact on the crest at Nashville, TN would have been 0.25 feet (3 inches).

Senator ALEXANDER. Let me ask you one more question about dams before I go to the forecast question. Wolf Creek and Center Hill Dams——

General PEABODY. Yes.

Senator ALEXANDER [continuing]. Have been unsafe. And we added money to the budget, which you used to make them safer, making them able to hold more water. If either of those dams had failed, and you'd had just to release the water during this event, what would the consequences have been in downtown Nashville?

General PEABODY. I can't even imagine it. As you can see from the diagram there, the circle in the upper right-hand corner represents Wolf Creek. You can see that the red represents how much storage capacity was used at that project; the blue represents storage capacity remaining. We raised Wolf Creek over 20 feet—21 feet I believe—as this weather event came down. And for a period of about 24 hours, we reduced the flow out of Wolf Creek to almost zero, about 200 cubic feet per second, which is next to nothing.

I want to assure the committee, and the people of Tennessee and Kentucky and Nashville, that even though these are unsafe dams, we are able to temporarily store large quantities of water behind these dams, so long as we bring the water down fairly quickly after a flood event.

Now, what we do, Senator, and what we did in this case when we have to store additional water behind these dams, is we have our project people go out on the dams, they intensify the measurements that they take, they examine all the instruments that we have on the dams to ensure they're safe. And in both Center Hill and Wolf Creek, we had no indications whatsoever of any movement or any issues of concern related to the dam during the period that it was surcharged.

Senator ALEXANDER. Senator Bennett, I wonder if I could ask a couple of more questions relating to the forecast, and then we'll get on, very shortly, to the next panel, because I know everyone has schedules to keep.

It seems to me that one of the obvious conclusions is that if somehow we could have a better Sunday morning forecast; things would have been a lot better. I mean, from what I hear in the testi-

mony and read in the after-action report, by Sunday night the Weather Service was able to let people know that there was a lot of water coming, a lot more water than anybody expected. But, if we had known it Sunday morning, that would have made a big difference.

Now, there are several things, in terms of letting people know that the water is coming, that I'd like to ask you, starting with Mr. Carter, to comment on. Mr. Bassham, you may have something to say about this, as well.

First, we have to have accurate information about it. And you've talked about models. Second, there has to be better internal communication between the Weather Service and the Corps. And you've talked about how that can be improved and about how some of the equipment was not—the Internet went down, as one example. But, a third, is translating that information to the mayors, the emergency service workers, the people of the area, so they can understand, in plain English, what's about to happen to them; and, in all three of those areas, make it part of the forecast.

And let me take an example that I think everybody understands. One of the emergency service workers in Millington—or, in Memphis, said to me, you know, “Ten years ago—well, the improvement that the broadcasters and the Weather Service have made on letting us know about tornados in the last 10 years has been a 1,000 percent.” And I thought about that, and I realized that I can turn on my television, if a tornado is anywhere in Tennessee, and I can find out, almost instantly, that it's coming down my street and that it'll hit my house in 15½ minutes, which is apparently an extraordinary cooperation between Federal agencies and the broadcasters to do that.

Now, I know that flooding is a different phenomenon. But, flooding is three out of four of the natural disaster—of the disasters—federally—disasters we have in this country. What can we do, Mr. Carter, what steps can we take to make the kind of information we provide to the public about floods more like what we tell them about tornados? Would it take more equipment, different models, better cooperation, and a new alliance with broadcasters? What would it take to do that, and how can we, in the Congress, help create that environment?

IMPROVING FLOOD FORECASTING

Mr. CARTER. Senator Alexander, thank you for asking that question, and thank you for recognizing the tremendous improvement in the tornado forecasts.

I believe that that improvement is even a wider partnership than you mention. There was a whole research group, better data, science and tools with the academic and other Federal agencies' research that went into understanding tornados and getting the techniques and tools into our weather offices. And it has paid off big time. Now, part of that is because it was made a national imperative. People were dying every year. Communities were being wiped out, with no warning, from severe thunderstorms and tornados. We heard it, we responded, we used the best science and technology, and we worked together with other partners, and with the media, to make these improvements.

I believe we need that same kind of imperative with our flood forecasting, and I'm so glad you've recognized that, that it's complicated, it's complex, it involves better data, better models, better capabilities to analyze where the water's going. And the other part of it is that we need to show, visually, the aerial extent and the depth of the flooding. This a major undertaking, to produce the better science and forecasts, and then produce the tools and techniques to update and display the water levels, and track them from neighborhood to neighborhood in these devastating types of floods.

This is an effort that cannot be accomplished by the Weather Service alone. We are responsible for the analysis and forecasts, but we need the science, tools, and data, especially from our primary flood-fighting partners—the USGS and the Army Corps—working with us on projects across agencies to tackle the national imperative and do a better job.

And I would be so grateful if you and your colleagues could help reinforce that amongst our agencies. We've been working, 2 years, to build this consortium and move in these very directions. But, it's hard to change Government agencies. The status quo is no longer acceptable. We have to work on these projects together, not individually and hope that everything comes together at the end. We have to work them from the beginning, develop the plans, the tools, and then implement the improved products and services, in partnership with our emergency managers and the first responders. In this way they know where the water's going, how deep it's going to be, and can take the protective measures to either protect property and get people out of harm's way.

Thank you.

Senator ALEXANDER. I'll talk with Senator Bennett and Senator Dorgan about it, but maybe a subsequent hearing that would focus specifically on the Federal agencies' ability to develop a system for floods that equals that of—or, comes closer to that of what we do with tornados would be a very useful thing to do.

Maybe, Senator Bennett, Mr. Bassham has something to add, and then we should go to the next panel.

Mr. BASSHAM. Two things and I appreciate the opportunity.

No. 1, from Friday afternoon, during this event, until Monday, our operations center at TEMA issued 171 warnings, to local governments, that were provided to us by the National Weather Service out of either Memphis or Nashville. That's a lot of information to put out. And those warnings go to the 24-hour warning points in each county government.

No. 2, as an outcome from the lessons learned, I think, from this event, we met last week with the National Weather Service office in Nashville, and what they have agreed to do is to provide a National Weather Service forecaster, out of their office, to the State when we activate for severe weather events like this. Ninety-nine percent of the time that would not be a requirement, but that 1 percent of the time, this time, it would have been helpful, I think. We didn't ask for it, we just didn't know to ask for it. But, I think, Senator, that's a lessons-learned, and our partnership with the National Weather Service is such that we're moving forward with that.

Thank you.

Senator BENNETT. Thank you very much.

Oh, yes, sir, General—

General PEABODY. I'm sorry, Senator, I just wanted to add a couple of clarifying points that I think are important.

I want to emphasize that, when I talk about our reliance on the Quantitative Precipitation Forecast that is not a criticism of the National Weather Service; rather, I think it's a criticism of me, of the Corps. So, when we have these significant rain events, in hindsight now, looking back, when we know that the Weather Service thinks that it might get worse than what the forecast tells us, we ought to take more aggressive precautionary and prudent measures to get ready for this storm. We did not do that in this case. We will do that in the future.

I want to emphasize and support Mr. Carter's point about inundation mapping. I want to comment, though, however, that that will require a great deal of resources and a lot of geospatial mapping to support that kind of ability to post on Web sites the predictions of the actual flood impacts that are likely to happen. And so, that would cost a lot of money in all the areas of the country where we have flood basins.

Thank you, sir.

Senator BENNETT. Thank you very much.

Thank you all. We appreciate you being here, and we appreciate your service in these difficult times.

We'll now go to the final panel. And again, they've all been introduced by Chairman Dorgan, so I will simply recognize them by name.

All right, gentlemen, thank you again for being here. As Chairman Dorgan indicated, we have Mayor Karl Dean, from Nashville, and Mayor Richard Hodges, from Millington, then Whit Adamson, president of the Tennessee Association of Broadcasters, and Bert Mathews, chairman of the board of the Nashville Chamber of Commerce. So, you represent a spectrum of opinion and experience with this particular challenge.

And, Mayor Dean, you seem to have been at the core of this particular incident, so we look forward to your testimony and we'll hear from you first.

Thank you.

STATEMENT OF HON. KARL F. DEAN, MAYOR, CITY OF NASHVILLE, TENNESSEE

Mr. DEAN. Thank you, Senator Bennett.

I want to state my appreciation for Senator Alexander for giving me the opportunity to be here today and to speak on behalf of the citizens of Nashville.

Before I talk about what our city experienced in early May and how we responded, I want to first formally recognize Senators Alexander and Corker and Congressman Cooper for their leadership, and specifically their assistance in helping Nashville secure Federal assistance early on.

FEMA was on the ground in Nashville even before we were officially declared a disaster area, and Nashvillians almost immediately began receiving checks. As of this week, over 22,000 Nashville residents have registered with FEMA and have received \$77.8

million, collectively, in aid. The Small Business Administration has disbursed another \$84.7 million in loans to Nashville residences and businesses.

The weekend after the flood, Nashville was visited by three of President Obama's Cabinet members: Homeland Security Secretary Napolitano, Commerce Secretary Locke, and Secretary Donovan, with the Department of Housing and Urban Development. I've also had the opportunity to meet with the administrators of FEMA and the SBA. All of this is to say that we are incredibly appreciative of the Federal support our city has received.

In Nashville, I'm proud to say that our metro departments were prepared to respond to the disaster. Over the years, the Office of Emergency Management has practiced and trained for various scenarios. In fact, just this past fall, a team of 64 OEM staff and departmental representatives spent 4 days at FEMA's Emergency Management Institute in Emmitsburg, Maryland, for an exercise that involves severe flooding.

We also had in place several agreements with outside organizations that aided in our response and in our—to the disaster and to the recovery. We had a memorandum of understanding with Belmont University that allowed us to use space on their campus, which is directly across the street from our Emergency Operations Center, for communication with the media.

