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IMPACT OF SEVERE HURRICANES ON BEAUFORT, SOUTH CAROLINA

FIELD HEARING

BEFORE THE

SUBCOMMITTEE ON DISASTER PREVENTION AND PREDICTION

OF THE

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION UNITED STATES SENATE

ONE HUNDRED NINTH CONGRESS

SECOND SESSION

AUGUST 17, 2006

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CONTENTS

	Page
Hearing held on August 17, 2006	1
Statement of Senator DeMint	1

WITNESSES

Fowler, Rob, Chief Meteorologist, WCBD, Charleston, SC	8
Prepared statement	9
Jones, Jr., John E., Deputy Director, National Weather Service, NOAA, DOC	14
Prepared statement	17
Lanham, Colonel Robert W., United States Marine Corps, Commanding Officer, Marine Corps Air Station, Beaufort, SC	3
Prepared statement	6
Winn, Jr., William, Director, Emergency Management Department, Beaufort County, SC	10
Prepared statement	13

IMPACT OF SEVERE HURRICANES ON BEAUFORT, SOUTH CAROLINA

THURSDAY, AUGUST 17, 2006

U.S. SENATE,
SUBCOMMITTEE ON DISASTER PREVENTION AND PREDICTION,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
Beaufort, SC.

The Subcommittee met, pursuant to notice, at 10:00 a.m. at the Marine Corps Air Station, Hon. Jim DeMint, Chairman of the Subcommittee, presiding.

OPENING STATEMENT OF HON. JIM DEMINT, U.S. SENATOR FROM SOUTH CAROLINA

Senator DEMINT. Good morning. Anyone who wants a seat, please come forward.

I want to thank everyone for coming out, particularly our panel this morning.

I'm Jim DeMint. I'm your United States Senator. And let me just take a minute to talk about the purpose of field hearings.

What we try to do with field hearings is get a lot of information on the record that we can take back and use with our colleagues in Washington, with a lot of the staff on the Commerce Committee, and particularly my subcommittee, which is a new committee, that was actually formed after the tsunamis did so much damage a couple of years ago. We realized, as a Senate, as a Commerce Committee, that we needed to focus on getting prepared for disaster, and to do everything we can to prevent the loss of life and the loss of property.

So this subcommittee is my committee, I'm Chairman of it. And so part of my job in the Senate is to help prepare the country for disasters, primarily natural disasters—hurricanes, earthquakes, tornadoes.

But we found that there is a big crossover with the potential man-made disasters, terrorist attacks—a lot of the same warnings, a lot of the same evacuations, are becoming critically important.

So we are working with the Homeland Security Department in trying to pull all of this together.

The hearing today is very important. You'll see that we have gotten the first responders here, we have our military, we have the weather service, we have the media; and all of these have to work together for the preparation, as well as the prevention aspects of disaster.

So, I thank everyone for coming. I particularly want to thank the folks here at the Marine Corps Air Station, COL Lanham, the base

CO and LT COL Ward, who's the base XO, LT COL Hamilton, who provided a great briefing this morning on how the base is working with the local community and first responders. That was very reassuring to see us getting prepared. Captain Ken Stiner who organized the whole thing, I thank you very much, Captain and Sergeant Major, thank you for allowing us to use the base as the facility.

I found out this morning we are really on Mt. Beaufort, the highest point in the county, basically, here at the base, which I think is about 32 feet above sea level.

But in the event of a storm, that's just enough height to give us a little safety.

I also want to thank all the enlisted folks who are here today.

It's a little sobering to think that at the first hearing that this committee did once it was formed, Senator David Vitter, the Junior Senator from Louisiana, made a presentation along with some folks from NOAA, about what would happen if a Category 4 or 5 hurricane hit the Gulf area, particularly around New Orleans.

You will see a lot of maps today, about what happens in Category 1 or 2 around this part of the country, but we saw then the devastation that would happen in New Orleans if you got a Category 3 or higher that actually came ashore in New Orleans.

And there was a pretty strong consensus that the levees would not hold.

This has been known, I think, since the seventies. And I think there was a kind of an attitude this could never happen to us.

But it is very sobering, that only a few months later, after that first hearing with that scenario of what would happen, Katrina hit New Orleans. And everything that had been predicted happened, just as we talked about it in committee.

And it was about a year ago, that I was looking out the door of a Coast Guard Jayhawk helicopter flying over the coast of Mississippi and Louisiana, just looking at the destruction—seeing the concrete pads where houses used to be for mile after mile along the Mississippi coast, and the water still at the rooftops in New Orleans.

It was really devastating, just from a property loss, but very heart wrenching just to see what people had worked for, for years—gone.

I want to make sure we do everything we can in South Carolina, and other parts of the country, to keep that from happening again.

In order for us to do it, we really have to be prepared.

There's not a lot we can do about a hurricane and where it goes. What we can do, though, is get better and better at tracking and predicting where it will hit, learning more and more about how to predict the intensity, so we are not caught off-guard by a storm that one day appears weak, and the next day it gains intensity too quickly for us to do a proper evacuation.

The weather service has gotten better and better at tracking, we saw that with Katrina, literally within a few miles—more than two days before, we knew pretty much exactly where that storm was going to go. So, there was plenty of time for evacuation. The intensity in that case was pretty close; unfortunately, a lot of the population did not listen to the disaster predictions.

You know there are a number of things that we can look at, as far as minimizing the impact after a storm that's coming ashore.

As I mentioned, accurate predictions.

One of the things we are also trying to avoid is over-evacuating. What I mean by that is, a storm is offshore, we evacuate too soon, we do it too often every time a storm gets here, and after a while, people don't pay any attention to you.

That was part of what was going on in Mississippi. They had been warned so many times, and it never really happened. And when it actually did, there were too many who had not evacuated; but, obviously, we don't want to under-evacuate, which means to wait until it's too late.

Maybe we don't define the area wide enough, so that people don't evacuate when you should, and then we have a loss of life. That is something we can't tolerate either.

So, I'm interested in hearing from all of our panelists here about what we are going to do as a state, and hopefully some of the things we do here we can take to other parts of the country, and demonstrate how we can be more effectively prepared.

We have an unusual situation here with the—I don't know that it's that unusual—a lot of bases around coastal areas, but having the Marine Corps here working with the folks in Beaufort, should give us some extra rescue capability, as well as just rebuilding once a storm hits.

So, I want to start with COL Lanham, to get his opening statement.

We have asked him to keep it to around five minutes.

But since I'm the only one here, if you have got something to say that takes a little longer, I think we can be accommodating to that. And then we will just work our way down our panel, and I'll just introduce each of you as we get to you.

So Colonel, if you will kick us off this morning.

STATEMENT OF COLONEL ROBERT W. LANHAM, UNITED STATES MARINE CORPS, COMMANDING OFFICER, MARINE CORPS AIR STATION, BEAUFORT, SC

Colonel LANHAM. Sure will, sir.

Senator DeMint, I would like to thank you for this opportunity to discuss the preparedness efforts of the civil and military communities here in the Lowcountry, and for your support of these efforts. I would also like to express the appreciation of both uniformed and civilian Marines, Sailors and military families here in Beaufort County for all that you have done to support our efforts here and around the world.

These are indeed challenging times. We face enemies abroad that have little regard for the ideals we Americans hold dearly. On the home front, we must also remain prepared for the unique challenges that nature can steer our way.

Just as shared awareness, cooperating and training with international partners can open doors and new opportunities for progress in the war against extremism, so we can foster long-term relationships and a spirit of cooperation here in the Lowcountry to meet the challenges at home. It is this spirit of cooperation that I would like to focus on today.

MCAS Beaufort's field elevation is 37′—among the highest elevations in Beaufort County. The Air Station is located right along the northern county's main storm recovery route, Highway 21.

The last large-scale evacuation occurred just prior to Hurricane Floyd in September 1999. During that evacuation, long traffic delays were one of the primary challenges, as there are only a few routes and bridges off of the islands making up most of the county. This geographical fact complicates execution of our plans and timing of critical decisions.

MCAS Beaufort has taken a pro-active and cooperative position with regard to prior planning, evacuation coordination and recovery efforts within the Tri-Command—our three military bases including the Air Station, Parris Island Recruit Depot, and the Beaufort Naval Hospital—as well as with our local and state governmental partners.