We had an MOU with Hands On Nashville to be the coordinating agency for volunteer assistance during and after a disaster. Staff from Hands On Nashville were in our Emergency Operations Center from day one. And we had an MOU in place with the Community Foundation of Middle Tennessee for the creation of a disaster relief fund, which allowed us to begin immediately collecting donations from the public and distributing those to nonprofit agencies that were assisting flood victims. Nashville was ready.

And so, just as we do anytime there's a potential for a severe weather event, we partially activated our Emergency Operations Center on Saturday afternoon, May 1, in preparation for what was predicted to be 5 inches of rain. By that evening, it was evident from the number of swift-water rescues from flash flooding in the area creeks, a full activation of our Emergency Operations Center would be necessary.

While we continued to focus most of our attention and resources on life-saving rescues, we also began to implement measures to prevent more individuals from unnecessarily encountering dangerous floodwaters. As many local streets and portions of Briley Parkway and Interstate 24 became flooded, we urged residents to stay off the roadways. We worked with our community partners to establish a shelter at Lipscomb University for individuals whose homes had been flooded or were unable to return to their homes due to the flooding. And we activated our community hotline in order to have a nonemergency line of communication with the public.

At that point, the flooding we were experiencing was flash flooding from rainfall in the Harpeth River and Mill Creek watersheds. That evening was the first time our Office of Emergency Management had communication with the Army Corps of Engineers. We were informed that the Cumberland River was at 22 feet and was

not at an immediate risk of flooding. That same evening, the rainfall predictions we were given by the National Weather Service remained at under 7 inches.

By early Sunday morning, our emergency responders had already conducted over 150 water-related rescues. Large numbers of Davidson County residents were without power. Our bus service was suspended. On Sunday afternoon, we declared a state of emergency in Davidson County to allow us to garner additional resources, as necessary.

By Sunday evening, we had confirmed five fatalities thought to be flood-related. We ordered the evacuation of MetroCenter, an office area, and First Avenue, for precautionary reasons. A second shelter was opened. And water conservation measures were placed in effect as one of our city's two water treatment plants was submerged by the flood.

From Saturday evening to Sunday afternoon, in less than 24 hours, the Cumberland River went from 22 feet, well below flood stage, to 44 feet, 4 feet above flood stage. We received 7 additional inches of rain beyond what was forecasted, for a total of 13.5 inches of rain in 48 hours, more than double the previous record of rainfall for any 2-day period in Nashville since they began keeping records.

On Monday, when the rain stopped, we began to assemble damage assessment teams and we setup Disaster Information Centers at five community centers throughout the county to get information and resources to flood victims who had lost access to television and other media.

While our city began to quickly prepare for the long road of recovery ahead, the waters of the Cumberland continued to rise. The cause of this is not for me to comment on or to speculate on. What I do know is that at no time did the Army Corps of Engineers inform us of scheduled water releases from dams upstream.

We received a projection from the National Weather Service as to when the river would crest, and at what level. But, when we checked the actual river gauge with the Army Corps' automated gauge, it was clear the river was rising at a speed that far outpaced the Weather Service's projections. We communicated this to the Weather Service and later received an adjusted crest-level projection. This happened more than once. And by Monday afternoon, with the crest level projection at 52.5 feet, we were extremely concerned about the consequences to our city if the projection was wrong again and the river rose to 53 feet.

Once the river crested and the water began to recede, we were able to assess the damage left behind. The private sector in Davidson County alone sustained over \$2 billion in property damage. We are still totaling the cost of repairs to our public buildings and infrastructure, but it is estimated to be over \$250 million.

We lost a total of 10 lives in Davidson County. It's important that I point out that all of these were from flash flooding of our creeks and tributaries. No one died from the flooding of the Cumberland River. Our emergency responders rescued a total of 1,400 individuals from the water, including some of their own who were put at risk while performing their duties.

What I have taken from this experience, and what I would press as the key point I would like to make here today, is that, during a disaster, the more accurate information we can get, and the sooner we can get it, the better position we are in, as a local government and as a city, to respond and make decisions.

I also have to take this moment to highlight the public response to this disaster in Nashville, because it was representative of the true character of our city.

In the days immediately following the flood, Hands On Nashville's system was overwhelmed with people wanting to volunteer. To date, the number of volunteers who have participated in disaster relief in our city has exceeded 17,000.

We have formed a Flood Recovery Team in the mayor's office that continues to work on our long-term recovery efforts, and they've already assisted in creating a Hazard Mitigation Buyout Program with the water department. And they have worked with the Housing Fund, a local nonprofit in Nashville that works on affordable housing and neighborhood revitalization projects, in creating a local disaster assistance program, called We Are Home, that is helping individuals fill the gap when funds from FEMA and SBA are not enough. The funds for this program are derived from Federal grant funding, local businesses and donations made to the Community Foundation.

Again, we are greatly appreciative of the Federal assistance we have received. When I speak to any group, even those visiting Nashville from somewhere else, I always make the point to thank them, as Federal taxpayers, for the assistance they gave our city.

PREPARED STATEMENT

Going forward, our city is going to continue to need the aid of the Federal Government to fully recover. And I look forward to continuing to work with our State's delegation, here in Washington, to ensure that Nashville remains a vibrant city in the months and years ahead.

Thank you.

[The statement follows:]

PREPARED STATEMENT OF HON. KARL F. DEAN

Thank you. I appreciate Senator Alexander for giving me the opportunity to be here today to speak on behalf of the citizens of Nashville.

Before I talk about what our city experienced in early May and how we responded, I want to first formally recognize Senators Alexander and Corker and Congressman Cooper for their leadership, and specifically their assistance in helping Nashville secure Federal assistance early on.

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The weekend after the flood, Nashville was visited by three of President Obama's cabinet members: Homeland Security Secretary Napolitano, Commerce Secretary Locke, and Secretary Donovan with the Department of Housing and Urban Development. I also had the opportunity to meet with the Administrators of FEMA and SBA. All of this to say, we are incredibly appreciative of the Federal support our city has received.

In Nashville, I am proud to say that our Metro departments were fully prepared to respond to this disaster. Over the years, our Office of Emergency Management has practiced and trained for various scenarios. In fact, just this past fall, a team

of 65 OEM staff and department representatives spent 4 days at FEMA's Emergency Management Institute in Emmetsburg, Maryland for an exercise that involved severe flooding.

We also had in place several agreements with outside organizations that aided in our response and recovery efforts. We had a Memorandum of Understanding with Belmont University that allowed us to use space on their campus, which is directly across the street from our Emergency Operations Center, for communication to the media. We had an MOU with Hands On Nashville to be the coordinating agency for volunteer assistance during and after a disaster. Staff from Hands On Nashville were in our Emergency Operations Center from day one. And we had an MOU in place with the Community Foundation of Middle Tennessee for the creation of a disaster relief fund, which allowed us to begin immediately collecting donations from the public and distributing those to nonprofit agencies that were assisting flood victims.

Nashville was ready.

And so, just as we do anytime there is potential for a severe weather event, we partially activated our Emergency Operations Center on Saturday afternoon, May 1 in preparation for what was predicted to be a 5 inch rainfall and flash flooding. By that evening, it was evident from the number of swift water rescues from flash flooding in area creeks a full activation of our Emergency Operations Center would be necessary.

While we continued to focus most of our attention and resources on life-saving rescues, we also began to implement measures to prevent more individuals from unnecessarily encountering dangerous flood waters. As many local streets and portions of Briley Parkway and Interstate 24 became flooded, we urged residents to stay off the roadways. We worked with our community partners to establish a shelter at Lipscomb University for individuals whose homes had flooded or were unable to return to their homes due to the flooding. And we activated our community hotline in order to have a non-emergency line of communication with the public.

At that point, the flooding we were experiencing was flash flooding from rainfall in the Harpeth River and Mill Creek watersheds. That evening was the first time our Office of Emergency Management had communication with the Army Corps of Engineers. We were informed that the Cumberland River was at 22 feet and was not at immediate risk of flooding. That same evening, the rainfall predictions we were given by the National Weather Service remained under 7 inches.

By early Sunday morning, our emergency responders had already conducted over 150 water-related rescues. Large numbers of Davidson County residents were without power. MTA bus service was suspended. On Sunday afternoon, we declared a State of Emergency in Davidson County to allow us to garner additional resources as necessary.

By Sunday evening, we had confirmed five fatalities thought to be flood related. We ordered evacuations of MetroCenter and First Avenue for precautionary reasons. A second shelter was opened. And water conservation measures were placed in effect as one of our city's two water treatment plants was submerged by the flood.

From Saturday evening to Sunday afternoon—in less than 24 hours—the Cumberland River went from 22 feet (well below flood stage) to 44 feet (4 feet above flood stage). We received 7 additional inches of rain beyond what was forecasted, for a total of 13.5 inches of rainfall in 48 hours—more than double the previous record of rainfall for any 2-day period in Nashville since they began keeping history records of weather.

On Monday, when the rain stopped, we began to assemble damage assessment teams. And we setup Disaster Information Centers at five community centers throughout the county to get information and resources to flood victims who had lost access to television and other media.

While our city began to quickly prepare for the long road of recovery ahead, the waters of the Cumberland River continued to rise. The cause of this is not for me to comment or speculate on. What I do know is that at no time did the Army Corps of Engineers inform us of scheduled water releases from the dams upstream.

We received a projection from the National Weather Service as to when the river would crest and at what level. But when we checked the actual river level with the Army Corps' automated gauge, it was clear the river was rising at a speed that far outpaced the Weather Service's projection. We communicated this to the Weather Service and later received an adjusted crest level projection. This happened more than once. And by Monday afternoon, with the crest level projection at 52.5 feet, we were extremely concerned about the consequences to our city if the projection was wrong again and the river rose above 53 feet. We decided to communicate this directly to the Army Corps of Engineers. Through a phone call, we clearly stated

that we didn't need anymore water in Nashville, and asked them to do whatever they could to aid in preventing further flooding of the Cumberland River.

Once the river crested and the water began to recede, we were able to assess the damage left behind. The private sector in Davidson County alone sustained over \$2 billion in property damage. We are still totaling the cost of repairs to our public buildings and infrastructure, but it is estimated to be over \$250 million. We lost a total of 10 lives in Davidson County. It's important that I point out that all of those were from flash flooding of our creeks and tributaries—no one died from flooding of the Cumberland River. Our emergency responders rescued a total of 1,400 individuals from the water, including some of their own who were put at risk while performing their duties.

What I have taken away from this experience, and what I would press as the key point I would like to make here today, is that during a disaster, the more accurate information we can get and the sooner we can get it, the better position we are in as a local government and as a city to respond and make decisions.

I also have to take this moment to highlight that the public response to this disaster in Nashville was representative of the true character of our city. In the days immediately following the flood, Hands On Nashville's system was overwhelmed with people wanting to volunteer. To date, the number of volunteers who have participated in disaster relief in our city has exceeded 17,000.

We have formed a Flood Recovery Team in the Mayor's Office that continues to work on our long-term recovery efforts full time. Already, they have assisted in creating a Hazard Mitigation Buyout Program with the Metro Water department. And they have worked with The Housing Fund, a local nonprofit in Nashville that works on affordable housing and neighborhood revitalization projects, in creating a local disaster assistance program called "We Are Home" that is helping individuals fill the gap when funds from FEMA and SBA are not enough. The funds for this program are derived from Federal grant funding, local businesses and donations made to the Community Foundation.

Again, we are greatly appreciative of the Federal support and assistance our city has received to date. When I speak to any group, even those visiting Nashville from somewhere else, I always make the point to thank them as Federal taxpayers for the assistance our city has received.

Going forward, our city is going to continue to need the aid of the Federal Government to fully recover. And I look forward to continuing to work with our State's delegation here in Washington to ensure that Nashville remains a vibrant city in the months and years ahead. Thank you.

Senator BENNETT. Thank you very much.
Mayor Hodges.

STATEMENT OF HON. RICHARD L. HODGES, MAYOR, CITY OF MILLINGTON, TENNESSEE

Mr. HODGES. Senator Bennett—

Is it on? Yes, it's on now.

Senator Bennett, Senator Alexander, I'm Richard Hodges, from the great city of Millington. With me is Chief Graves, our fire chief for the city of Millington. We're honored to be here today to discuss the devastating flooding of our city on May 1 and 2, and how local, State, and Federal agencies, along with the Millington community, responded to this disaster.

I have four parts of my presentation today: preparedness—preparations made by local, State, and Federal agencies; the local response and role of outside agencies; recovery efforts by our citizens and government agencies; and conclusion.

The flooding that struck our area in the early morning hours of Saturday, May 1, was unlike any in my lifetime. I have been a lifelong resident of Millington and very well remember the Christmas Day flood of 1987. Following the 1987 flood, the Corps of Engineers constructed a series of levees and various flood control measures to mitigate flooding in our city. Since that time, we have experienced

numerous rains. The flood control measures in place performed, as designed.

This event, though, was much greater in scope, occurred quicker than could have been imagined. An estimated 14 to 16 inches of rain fell in Millington on May 1 and 2, topping levees and causing flash flooding throughout the city and the Naval Support Activity Mid-South.

Preparations: Our area is prone to various severe weather events that have an impact on our community. As part of our emergency preparedness, we receive high-impact weather alerts from the Memphis office of National Weather Service.

On Thursday, April 29, we participated in high-impact weather conference's call, facilitated by the National Weather Service. They gave predictions of rainfall in excess of 10 inches in some areas, with widespread tornados.

On Friday, April 30, the Memphis office of National Weather Service held a second conference call. They reiterated that the computer models continue to indicate heavy rain and severe weather, beginning overnight.

Response: At approximately 5 a.m. the morning of May 1, the Millington Fire Department began to receive 911 calls to rescue persons trapped in their homes and cars. We saw early of the magnitude of this event. We were proactive by declaring a state of emergency in the city, and notified our emergency management partners. As the need for resources increased, our fire department's assets were quickly overwhelmed. The cooperation we received from our counterparts within Shelby County, the support of neighboring municipalities, and the NAS Mid-South was outstanding.

Together, we coordinated, conducted over 1,500 rescue efforts on May 1 alone. These included rescue evacuations from the Federal prison, naval support activity, and hundreds of homes. Our rescue efforts continued through late Sunday, May 2, and were interrupted several times by severe weather.

The cooperation among government agencies extended beyond the local jurisdictions in our emergency management, both local and State. TEMA director, James Bassham, and their west Tennessee office were particularly helpful in ensuring we had the necessary resources on the ground to respond. In addition, tremendous intergovernmental cooperation, I must acknowledge the outpouring support from the Millington community. Local businesses and private citizens stepped forward offering boats, foods, and other assistance.

Recovery: As we entered into the 48th hour of this event, we felt confident that all persons affected had been rescued and moved to temporary locations. We began concentrating on recovering efforts. Typically, the recovery effort moves to a more localized response with support of the local, State, and Federal agencies. The recovery effort is a lengthy process which can cause additional strain on those affected. It was clear that our citizens in our city would need Federal assistance to recover from this catastrophe.

People have come to expect Federal assistance in times of disaster, yet the process to obtain declaration can be daunting, time-consuming task. I applaud FEMA Administrator Craig Fugate and FEMA Regional IV for introducing the concept of early declaration.

This made resources needed to begin recovery efforts quickly available to those in most need. To receive a declaration for category A and B for the local government and individual assistance to our citizens would typically take 2 weeks, but ours came in a matter of days. We felt strong support for the Federal Government in our community, with visits from FEMA, Administrator Fugate, Secretary of the Navy, Ray Mabus, Secretary of Housing and Urban Development, Mr. Donavant, and Secretary of Commerce, Gary Locke. I especially want to thank the Senators Alexander, Corker, and Congressman Cohen, for their visits to Millington during this effort.

While we are enormously grateful for all the Federal support, I am most proud of Millington community, how they pulled together. Clearly, Federal support is vital. But, the real recovery begins at home. Our city employees worked around the clock for this—of this disaster. The quick and decisive action of Chief Graves saved lives. Everywhere you look in Millington, you see people helping people. The faith-based communities came forward. NAS Mid-South, through Captain Grant, provided shelter for our people. Private citizens organized boats, floods, and initiatives to help.

Conclusion: In conclusion, it is hard to say if this disaster could have been averted. There is probably no way to fully protect our community from acts of God, yet we are currently looking at infrastructure in place. There are always lessons to be learned from this situation. I encourage the continued appropriations for training first responders. As Administrator Fugate knows, fire personnel in our region were completing a month-long series of technical rescue training.

I also would encourage the committee to form a group to examine waterways in and around our area. The flooding left behind much debris and open channels, and in coming months, we can anticipate more flooding or rains. The waterways will once again become filled and rain will begin pushing large amount downstream. I would also like to encourage FEMA to continue moving forward for swift presidential declarations. This ensures the rapid help so desperately needed.

Senators, Millington is a small town, population 10,000 people. When you think of “small town USA,” you’re thinking of Millington. It’s a wonderful place to live. We have been thrust into the national spotlight as a result of the largest natural disaster ever to affect Millington—the amount of rainfall. We prepared the best that we could. We responded in a swift and systematic manner, and we are on the road to recovery. I understand and accept I am responsible for our citizens. When disaster strikes, we are fortunate to have support of the government, but recognize the response begins at home.

I hope we have demonstrated in some minute way how intergovernmental relations work, when local, State and Federal agencies work together for the good of the community.

Senator Alexander, I want to thank you for your support. I appreciate the time and attention of this subcommittee and the opportunity to be here with you today. And Chief Graves and I will be happy to answer any of your questions at this time.

PREPARED STATEMENT

And I might say that Chief Graves, early that Saturday morning, at 4 o'clock in the morning, he had been active with Emergency Management, he knew what to do. He knows what kind of mayor I am, though, and he came to me, and he said, "mayor, I know what to do, we're working on it, we're going to get it done, I need you to do one thing." I said, "What's that?" He said, "Stay out of the way and let me do my job."

And that's exactly what I did.

Thank you.

[The statement follows:]

PREPARED STATEMENT OF HON. RICHARD L. HODGES

Chairman Dorgan, Ranking Member Bennett, Senator Alexander and distinguished Members of the Subcommittee on Energy and Water Development, thank you for the opportunity to be with you today. My name is Richard Hodges, mayor of the great city of Millington, Tennessee. With me is Gary Graves, Fire Chief of the city of Millington. We are honored to be before you today to discuss the devastating flooding to our city on May 1-2, 2010 and how local, State and Federal agencies along with the Millington community responded to this disaster.

My statement today will be summarized to four key points.

—Preparations made by local, State and Federal agencies in the days before May

1

—The local response and role of outside agencies

—Recovery efforts by our citizens and government agencies

—Conclusion

The flooding that struck our area in the early morning hours of Saturday, May 1, 2010 was unlike any seen in my lifetime. I have been a life-long resident of Millington and remember well the Christmas day flood of 1987. Following the 1987 flood, the Corps of Engineers constructed a series of levees and various flood control measures to mitigate flooding in our city. Since that time we have experienced numerous torrential rains. The flood control measures in place performed as designed. This event was much greater in scope, occurred quicker than we could have imagined, and the damage more widespread than what we had ever seen before. An estimated 14 inches of rain fell in Millington on May 1 and 2 topping the levees and causing flash flooding throughout the city of Millington including Naval Support Activity Mid-South.