Additionally, we are currently completing formal agreements to allow life flight evacuations of Beaufort Memorial Hospital patients from the Air Station.

In conjunction with city and county agencies, and our Tri-Command partners, detailed planning and pre-hurricane season exercises are conducted annually. These efforts ensure hurricane preparedness through inspections of our facilities and base housing, hurricane supply lockers, emergency meal rations, security, and evacuation procedures. All tenant units, commands and sections aboard the Air Station provide Destructive Weather representatives to the Operations Department, and directly participate in the annual training exercise. We utilize five hurricane conditions of readiness, based upon hurricane strength and proximity to our installations. Each condition has immediate action guidelines/steps to be accomplished once the condition is set. Hurricane Condition-5 HC–5 is a seasonal condition set from 1 June to 30 November. HC–4 is set 72 hours prior to the expected storm landfall in the local area. HC–3 is set 48 hours; HC–2, 24 hours, and HC–1, 12 hours prior to landfall.

This system provides for a comprehensive notification process of the potential impact of a hurricane to all personnel. All hands receive annual hurricane briefs, and are provided preparedness handouts that specifically address conditions of readiness, appropriate evacuation procedures, and recommended personal evacuation supplies/kits.

We also take care to push all available information to our military families through the base newspapers, e-mail notifications, Internet websites, handouts, and "town meetings."

In the event of an actual hurricane, time-critical information is distributed to all commands via multiple sources: e-mail, automated call-down phone notification, Public Affairs Office marquees, and our military television channel.

The resident Marine Aircraft Group and one Navy squadron fly all operating aircraft to either Texas or Ohio. Any remaining aircraft are placed in available hangars.

There is an agreement in place to allow the county to preposition vehicles aboard the air station during an evacuation.

These vehicles would be utilized in direct support to the recovery effort in the aftermath of a significant event.

Military personnel, their families and the air station civilian staff/workforce are expected to self-evacuate. At the Commanding Officer's direction, a minimal cadre of essential personnel is designated to remain at the air station.

Should the intensity of the storm require the Beaufort County government to evacuate, the Air Station has an agreement to send upwards of 200 personnel to their fall-back site located at the Allendale-Fairfax High School to ride out the storm.

In advance of the storm's landfall, we plan to pre-position generators, water trailers, heavy equipment, and vehicles on the relative high ground of our flight-line, so it will remain accessible and reasonably free of trees, power lines, and potential storm surge flood waters.

MCAS Beaufort coordinates directly with the Beaufort County Emergency Management Division. They allow us direct representation in their downtown emergency Operations Center to assist in disseminating time-critical storm information and coordinating our efforts.

Additionally, along with the other town managers and mayors from within the county, we are invited to call in and participate on the county's conference calls with the Governor's office to discuss courses of action and potential timelines for mandatory evacuation orders.

We have established communications connectivity through a dedicated fiberoptic line from our EOC to the county's traffic control fiber network, which is also linked directly to the Beaufort County EOC.

We have two computers in the EOC that are directly linked to the Beaufort County network. This allows for MCAS personnel to access Web-EOC, ThinkMap Geographic Information Systems (GIS) (provides updated county aerial photos, including flood data projection overlays) and access to all 37 county traffic control cameras.

In this way, emergency planners and decisionmakers are all on the same page, provided the same information, and are using the same software to assist in more effective and coordinated decision-making.

Direct-line telephone connections run between the Air Station, Parris Island, Beaufort Naval Hospital, and the Beaufort County EOC. Additionally, Beaufort County programs all of our 800 MHz radios. Currently, we have 36 of these on hand: 27 hand-helds, five vehicle-mounted and four base-stations.

This capability allows for interoperable and mutual support during evacuation and recovery, and provides for an alternate means of communication between the EOCs.

Once the storm passes, these same communications links and planning and decision tools will facilitate execution of coordinated recovery plans, beginning with whatever is required to respond to the situation as it develops.

Clearing highways, making early assessments, and establishing power, communication, and access for safety and security personnel will likely be early priorities.

No one can predict the precise effects of strong storms and what they will leave in their wake, but here in the Lowcountry, we are trying to imagine and prepare for numerous contingencies.