PREPARATIONS

Our area is prone to various severe weather events that have an impact on our community. As part of our emergency preparedness we receive high-impact weather alerts from the Memphis office of the National Weather Service. On Thursday, April 29 we participated in a high-impact weather conference call facilitated by the National Weather Service. They gave predictions of rainfall in excess of 10 inches in some areas with the possibility of widespread tornados. Following this conference call, we received an e-mail from the Memphis-Shelby County Office of Preparedness alerting all public safety agencies in the area of the potential weather event in the next 24-36 hours. On Thursday, we issued an e-mail alert to all department directors to begin preparations and ensure essential personnel were on alert throughout the weekend. On Friday, April 30 the Memphis office of the National Weather Service held a second conference call. They reiterated that all computer models continued to indicate heavy rain and severe weather beginning overnight and moving eastward throughout the day on Saturday.

RESPONSE

At approximately 5 a.m. the morning of May 1, the Millington Fire Department began to receive 9-1-1 calls to rescue persons trapped in their homes and cars. We saw early on the magnitude of this event. We were proactive by declaring a state of emergency in the city and notified our emergency management partners. As the need for rescues increased, our fire department's assets were quickly overwhelmed. The cooperation we received from our counterparts within Shelby County, the support from neighboring municipalities and NSA Mid-South was outstanding. Together, we coordinated and conducted over 1,500 rescue efforts on May 1. These in-

cluded rescue evacuations from a Federal prison, Naval Support Activity Mid-South, and hundreds of homes. Our rescue efforts continued through late Sunday, May 2 and were interrupted several times by severe weather.

The cooperation among government agencies extended beyond the local jurisdictions to our emergency management partners, both local and State. We were in constant contact with the Memphis—Shelby County Office of Emergency Preparedness and the west region of the Tennessee Emergency Management Agency. TEMA Director, James Bassham and their west Tennessee office were particularly helpful in ensuring we had the necessary resources on the ground to respond. The local television stations provided nearly non-stop coverage of the weather affecting the area and allowed us several on-air interviews providing up-to-date information for our citizenry. In addition to the tremendous inter-governmental cooperation I must acknowledge the outpouring of support from the Millington community. Local businesses and private citizens stepped forward offering boats, food and other assistance to aid in our efforts.

RECOVERY

As we entered into the 48th hour of this event, we felt confident that all persons affected had been rescued and moved to temporary locations. We began concentrating on recovery efforts. Typically, the recovery effort moves to a more localized response with support of the local, State, and Federal agencies. The recovery effort is a lengthy process which can cause additional strain on those affected. It was clear that our citizens and our city would need Federal assistance to recover from this catastrophic event. People have come to expect Federal assistance in times of disaster. Yet the process to obtain a declaration can be a daunting, time-consuming task. I applaud FEMA Administrator, Craig Fugate and FEMA Region IV for introducing the concept of early declaration. This made resources needed to begin recovery efforts quickly available to those most in need in our community. To receive a declaration for Category A & B for the local government and individual assistance for our citizens would typically take 2 weeks, but ours came within a matter of days. We felt the strong support of the Federal Government in our community with visits from FEMA Administrator Craig Fugate, Secretary of the Navy Ray Mabus, Secretary of Housing and Urban Development Shaun Donovan and Secretary of Commerce Gary Locke. I especially want to thank Senators Alexander, Corker and Congressman Cohen for their visits and genuine concern on the recovery efforts and needs of the Millington citizens.

While we are enormously grateful for all of the Federal support, I am most proud of how the Millington community pulled together. Clearly, the Federal support is vital, but the real recovery begins at home. City employees worked around the clock in response to this disaster. The quick and decisive action of Chief Graves saved lives. The Millington Fire Department conducted over 1,500 rescue missions with no loss of life or injury. The Millington Police were outstanding in securing the neighborhoods and keeping order. Millington Public Works brought hope back to our neighborhoods as they cleared personal belongings acquired over lifetime that were heaped in piles of debris lining the streets. I have yet to hear a single complaint from the employees of the city of Millington. The only thing I hear is, "What can I do to help?" Everywhere you look in Millington you see people helping people. The faith based communities stepped forward to provide emergency food, shelter and flood buckets filled with cleaning supplies for those in need. The civic organizations provided tremendous amounts of food, water and other resources. NSA Mid-South, in the midst of their own devastation of massive flooding with over 300 dislocated military families, stepped forward under the leadership of Capt. Douglas McGowen, to provide shelter for the dislocated civilians of Millington. Capt. McGowen said, "With the great need to shelter those displaced by the flooding and the large building we had available, it became a priority for us to ensure these Millington residents had a roof over their heads." Local businesses provided much needed food and supplies with an attitude of pay me later and never taking advantage of the situation. Private citizens organized benefits and flood recovery initiatives to help those affected. Like, Mr. Larry Silvey, a 70 year old Millington resident. A retired Navy Master Chief, contractor and entrepreneur, Silvey set up a tent at the corner of Arapaho and Bill Knight in one of the hardest hit areas in Millington. This tent became his headquarters of operations 6 days a week with only Sundays off. From this tent, he organized teams of hundreds of volunteers that have logged over 8,000 hours to date helping their neighbors tear out and rebuild their homes through this disaster. Donating 100 percent of their time and talent, these volunteers have rebuilt over 200 homes and counting.

CONCLUSION

In conclusion, it is hard to say if this disaster could have been averted. There is probably no way to fully protect your community from acts of God. Yet we are currently looking at the infrastructure in place to identify any areas for improvement. There are always lessons to be learned in every situation. I would encourage the continued appropriations for training first responders. As Administrator Fugate knows, fire personnel in our region were completing a month long series of technical rescue training as part of the Urban Area Security Initiative (UASI) grant funds. Coincidentally, the last day of the swift water rescue class was on May 1. Much of the equipment used in our response came as a result of funding under the UASI program and our homeland security district.

I also would encourage this subcommittee to form a group to examine the waterways in and around our area. The flooding left behind much debris in the open channels. In the coming winter months, we can anticipate more flooding rains. The waterways will once again become filled with rain and begin pushing large amounts of debris downstream. Next Spring has the potential of another catastrophic event if these issues are not addressed. I would also like to encourage FEMA to continue moving forward for swift presidential declarations. This ensures the rapid help so desperately needed in disaster situations gets into the hands of those in need.

Senators, Millington is a small town in west Tennessee with a population of barely 10,000 people. When you think of small-town USA, you are thinking of Millington, Tennessee. It is a wonderful place to live and visit with friends and family, but we don't normally draw national attention. We have been thrust into the spotlight as a result of the largest natural disaster to ever affect Tennessee. The amount of rainfall, albeit historic in proportions, was predicted. We prepared the best we could. We responded in a swift and systematic manner and we are on the road to recovery. I understand and accept that I am responsible to our citizens. When disaster strikes, we are fortunate to have the support of the Government, but recognize that response and recovery begins at home. I hope we have demonstrated in some minute way how inter-governmental relationships work. When local, State and Federal agencies work together for the good of the community the citizens are better served.

Senator Alexander, thank you for your support. I appreciate the time and attention from this subcommittee and the opportunity to be here with you today. Chief Graves and I will be happy to answer any of your questions at this time.

Senator BENNETT. Thank you very much.

Mr. Adamson.

STATEMENT OF WHIT ADAMSON, PRESIDENT, TENNESSEE ASSOCIATION OF BROADCASTERS

Mr. ADAMSON. Good morning, Chairman Bennett, Senator Alexander.

My name is Whit Adamson, and since 1987 I've been the president and chief executive officer of the Tennessee Association of Broadcasters in Nashville. TAB is thankful to Senator Alexander for requesting this hearing and his ongoing support for improving disaster communications. I look forward to sharing with you the valuable, often life-saving public service and full power local radio and television stations provide during these times of disaster.

Broadcasters are proven, reliable tools in the face of disaster. Even if the electricity is out, causing the Internet and cable to go down, or cell coverage is inoperable due to congested networks; free over-the-air broadcasters can still be on the air, delivering vital information to battery-operated receivers.

In addition to our ongoing comprehensive news coverage of emergencies, broadcasters are also the backbone of the Emergency Alert System, or the EAS, including AMBER Alerts. Nationwide AMBER Alerts have helped safely recover more than 500 abducted children since broadcasters created this program in 1996. In Tennessee, we have one of the best AMBER Alert programs in the country, thanks to the Tennessee Bureau of Investigation.

EAS, which is a largely wireless network that connects over-the-air radio, television, and cable systems, is used during sudden, unpredictable, or unseen events. Participation in the EAS is technically voluntarily, yet virtually all radio and television stations participate, and do so proudly. EAS equipment is purchased by broadcasters at their own expense, and stations must test their EAS systems on both a weekly and a monthly basis. We've all seen or heard the familiar announcement, "The following is a test of the Emergency Alert System. This is only a test."

We are proud of the actions of our broadcasters before and after the flooding in Tennessee. One of the most critical reporting jobs that weekend came from a small radio station, WUCZ-FM, in Carthage. Dennis Banka's station is located at the mouth of the Caney Fork River, 28 miles below Center Hill Dam on the Cumberland River, and 153 miles below the Wolf Creek Dam. Due to the known instability of both of these dams, a local State representative could get critical information, by cell phone, related directly from Lieutenant Colonel Anthony Mitchell, to the station and then out to the public. Emergency exercises of this type had never been tested before in this area.

Last year, the TAB launched a project with the Office of Emergency Management and Mayor Dean's office in Nashville to improve local implementation of EAS alerts. Mayor Karl Dean is to be commended for his ongoing work in this area. The goal of this plan enables authorities to act as the true civil authority needed to test our EAS system and to create the opportunity for initial—initiate real alerts.

The ongoing reliability and success of the EAS network depends on several important developments:

First, funding would be helpful to support expanded training of local public safety officials in how to use the EAS. Currently, there is an unacceptable level in the knowledge and expertise of local authorities in how to, and when to, employ EAS. These funds could be distributed through FEMA, which could also design a training and education program.

Second, FEMA is in the midst of implementing a next generation of EAS which will modernize the technology and the computer language used to deliver EAS messages. It will require most broadcasters to replace their EAS equipment. The expense of such equipment is beyond the means of some broadcast stations and local governments. Some entities may even be forced to opt out of participating in the EAS, at least for a period of time. Federal funding would be critical to aiding broadcasters and local governments in fully implementing FEMA's plans for a next-generation EAS.

Third, at little or no cost, cell phone manufacturers could include FM radio receivers in phones to give consumers important mobile access to radio services, including EAS messages. Broadcasters are grateful for the encouragement we have received from Congress in favor of expending mobile—expanding mobile access to radio services. We are also excited about our future in mobile DTV, currently being deployed right here in Washington and in a number of markets across the country. This technology will bring the benefits of over-the-air television to the mobile generation, including live local emergency information.

PREPARED STATEMENT

Finally, in Tennessee, we are continually pursuing the modernization of emergency notification systems. Tennessee public safety officials, broadcasters, and others are working to develop this new system. Tennessee is home to several potential terrorist targets, and it is also extremely prone to severe weather conditions. Improving our local emergency information system could very well save lives. Funding support for this endeavor will be critical to completing this task, and I am grateful for the opportunity to share my views on emergency communications in Tennessee, as well as nationally and look forward to working with you.

Thank you.

[The statement follows:]

PREPARED STATEMENT OF WHIT ADAMSON

Good morning Chairman Dorgan, Ranking Member Bennett, Senator Alexander, and members of the subcommittee. My name is Whit Adamson. Since 1987 I have been the president and chief executive officer of the Tennessee Association of Broadcasters in Nashville. Thank you for the opportunity to speak with you today about the valuable, often life-saving services that full power local radio and television stations provide during natural disasters and other crises. As discussed in detail below, local broadcasters are the most important source for vital emergency journalism for all Americans. In addition, local radio and television stations serve as the backbone of this Nation's Emergency Alert System. I am pleased to share with you today the views of Tennessee's broadcasters about how to improve our emergency communications system in the digital age.

To date, much of the discussion related to emergency communications has concerned improving interoperability among public safety authorities, fire, police, and other emergency operations, namely, the ability for these various authorities to communicate among themselves during a disaster. While broadcasters certainly support this laudable goal, we also believe the time is ripe to expand the conversation to include improved emergency public notification. To a significant degree, interoperability and public alerting go hand-in-hand, such that the success of each depends partly on the success of the other. For example, the lessons learned during 9/11 demonstrate that improved emergency communications among public safety officials certainly would have improved the critical, life-saving information that could have been shared with the public. Below, I will focus my remarks on public alerting, and our efforts in Tennessee to improve emergency notification to the public.

BROADCASTING IS THE MOST IMPORTANT SOURCE FOR CRITICAL, LIFE-SAVING
EMERGENCY JOURNALISM FOR ALL AMERICANS

Broadcasters' commitment to public service is never more apparent than during times of crisis. During an emergency—particularly one that arises with little notice—no other industry can match the ability of full power broadcasting to deliver comprehensive, up-to-date warnings and information to affected citizens. Local television broadcasters reach 99 percent of the approximate 116 million households in the United States, while local radio reaches an audience of more than 236 million, or 93 percent of all Americans, on a weekly basis. The wide signal coverage of broadcasters ensures that anyone in a car, at home or even walking around with a mobile device can receive up-to-the-minute alerts when disaster strikes. As a virtually ubiquitous medium, broadcasters understand and appreciate their unique role in disseminating emergency information. Radio and television broadcasters are first informers during an emergency, and Americans know to turn to broadcasting first for in-depth coverage when disaster strikes.

Radio and television stations are also our Nation's most reliable network for distributing emergency information. Even if the electricity is out, causing the Internet and cable television to go down, and cell coverage is lost because networks are clogged or a tower is down, free, over-the-air broadcasters can still be on the air. Our dedicated news and weather personnel use their familiarity with the people and geography of their local communities to provide the most useful, informative news to their audiences, whether that includes information on where to shelter-in-place, or which streets will serve as evacuation routes, or where local businesses may find fuel or generators.

Broadcasters deliver emergency information with passion. Let me give you a recent example of broadcasters' performance during floods in Nashville. On Saturday morning May 1, 2010, every news station in Nashville preempted regular programming around 7 a.m. in favor of continuous, commercial-free weather event content for almost the entire weekend. Local radio stations, with only weekend staffing in place, provided constant weather alerts from both the National Weather Service and joint news cooperation arrangements with local television stations. One of the best reporting jobs came from a small FM radio station in Carthage, Tennessee, WUCZ. Dennis Banka, who reported from the station as a virtual one-man show for an entire weekend during the floods, managed to keep his station on the air for almost 48 hours straight for the benefit of local listeners in need. This station is located at the mouth of the Caney Fork River, 28 miles below the Center Hill Dam on the Cumberland River (which is about 50 miles below the Wolf Creek Dam northwest of Nashville). Both of these dams exhibited known instability, but fortunately Mr. Banka and his station had vital contacts with emergency personnel and other authorities and were able to report critical information about the situation of both rivers in a timely manner.¹

Here in Washington, during the blizzards that hit the east coast this past winter and essentially closed down the Nation's Capital for a week, broadcasters provided up-to-the-minute information that was critical to affected residents. For instance, Washington, DC station WRC-TV's wall-to-wall coverage and "potentially life-saving newscasts" were lauded by Maryland Senator Barbara Mikulski, and stations WJLA-TV and WUSA also earned praise for their coverage of the snowstorms.² Station WTOP-FM alone sacrificed \$140,000 in lost advertising revenue in order to provide 24-7 coverage, and incurred another \$50,000 in expenses to cover the blizzards.³ Federal Communications Commission (FCC) Chairman Genachowski observed that "not only were local broadcasters a lifeline for the community, WRC-TV used its robust Web site and Twitter feed to help residents who had lost power get up-to-the-minute information through their computers and phones."⁴

Similarly, during Hurricane Rita, KLFY, a Lafayette, Louisiana CBS affiliate, broadcast continuous live coverage. According to the station, all resources were put into action. All reporters, live trucks, videographers, directors, producers, studio personnel, and engineering were on hand till the "all clear" was sounded. Network and syndicated programming was preempted for live weather coverage. Emergency generators were put on line when power was lost, and special arrangements were made with video programming distributors to ensure the television station's signal would continue to reach viewers. Additional sign language interpreters were hired so the station's coverage would reach the hearing impaired. The station provided overtime, extra staff and food, and shelter during the emergency.⁵

Yet another example of broadcasters' coverage occurred during the ice storms in Kentucky last year. When a snow and ice storm left hundreds of thousands in the dark in 2009 and caused a statewide emergency declaration this past winter, radio stations WBIO-FM, WXCM-FM, WLME-FM, WKCM-AM and WVJS-AM in Owensboro, KY., and WTJC-AM/FM in Tell City, IN., covering a large part of rural Northern Kentucky and Southern Indiana, powered on. Throughout the day and night, these stations broke from all regular programming to get crucial information out to their listeners, many of whom had no power, no heat and no other means of obtaining emergency information. Phones at the stations rang throughout the crisis. Callers with information on kerosene and generators got the word out through

¹The U.S. Army Corps of Engineers oversees both of these dams and have recognized the need for repairs. In 2006, the Army Corps lowered these lakes and began a massive project to mitigate seepage at the dams, which have been leaking for decades. President Obama's fiscal year 2011 budget will further those efforts. The budget includes \$4.939 billion in gross discretionary funding for the Civil Works program of the Corps of Engineers, of which almost \$300 million will flow into the Nashville district. \$134 million of this will be devoted to ongoing seepage repairs at Wolf Creek Dam. The remainder will be divided into accounts for investigations and studies, construction, and operation and maintenance of Corps projects, including \$82.8 million for seepage repair at the 61-year-old dam on the Caney Fork River.

²John Eggerton, "As the Snowy World Turns," *Broadcasting & Cable* (Feb. 10, 2010).

³See "Washington DC Broadcasters Recap Snow Coverage for FCC," *Radio Business Report/Television Business Report* (March 22, 2010). WTOP-FM's morning anchor reported that, "[f]or well over 100,000 people who lost their power in the storm, WTOP was a lifeline. That's not what I say. That's what they told us."

⁴Prepared Remarks of Chairman Julius Genachowski, NAB Show 2010, Las Vegas, Nevada, at 2 (April 13, 2010) (Genachowski NAB Remarks).

⁵The Economic Realities of Local Television News—2010: A Report for the National Association of Broadcasters, (April 2010) (NAB Report), at 24, attached to Comments of the National Association of Broadcasters, Examination of the Future of Media and Information Needs of Communities in a Digital Age, GN Docket No. 10-25 (filed May 7, 2010).

radio. The stations stayed on air continuously with updates until the crisis passed. “People will come up to me and thank us for being a lifeline, because there was no other way to get information,” said news director Mike Chaney. “When the power is out, you have radio.”⁶

Moreover, broadcasters’ commitment to their local communities does not end when the crisis ends. The effects of a disaster on a community are often long-lasting, and when national attention turns away, local broadcasters remain to assist their community and listeners. For example, when wildfires in Southern California destroyed more than 1,000 homes and burned hundreds of thousands of acres, KABC-AM in Los Angeles immediately responded to the crisis, partnering with sister station KLOS-FM and KABC-TV to organize the first media relief fundraiser. The “drive-by” event was held at three separate locations on one day. On-air personalities greeted and interviewed donors at their cars during the 14-hour live broadcast. The KABC Web site linked to all area Red Cross chapters, and the National American Red Cross set up a special link on the KABC Web site so listeners could donate any time of day or night. Station staff gave 288 hours to the effort and, with individual and corporate donors, raised a remarkable \$4.5 million for the victims of the fire.