Our planning efforts have been consciously tied together, our infrastructure put into place with mutual support and coordination in mind, and our recovery planning and execution have been designed to succeed as much as our resources will possibly allow. We cannot guarantee success, but we are confident that we can make sound decisions and enhance the safety and security of our people.

Again, Senator, thank you for your time and support, and for allowing us to participate in this hearing today.

[The prepared statement of Colonel Lanham follows:]

PREPARED STATEMENT OF COLONEL ROBERT W. LANHAM, UNITED STATES MARINE CORPS, COMMANDING OFFICER, MARINE CORPS AIR STATION, BEAUFORT, SC

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Planning

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In advance of the storm's landfall, we plan to pre-position generators, water trailers, heavy equipment and vehicles on the relative high ground of our flight-line so it will remain accessible and reasonably free of trees, power lines and potential storm surge flood waters.

Air Station personnel are organized into emergency support teams including Emergency Operations Center (EOC) staff, weather service personnel, shelter management teams, communications support teams, electrical repair teams, heavy equipment operators, medical and emergency support teams, and Military Policy security teams.

Coordination

MCAS Beaufort coordinates directly with the Beaufort County Emergency Management Division. They allow us direct representation in their downtown Emergency Operations Center to assist in disseminating time critical storm information and coordinating our efforts. Additionally, along with the other town managers and mayors from within the county, we are invited to call-in and participate on the county's conference calls with the Governor's office to discuss courses of action and potential time-lines for mandatory evacuation orders.

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Recovery

Once the storm passes, these same communications links and planning and decision tools will facilitate execution of coordinated recovery plans, beginning with whatever is required to respond to the situation as it develops. Clearing highways, making early assessments, and establishing power, communication, and access for safety and security personnel will likely be early priorities.

No one can predict the precise effects of strong storms and what they will leave in their wake, but here in the Lowcountry, we are trying to imagine and prepare for numerous contingencies. Our planning efforts have been consciously tied together, our infrastructure put into place with mutual support and coordination in mind, and our recovery planning and execution have been designed to succeed as much as our resources will possibly allow. We cannot guarantee success, but we are confident that we can make sound decisions and enhance the safety and security of our people.

Again, Senator, thank you for your time and support, and for allowing us to participate in this hearing today.

Senator DEMINT. Thank you, Colonel. And before I introduce Mr. Fowler, Senator Inouye is the Ranking Member on the Commerce Committee. And one of his top staffers, Helen Colosimo is here.

Helen, if you will just raise your hand, so folks will know you are here. I appreciate you coming to listen in.

Rob Fowler is the Chief Meteorologist for WCBD in Charleston, and has guided large part of South Carolina through a number of storms.

Rob, the media is critical in getting peoples' attention. In fact, we in the government, NOAA, can do very little unless folks believe you when you tell them.

So, we appreciate what you have done in the past, and your willingness to participate as part of this team to get South Carolina ready.

Mr. Fowler.

STATEMENT OF ROB FOWLER, CHIEF METEOROLOGIST, WCBD, CHARLESTON, SC

Mr. FOWLER. Thank you, Senator. This is an honor to talk to you. I usually talk to second graders.

Senator DEMINT. That's about the reading level here in the Senate.

Mr. FOWLER. I'll keep it all the same.

It is hard to believe it has been almost 17 years since Hurricane Hugo hit the South Carolina coast. A lot has happened since that time, and during that time, no other major hurricane has made landfall along our beautiful beaches.

It pains me to think about these days before, during, and especially after the storm.

I came to Channel 2 in Charleston in 1987 from Green Bay, Wisconsin.

I told my wife we were going on a long honeymoon in a beautiful coastal city.

Little did I know at the time, the honeymoon would only last two years, and our lives were about to be turned upside down.

As a broadcast meteorologist, Hurricane Hugo was a lesson you would never learn in a college classroom.

Because of that, it has been my responsibility to report, to the best of my ability, the potential tropical dangers, from the coast of Africa, to the Bahamas, to the Gulf of Mexico, and everywhere else in between.

I remember Tropical Storm Gaston. It looked like a hurricane, did damage like a hurricane, but was only upgraded to a hurricane later in the season, in November.