There are many more examples. Broadcast stations continue to provide emergency information and other services even though the costs—in overtime for personnel, in meals and hotels, in equipment, and of course in advertising lost due to providing wall-to-wall coverage—are substantial. For example, one station reports that a single season’s hurricane coverage cost \$160,000 before accounting for lost advertising revenue.⁷ Another station reports that it lost 50 percent of its revenue for an entire month following the events of September 11, 2001, because its intensive news programming preempted so much of its normal programming.⁸ Emergency journalism clearly requires the commitment of substantial resources from the Nation’s local broadcasters.

LOCAL BROADCAST STATIONS REMAIN THE BACKBONE OF THE NATION’S EMERGENCY ALERT SYSTEM

In addition to the on-going, comprehensive coverage of emergencies that broadcasters provide during emergencies, we are also the backbone of the Emergency Alert System (EAS). EAS is a largely wireless network that connects over-the-air radio, television and cable television systems. The in-place infrastructure of EAS allows the prompt dissemination of alerts to the widest possible audience, or to target alerts to specific areas, as appropriate. EAS is intended for use during sudden, unpredictable or unforeseen events that post an immediate threat to public health or safety, the nature of which precludes any advance notification or warning.

In some States, EAS is coordinated by Government authorities. EAS can be potentially accessed or triggered by the President, Governors and local authorities under certain conditions, and the National Oceanic and Atmospheric Administration (NOAA) and the National Weather Service (NWS). Broadcasters typically work in partnership with State, county and local emergency managers, sheriffs and local police, on how best to deploy EAS. For example, about a year ago, the Tennessee Association of Broadcasters, with dated equipment and existing funds, launched a project with the Nashville Mayor’s Office of Emergency Management and Mayor Dean’s Office to improve our local implementation of EAS alerts. The goal of this plan is to enable these local authorities to act as the true “civil authority” to test our EAS system and to create the opportunity for them to initiate any real alerts. Unfortunately, we were unable to complete our work in time for the recent floods in Nashville, but we do expect to be finished in the very near future.

⁶In this vein, broadcasters are also developing new avenues for distributing their services, particularly emergency communications. In particular, the radio industry is working to partner with the cellular telephone industry to expand the availability of radio service in mobile telephone handsets. We believe that expanding this market holds several benefits for the American public. First, unlike cellular networks, radio service never clogs or becomes congested, as occurred after the terrorist attacks on 9/11 and during Hurricane Katrina. Second, there are no technical obstacles to incorporating radio reception into a cellular handset. In fact, there are currently over 800 million handsets in Europe with readily accessible radio service, while only a handful of handset models here in the United States include this valuable feature. Third, broadcasters believe that FM radio reception in mobile handsets is an efficient, economical method for delivering emergency alerts and information to the public. Incorporating radio reception into cellular handsets would provide the American public with one-stop shopping for mobile emergency warnings and in-depth news coverage.

⁷NAB Report at 23.

⁸Id. at 24.

The content of EAS messages can vary depending on the nature of the emergency, but may include information on evacuation plans and routes, shelter-in-place instructions, storm paths, and America's Missing: Broadcasting Emergency Response Alerts, or Child Abduction AMBER Alerts, that help expand the eyes and ears of local law enforcement when a child is abducted. In fact, we are extremely proud of our local AMBER Alert System in Tennessee, which is one of the most successful systems in the country due to our cooperation with the Tennessee Bureau of Investigation (TBI). Nationwide, since the inception of AMBER in 1996, AMBER alerts have helped safely recover more than 500 abducted children.⁹ In fact, the Amber Plan was originally created by broadcasters with the assistance of law enforcement agencies in the Dallas/Ft. Worth area.

Clearly, EAS participation is an important component of broadcasters' public service. Although participation in EAS is technically voluntary, virtually all radio and television stations participate, and do so proudly. All EAS equipment is purchased by broadcasters at their own expense. All stations must test their EAS systems on both a weekly and monthly basis. We have all seen or heard the familiar announcement: "The following is a test of the Emergency Alert System. This is only a test."

In January 2010, the FCC and the Federal Emergency Management Agency (FEMA) jointly conducted a statewide test of the EAS in Alaska.¹⁰ Radio and television stations in Alaska coordinated closely with Federal and local authorities in Alaska to help ensure the success of this test. Their efforts included a comprehensive public awareness campaign that provided Alaskans with repeated advance notice of the statewide EAS test, and helped to prevent any undue surprise to the statewide test.

More recently, the FCC announced its intention to introduce a yearly nationwide test of the EAS, starting in 2011.¹¹ The broadcast industry supports national EAS testing. We are committed to working with our Federal and local partners to ensure that the national test is useful and informative. In particular, we intend to play a critical role in raising advance awareness of the national test. Broadcasters are also preparing for the national exercise by reviewing their internal EAS equipment and processes, and if appropriate, upgrading software or hardware in advance of the national test. Although broadcasters provide EAS and in-depth emergency information as part of their service to the public, and do so enthusiastically, participating in a reliable, functional EAS is not without certain challenges. For example, in June 2006, President Bush issued Executive Order 13407, entitled Public Alert and Warning System, which states:

It is the policy of the United States to have an effective, reliable, integrated, flexible, and comprehensive system to alert and warn the American people . . . establish or adopt, as appropriate, common alerting and warning protocols, standards, terminology, and operating procedures for the public alert and warning system to enable interoperability and the secure delivery of coordinated messages to the American people through as many communication pathways as practicable . . . administer the Emergency Alert System (EAS) as a critical component . . . ensure that under all conditions the President of the United States can alert and warn the American people.

In response, FEMA has served as the lead Federal agency for developing this program, called the Integrated Public Alert and Warning System (IPAWS) Program. Among other things, IPAWS is designed to improve public safety through the rapid dissemination of emergency messages to as many people as possible over as many communications devices as possible. To do this, FEMA's IPAWS program is planning to expand the traditional EAS to include additional technologies, to capitalize on recent shifts in how many Americans consume information. IPAWS will enable Federal, State, territorial, tribal, and local alert and warning emergency communication officials to access multiple broadcast and other communications pathways for the purpose of creating and activating alert and warning messages related to any hazard impacting public safety and well-being. Broadcasters are working closely with FEMA to ensure that EAS via free, over-the-air television and radio remain a critical element of the next generation of EAS and public alerting.

In Tennessee, and nationwide, radio and television stations do a commendable job assisting public safety officials in disseminating emergency information, whether

⁹ See http://www.missingkids.com/missingkids/servlet/PageServlet?LanguageCountry=en_US&PageId=991 (last visited July 15, 2010).

¹⁰ Alaska Plans EAS Test Using EAN Code, Radio Magazine (Dec. 31, 2009), available at http://radiomagonline.com/studio_audio/EAS/alaska_ean_test_1231.

¹¹ Review of the Emergency Alert System, Second Further Notice of Proposed Rulemaking, EB Docket No. 04-296 (rel. Jan. 14, 2010).

through our on-air news programming, or through EAS. Regarding the latter, we fully intend to continue our efforts to devote personnel and attention to making sure that our internal EAS systems work properly. However, the ongoing reliability of the EAS network will depend on the success of several important developments. First, the success of EAS will largely turn on the expertise and ability of local authorities to fully deploy EAS and act as a “civil authority” with full access to the system. In the past, some of the isolated instances where EAS could have been used more judiciously directly resulted from a lack of awareness or expertise on the part of local officials concerning EAS. In this day and age, it is unacceptable that some local emergency managers remain unaware of the benefits of EAS, or how and when to trigger an EAS alert. I respectfully call on this subcommittee to consider funding a comprehensive EAS training program for State and local public safety officials, so that EAS will continue to work as intended for the benefit and safety of all Americans. Such a program could be administered through FEMA, which could allocate the funds as needed to various local authorities and also design and conduct seminars and other educational experiences for local officials and the public regarding EAS.

Second, as mentioned, FEMA is in the midst of implementing a next generation of EAS. This new system will modernize the technology and computer language used to deliver EAS messages from public safety officials to EAS Participants. Under the Commission’s existing rules, broadcasters and other EAS Participants will be required to process an EAS message that is formatted in this new computer language known as the Common Alert Protocol (CAP) within 180 days of FEMA’s formal adoption of standards for the new format. This will be a substantial burden for many broadcasters, as it will require the replacement of EAS equipment at most radio and television stations. The costs of such new equipment are beyond the means of many small broadcast stations, especially after the recent severe recession. As a result, it is possible that some radio and television stations may be forced to opt out of initially participating in EAS going forward. Therefore, I also respectfully ask this subcommittee consider funds that could be distributed through State emergency management offices to help certain broadcasters absorb the costs of replacing their EAS equipment to comply with FEMA’s directives and standards. Such funds could be critical to the success of the next generation of EAS.¹²

Third, in Tennessee, we are undertaking an effort to substantially improve and modernize our emergency notification plan one county at a time. Under this “perfect” notification plan, a managed “system-of-systems” would be created through which multiple systems would work together to deliver more alerts and warnings more securely, faster, and to more people. This statewide program would be designed to take advantage of existing investments and future initiatives, including a modernized EAS system, and would be poised for connection to any national system that is developed. At the same time, however, the plan would maintain primary responsibility for alerting at the local level and would include the ability to target alerts geographically.

The goal of this Tennessee statewide notification program would be to deliver alerts and warnings throughout the State with sufficient capability and speed, in advance of pending disasters, to help prevent loss of life and property. The program would be consistent with State and Federal initiatives and standards including, but not limited to the Tennessee Emergency Response Plan (TEMP), Tennessee Homeland Security Strategy, IPAWS, and the CAP. This program will also require funding. These funds would be used to create and manage the program, facilitate collaboration, develop operational and governance guidelines and training, purchase technology, and conduct public outreach.

The program would be developed collaboratively, engaging “communities of interest” including public safety and others responsible for issuing alerts, network providers such as broadcasters, cable television operators, and telephone carriers, critical recipients of alerts including special needs communities, and relevant infrastructure providers, including electrical utilities, healthcare systems, and transportation officials. This program for Tennessee would be modeled after successful ef-

¹²One critical improvement can be achieved without expenditure of any funds. Specifically, broadcasters need credentialing from State and local authorities to allow them to access their facilities, such as studios and antenna towers, during times of emergency. This will enable radio and television stations to repair or maintain their equipment and fully leverage their resources, local knowledge and training to keep the public informed during emergencies. While certain States accommodate broadcasters in need of access to their facilities, such cooperation is not universal. Congressional action in this area could greatly enhance our ability to maintain operations and deliver vital information to our audiences.

forts by other States and the Federal Government, and attempt to leverage the advantages and lessons learned elsewhere.

The statewide notification program we have in mind would greatly expand public participation in emergency communications. Under this program, members of the public will be able to indicate their preference for how to receive emergency notifications, and improve accommodations for the special needs community and non-english speaking citizens. We also intend to launch an effective public education and awareness program. The program will also help facilitate the management of volunteers. Finally, it will significantly enhance the use of EAS by local officials, for example, by using technology to enable local officials to more easily deploy EAS without interfering with their other responsibilities, and enabling officials to use EAS for certain non-threatening situations on a local basis, provided such use does not interfere with alerts for threatening matters.

A properly working EAS is a fundamental and essential component of our Nation's Homeland Security. It is crucially needed in our State of Tennessee to respond to the myriad of potential terrorist threats facing our region's target rich environment, including two nuclear power plants, and the Oak Ridge National Laboratories, one of the world's premiere centers for the United States Department of Energy's research and development on energy production. Tennessee also often experiences severe weather conditions. Numerous flooding situations have hit our State in the past, and even though our broadcast stations pride themselves on having the latest in storm-tracking technology, Tennessee still leads the Nation in tornado deaths over the past decade.

Perhaps most importantly, the Volunteer State's many major roadways are among our Nation's most significant transportation corridors, potentially facilitating the transport of dangerous substances such as biological, chemical or nuclear waste material. Tennessee is also bordered by eight States, meaning that hundreds of thousands of people from all over the world travel to and through Tennessee daily via our packaging routes, bus lines, and the large regional airports across our State. Accordingly, it is imperative that the EAS system, both nationally and statewide in Tennessee, receive funding and other support necessary to maintain its reliability. The lives of Tennesseans could very well depend on it.

The TAB is thankful to Senator Alexander and this subcommittee for hosting this hearing and his support for improving our communications to prevent the loss of life and property in the future. As we continue to discuss damage estimates, disaster-related costs, and rebuilding our communities after the recent severe floods, we must take care not to overlook this opportunity to improve public warning and emergency communications in advance of the next event, instead of during its aftermath.

Thank you.

Senator BENNETT. Thank you, sir.

Mr. Mathews.

STATEMENT OF BERT MATHEWS, CHAIRMAN OF THE BOARD OF DIRECTORS, NASHVILLE CHAMBER OF COMMERCE

Mr. MATHEWS. Thank you, Senator Alexander and Senator Bennett, for inviting the business community to address actions to prevent loss of life and property from floods. I bring both a personal perspective, as a business owner with flood damage, and a broader perspective, as chairman of the Nashville Area Chamber of Commerce.

First of all, thank you for your response to our community. Our congressional delegation, FEMA, SBA, and the Departments of Commerce, Homeland Security, and Housing and Urban Development were on the ground immediately to respond to community needs.

From our experiences, we've learned three lessons. First, with better warning, businesses could have saved hundreds of millions of dollars of losses. Second, Federal disaster assistance for business needs to be modernized. And third, the Federal Government must have mechanisms in place to mitigate future disasters.

In the past 12 weeks, we've worked with government and business to gather economic impact information, and we have learned the following: More than 2,700 Davidson County businesses were impacted, accounting for nearly 15,000 jobs. An estimated 450 businesses have not reopened, and more than 1,500 jobs are unlikely to return. Businesses interviewed to date estimate losses over \$300 million. Other cities, with past floods, report that 30 to 60 percent of businesses affected by these floods could possibly fail. And finally, support is critical during the first 3 weeks after a flood.

The flood has had a recession-like impact and damages are expected to negate projected GDP gains, which effectively puts the region into its third consecutive year of recession.

Our initial assessments based on actual business experiences result in these lessons and recommendations:

First, timely and accurate warning could have saved hundreds of millions of dollars. John Johnson, of Mid-South Wire, said he needed timely updates on expected flood levels. With 6 more hours of warning, he could have saved \$3 to \$4 million worth of inventory and equipment. And Colin Reed, of Gaylord Entertainment, said they received inaccurate water-level predictions and expressed frustration with a lack of coordinated and consistent communication between the Army Corps of Engineers and the National Weather Service.

We recommend the Federal Government provide resources to the Army Corps of Engineers and the National Weather Service to better predict and communicate flood levels, create a coordinated communications plan that reaches businesses, and integrate business into flood—or into Federal emergency response activity.

Second lesson: Business recovery resources are limited, and Federal support needs to be easier, faster, and built to help and not frustrate. For example, Ben Jumper of SBA said the—of Soundcheck—said the SBA should increase the application loan limit from \$1 million so that businesses can apply for what they need in one application.

We recommend that the Federal Government modernize and maximize disaster assistance to fit into today's business needs; increase the SBA initial application loan limits from \$1 million; increase the speed in which the businesses can receive funding; and amend the Federal cost-share for FEMA from 75 to 90 percent.

Third lesson: Federal agencies must have the mechanisms to mitigate the effects of future disasters. Craig Phillip, of Ingram Barge, explained the unique Cumberland River topography—narrow, with many tributaries, caused the water to rise very quickly, necessitating systems to better control water flow. Alan Valentine, of the Nashville Symphony, said the saturation of groundwater and the water table beneath the Schermerhorn Symphony Center created a situation where there was nowhere for the water to go.

So, we recommend that the Federal Government assess how the Army Corps of Engineers can better mitigate floods through the Cumberland River's current dam system and provide the National Weather Service with modeling capabilities to better predict and communicate flood levels.

PREPARED STATEMENT

In conclusion, personal and job recovery must go hand-in-hand. Businesses and their employees experienced incredible losses that could have been prevented. We know our recommendations come with a cost, but we hope you will find our presentation helpful as you consider how to prevent this level of loss again.

Again, thank you for what the Federal Government has done today.

[The statement follows:]

PREPARED STATEMENT OF BERT MATHEWS

Thank you Senator Alexander, Senator Dorgan and Members of the Senate Energy and Water Development Appropriations Subcommittee for inviting the business community to address actions to prevent loss of life and property from floods.

I bring both a personal perspective, as a business owner with flood damage, and a broader perspective, as chairman of the Nashville Area Chamber of Commerce.

First of all, thank you for your response to our community. Our congressional delegation, FEMA, HUD, SBA, and the Departments of Commerce and Homeland Security were on the ground immediately to respond to community needs.

From our experiences, we've learned three lessons:

- First: With better warning, businesses could have saved hundreds of millions of dollars of losses;
- Second: Federal disaster assistance for business needs to be modernized; and
- Third: The Federal Government must have mechanisms in place to mitigate future disasters.

In the past 12 weeks, we have worked with government and business to gather economic impact information and have learned that:

- More than 2,700 Davidson County businesses were impacted, accounting for nearly 15,000 jobs;
- An estimated 450 businesses have not reopened, and more than 1,500 jobs are unlikely to return;
- Businesses interviewed to date estimate losses over \$300 million;
- Of these businesses, operating capacity is 39 percent and is expected to be 67 percent in 12 months;
- Other cities with past floods report that 30–60 percent of businesses affected could fail; and
- Support is critical in the first 3 weeks.

The flood has had a recession-like impact. Damages are expected to negate projected GDP gains, which effectively puts the region into its third consecutive year of recession.

Our initial assessment based on actual business experiences results in these lessons and recommendations:

First Lesson: Timely and accurate warning could have saved hundreds of millions of dollars.

John Johnson of Mid-South Wire said he needed timely updates on expected flood levels. With 6 more hours of warning, they could have saved \$3–\$4 million of inventory and equipment.

Colin Reed of Gaylord Entertainment Company said they received inaccurate water level predictions and expressed frustration with the lack of coordinated and consistent communication between the Army Corps of Engineers and National Weather Service.

We recommend the Federal Government:

- Provide resources to the Army Corps of Engineers and National Weather Service to better predict and communicate flood levels and impact;
- Create a coordinated communications plan that reaches business; and
- Integrate business into Federal emergency response activity.

Second Lesson: Business recovery resources are limited. Federal support needs to be easier, faster and built to help, not frustrate.

Denise Full of Custom Fit Accounting and Tax said the SBA could not fill her immediate capital and cash flow needs.

Ben Jumper of Soundcheck said the SBA should increase the application loan limit from \$1 million so businesses can apply for what they need in one application.

We recommend the Federal Government:

- Modernize and maximize disaster assistance to fit today's business needs;

- Increase SBA initial application loan limits from \$1 million;
- Increase the speed in which businesses can receive funding;
- Amend the Federal cost-share for FEMA from 75 to 90 percent;
- Adequately fund Federal disaster assistance; and
- Determine what Federal information about damaged businesses can be shared with local business organizations to accelerate response and recovery.

Third Lesson: Federal agencies must have the mechanisms to mitigate the effects of future disasters.

Craig Phillip of Ingram Barge Company explained that the unique Cumberland River topography—narrow with many tributaries—caused the water to rise very quickly, necessitating systems to better control water flow.

Alan Valentine of the Nashville Symphony said the saturation of the ground and water table beneath the Schermerhorn Symphony Center created a situation where there was nowhere for the water to go.

We recommend the Federal Government:

- Assess how the Army Corps of Engineers can better mitigate floods through the Cumberland River's current dam system; and
- Provide the National Weather Service with modeling capabilities to better predict and communicate flood levels.

In conclusion, personal and job recovery must go hand-in-hand. Businesses and their employees experienced great losses that could have been prevented.