It showed people that it doesn't take much to get your attention, and a slow-moving category one hurricane can do quite a bit of damage. It doesn't always have to be the monster storm for us to stand up and take notice.

We are blessed in this community in that we have many people who have been through hurricanes before. They know what to expect. We rely on their expertise and experiences to spread the word to others.

The problem is, there are many more "others" than ever before.

More and more people are moving to the coast, putting more people at risk when a hurricane threatens.

Along the South Carolina coast, we know it is not a matter of "if" but a matter of "when."

That is why we have formulated a very close relationship with the National Weather Service in Charleston.

We know we are going to need their help in the future, and we know we, the media, will be needed, as well.

We have worked together closely for a long time, in fact.

I spent the night at the National Weather Service office in Charleston the night Hurricane Hugo hit.

When the roof sounded like it was about to be pulled off in the middle of the night, you have never seen 13 meteorologists move faster than we did heading to the bathroom, which was the designated safe-room at that facility.

The last two years for us have been very stressful, and it has prompted all of us to ramp-up our hurricane speeches and presentations.

I don't think there is one person in our viewing area who at one time or another looked at Florida in 2004, and the Gulf Coast in 2005, and said: "That could be me."

That is why we have tried to get out to as many community groups, civic organizations, senior citizen complexes, churches, hospitals, and schools and get the word out: Get ready now. Don't wait until the storm is here. Know what you are going to do, and get your kit ready, just in case.

To the kids out there, make sure you tell your parents to have a plan on when and where you are going to evacuate.

Parents, make sure your kids understand what is happening. Let them be a part of the decisionmaking process. Teach them what they need to know and do.

In closing, we know we are in a very active tropical cyclone pattern. Is it global warming or just the natural, cyclical way the earth and its atmosphere changes? Whatever the reason, we need to remember that we have chosen to live along this beautiful coast for a special reason.

Unfortunately, there is a risk involved. And all of us need to understand and accept that risk, so that when the next one comes, we will be ready, willing, and able to either stay and protect ourselves and our family, or leave.

The choice is yours. The decision is yours. My job is to make sure you have all the necessary facts to make that decision.

[The prepared statement of Mr. Fowler follows:]

PREPARED STATEMENT OF ROB FOWLER, CHIEF METEOROLOGIST, WCBD, CHARLESTON, SC

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Whatever the reason, we need to remember that we have chosen to live along this beautiful coast for a special reason. Unfortunately, there is a risk involved, and all of us need to understand and accept that risk, so when the next one comes, we will be ready, willing, and able, to either stay and protect ourselves and our family, or leave. The choice is yours. The decision is yours. My job is to make sure you have all of the necessary facts to make that decision.

Senator DEMINT. Thank you, Mr. Fowler.

One of the things we learned from Hurricane Katrina is that the Federal Government is not going to be there the next morning to take care of everything.

A lot of folks have blamed FEMA. Certainly, we had a lot of problems and still are having them.

So we are leaving a lot there. The whole purpose of FEMA is to come in two, three, four days after a disaster and support First Responders and local emergency folks.

We have done that well in the past in South Carolina. We know it's our responsibility. William Winn is the Director of the Beaufort County Department of Emergency Management.

It's his job to coordinate our preparation and to have a plan in place.

I am encouraged by what I have heard about how you are working with the base and others.

Mr. Winn, we are looking forward to your testimony.

STATEMENT OF WILLIAM WINN, JR., DIRECTOR, EMERGENCY MANAGEMENT DEPARTMENT, BEAUFORT COUNTY, SC

Mr. WINN. Thank you, sir.

Senator DeMint, it is a pleasure today to address you, and the Senate Subcommittee on the preparedness issues facing Beaufort County.

As the Director of Emergency Management for Beaufort County, I have had the experience of evacuating this county on five different occasions. As the only county in South Carolina that requires an entire evacuation to include all levels of government, we face a substantial challenge to develop and maintain the level of readiness necessary to accomplish that mission.

Beaufort County and the State of South Carolina, in its commitment to residents and visitors have developed an in-depth evacuation plan. In cooperating with our state partners, we believe that we have the ability to fully implement that plan, and successfully evacuate those residents who want to leave.