We know our recommendations come with a cost, but we hope you find our presentation helpful as you consider how to prevent this level of damage and loss in the future.

Thank you again for all the Federal Government has done—and will continue to do—for our communities' emergency response and recovery efforts and for the opportunity to be here.

Senator BENNETT. Thank you all for your testimony.

Senator Alexander.

Senator ALEXANDER. Thanks, Senator Bennett.

Thanks, to the four of you, for your testimony.

Mayor Dean, I know you have a plane to catch, so if you need to leave to do it, please feel free. But, I want to ask you a question, if you have a moment.

First, I'd like to—I think it's important to say, from first-hand observation, how impressed not only I was, but I think most Tennesseans were, with the leadership of Governor Bredesen, and most especially, with Mayor Dean, Mayor Hodges, and other local officials, whether it's Clarksville, Ashland City, other places.

I mean, I think you're right, Mayor Dean, I think Nashville was ready.

And, Mayor Hodges, I think Millington was ready.

And the spirit there that—and the quiet confidence that the leadership demonstrated has been enormously helpful to the city's future, despite the fact that it's all in a midst of a tragedy. And I think it is important—we have many examples we can point to when we don't like what government is doing. Here is a whole series of opportunities to catch various levels of government doing something right. And I think there's almost unanimous agreement in Tennessee that FEMA did a good job. They were on time, they—it was easy to get in touch with them. They didn't do everything everybody wanted, but in the last 2½ months, they've done a good job.

BENEFIT OF FORECAST IMPROVEMENTS

And, Mayor Dean, my question is this. You've—you heard Mr. Mathews cite some specific examples in Nashville that—from businesses—about how much money could have been saved from an earlier, better forecast. And you heard the earlier testimony. What

would have been the difference if you, as mayor, and if your citizens in Nashville, had received a more accurate, clearer forecast on Sunday morning about the flood coming, rather than one on Sunday night?

Mr. DEAN. Well, I could only speculate that we'd probably ask more citizens to evacuate or give people a warning—

Senator ALEXANDER. What—

Mr. DEAN [continuing]. That they—

Senator ALEXANDER [continuing]. Push your button.

Mr. DEAN. We could ask more people to evacuate or give businesses and citizens an opportunity to move property that could be endangered. Although, we did, based on information we were getting, and some of our uncertainty as the reliability of information—for instance, we ordered the evacuation of MetroCenter, which did not flood, but we were fearful that it could, and that, if it did flood, it would be very harmful to people and to property. So, we made that determination on our own, and we evacuated areas of downtown, the First Avenue area.

You know, I think, clearly, the key thing is, we need to know the most accurate information available and then make the very best decisions we can. I don't—I think it's difficult, in any emergency, to get that information, and it's also difficult to make the necessary decisions, but you've got to at least have an opportunity to have the best information available. And so, anything we can do, and the Federal Government can do—to improve what's already been identified and, I think, acknowledged by all parties as a serious lack of communication between the Weather Service and the Corps of Engineers that should be addressed.

I also would recommend—and I've only had a very cursory opportunity to look at the draft from the Corps—that one of the areas they have a challenge on is how they communicate with local governments. And I'd say that's the National Weather Service, too. The local governments are the people with their feet on the ground who are responding to these crises on a minute-by-minute basis. And I think they need to be much more proactive in reaching out and contacting local governments. They need to be much more aggressive in getting information to local governments. That's my major lesson from all of this.

Senator ALEXANDER. Mayor Hodges, the rain came a little earlier in west Tennessee, as it always does, than it did in Nashville. What if you've had 10 or 12 hours earlier, a clearer forecast of what was coming, could you have done anything about it, or not?

Mr. HODGES. One thing fortunate for us is the fact that we're a lot smaller than Nashville. And we did have, I feel, sufficient notice. I think what helped us tremendously was the fact that Chief Graves virtually responded just about on the first notice from the National Weather forecast, on Thursday, that rain was coming, and tornadoes, and he actually started, with our department heads, in preparation on Friday. So, we were actually in full-scale evacuation and preparedness the second the rain started, early Saturday morning.

So, I give credit to our chief for not waiting maybe a day or two to just see how bad it was, for acting early on it. That helped us a lot.

IMPROVING EMERGENCY INFORMATION FOR BROADCASTERS

Senator ALEXANDER. Mr. Adamson, you've heard the discussion about information, and it seems to me it's not just accurate information and timely information, but if the information's in Greek, nobody's going to be able to understand it. So, the information has to be translated, as the Corps' own report said, into some form so that businesses, citizens understand it.

What's your reaction to all this discussion about the work broadcasters have done to improve communication about tornados, and whether any lessons from that could—or alliances could be formed to do the same kind of thing with information about floods, since flooding actually is three out of four of the federally declared disasters that we have in this country?

Mr. ADAMSON. I think we've heard, today, that maybe the forecasting could be similarly improved. And you're exactly right, Senator, that our broadcasters are only as good as the information that comes to us, either to our news departments or to our emergency alerting system. And it has to be in an understandable form for both viewers and listeners. And that's what we would look forward to the most, to be sure that we're in that link. We've spent an awful lot of time and money, mostly since 9/11, improving our interoperability so these firefighters and law enforcement and emergency management people can do their jobs and communicate with each other. And my business thinks that its due time for us to maybe leap forward to prevention instead of—or including rebuilding—

Senator ALEXANDER. Yes. Well, who—

Mr. ADAMSON [continuing]. Which would improve these systems.

Senator ALEXANDER. If I may ask a minute, who came up with the way that television stations and radio stations let us know about tornadoes? I mean, that must have taken a lot of tremendous effort and cooperation between the National Weather Service and other agencies. And is there the same kind of effort going on to try to—on the part of broadcasters, do they have the same incentive to try to get a similar alliance going on floods?

Mr. ADAMSON. Yes, sir. I know you remember those whiteboard days or chalk—

Senator ALEXANDER. Yes.

Mr. ADAMSON [continuing]. Days of weather reporting. And certainly the stations buy an awful lot of expensive equipment—

Senator ALEXANDER. Yes.

Mr. ADAMSON [continuing]. Just so that they can stay right on top of whatever is available out there equipment wise. And certainly the National Weather Service has done a phenomenal job with their forecasters and their equipment.

BENEFITS OF EARLY EMERGENCY NOTIFICATION

Senator ALEXANDER. Mr. Mathews, you've been very specific. I'll ask you the same question I asked Mayor Dean. If there had been a weather forecast on Sunday morning, say at 10 a.m., instead of Sunday evening, at around 10 a.m., that gave Nashville businesses accurate information about the rising water, based on your testi-

mony that would have saved tens of millions of dollars. Is that—am I overstating that?

Mr. MATHEWS. You are not overstating it, Senator. And let me give you a couple of more specific examples. A.O. Smith is a—manufactures water heaters in Cheatham County, and they lost \$18 million in finished-good inventory of finished water heaters. They were pulling their trailers, empty, out of their lot to keep the trailers from flooding. If they had had adequate notice, they could have filled those trailers with those water heaters and gotten them out of the flood.

In five, six, seven different companies that I've talked to personally, each of them have said, "With adequate warning, we could have moved millions of dollars worth of extremely valuable equipment, records, out of the way." And it related specifically to inadequate warning.

Senator ALEXANDER. Senator Bennett, I think this has been a very helpful first step at getting a clear picture of what actually happened in Tennessee, from Nashville to the Mississippi River, on April 30 through the weekend of May 1 and 2, and beyond. And I think the jury's still out on whether the Army Corps of Engineers could have managed the water better and differently in a way to have reduced flooding. I'm—I think my questions that I'll ask following the hearing, in writing, and the answers we expect to get, and careful study of the after-action report, and the Corps' own self-examination, will answer those questions.

But, I think what the jury is not out on is that we have a—an inferior system of reporting timely, accurate information about rising water and flooding in a way that people who need to know about it can understand it. And when you hear the numbers talked about here, hundreds of millions of dollars, \$2 billion of damage to the private sector in Nashville, Federal taxpayers already handing over a quarter of a billion dollars to 64,000 Tennesseans, there are lots of people I know in Nashville who just cleaned up their basement and bought their new water heaters, and paid for it themselves. You know, we'll never—it's a tremendous amount of money.

It seems to me that a major focus of the Federal Government—and maybe this hearing and this subcommittee can help—is to corral the Federal agencies and say, "Give us a plan or give us some options about how we can do, with information about flooding, what we already do about tornados," and see if we can move that along, not just for Tennessee, but for Utah and North Dakota, since three out of four of the federally declared disasters are flooding.

Floods aren't as spectacular on television, I guess, as a tornado coming. But, as we've seen today, they can be much more damaging and kill many more people.

So, I'm very grateful to you, Senator Bennett, and to Senator Dorgan, for taking so much of your time to look at the Tennessee flood. But, I believe it has lessons for our country.

And I'm especially grateful to the Tennesseans for taking time to come here today to let us put the spotlight on not only a tragedy, but dozens of examples of catching citizens and their locally elected leaders doing things right and, in some cases, heroically.

Senator BENNETT. Thank you very much.

I appreciate being informed on this. I realized there was a terrible problem, but you've filled in a lot of details for me, and I'll do my best to be as cooperative as I can on this subcommittee—and Senator Dorgan will be, as well—to do what we can to more further steps in the right direction.

CONCLUSION OF HEARING

I want to close the hearing with the comments that Senator Corker made, however, in opening the hearing. For all of the difficulties and challenges, Tennessee has demonstrated a tremendous capacity to deal with the problem themselves. Whatever the communications, difficulties, and challenges within the Federal agency, there is no indication of anybody not stepping up to the plate as best he or she could under the circumstances. And for that, we are all grateful, even as we look for additional solutions.

With that, the hearing is recessed.

[Whereupon, at 11:32 a.m., Thursday, July 22, the hearing was concluded, and the subcommittee was recessed, to reconvene subject to the call of the Chair.]

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