Much of our ability to successfully evacuate depends upon accurate and timely weather information that is presented to us in a format that is convincing to the public of the necessity to leave.

The Charleston National Weather Service Office, who provides our local information, has in the past, and we feel confident in the future, being able to provide these services.

As good as the people are in the Charleston National Weather Service Office, they can be no better than the forecast given to them by the National Hurricane Center.

In the past, and even today, we have continually seen improvements in their forecast.

This rate of improvement cannot end. Adequate funding, training, and applying knowledge learned must be maintained on a level necessary to keep evacuation plans current and effective.

Out-of-date and unrealistic replacement times for hurricane evacuation studies must end.

Let me encourage you to revitalize a successful plan to update the South Carolina Hurricane Evacuation Study, as well as those in other areas.

But equally important is to ensure that the National Hurricane Center and the Local Emergency Performance Grants Program be fully funded, to allow continued improvements in hurricane forecasting and provide qualified Emergency Managers for local communities.

This year, Beaufort County developed two new systems to better serve our residents before and during evacuations.

First, we purchased and installed a telephone emergency alert system to allow us to direct call all our residents to ensure they are aware of evacuation and storm threat;

Second, we have purchased a toll-free number for all residents to use to contact Beaufort County for reentry and situation reports affecting the county reentry and recovery. This will allow our citizens to determine the situation they will be facing as they return to their homes and jobs.

Beaufort County has also invested in a second toll-free number for government employees to call for storm reentry. All municipalities, state, and Federal agencies in Beaufort County participate in this program.

We have established a reentry pass system that allows us to bring specific government and private groups quickly back into the county to clear highways and establish medical facilities.

As an educational effort, Beaufort County and the Town of Hilton Head Island have developed two hurricane preparedness brochures for distribution to the public.

These are basic instructions along with our toll-free number. The second brochure is simply twenty questions to ask your insurance company.

As of today, we have distributed over 30,000 of these brochures.

To ensure adequate communications, Beaufort County has purchased and installed three satellite communications systems, and a fourth was just funded.

With a major storm such as a CAT 4 or 5, we have developed continuity of government planning to allow us to move our command and control facilities out of the county.

This coming year, we have allocated funds to construct a back-up facility in another county to ensure back-up capacities for our computer systems.

Beaufort County has created a Hurricane Recovery Task force to develop a long-term recovery plan.

The Town of Hilton Head Island has completed its base recovery plan and is now developing implementation guidelines.

And lastly, we have established a county-wide fiber network to interconnect all of our command and control facilities along with municipalities, Federal, and state agencies.

This network allows over 300 users quick and effective communications with our EOC, and to share information quickly.

Beaufort County is very fortunate in experiencing a strong working relationship with the MCAS, MCRD, and Beaufort Naval Hospital.

Through a dedicated effort, we have achieved successful integration of emergency operations with all three bases.

Interoperability of radio communication has been achieved.

With all of the improvements to our plans, there remains a critical issue that provides a growing threat to our successful evacuation.

That threat is the lack of sufficient highway infrastructure to carry the evacuation traffic.

Unless we see the immediate planning and construction of a four-lane, multi-use highway out of the South Carolina Lowcountry into the Aiken/Augusta area, our future ability to evacuate is in jeopardy.

My emphasis to you today is preparedness and partnerships. Only through cooperation on the local, state and Federal level have we, and will we be able to educate the public and convince them of the need for personal preparedness.

Thank you for your time today, and it has been an honor for me to have this opportunity.

[The prepared statement of Mr. Winn follows:]

PREPARED STATEMENT OF WILLIAM WINN, JR., DIRECTOR,
EMERGENCY MANAGEMENT DEPARTMENT, BEAUFORT COUNTY, SC

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My emphasis to you today is preparedness and partnerships. Only through cooperation of the local, state, and Federal level have we, and will we be able to educate the public and convince them of the need for personal preparedness.

Thank you for your time today, and it has been an honor for me to have this opportunity.

Senator DEMINT. Thank you, Mr. Winn. Perhaps some questions in a minute, but I want to introduce Mr. John Jones, who is a Deputy Director of the National Weather Service.

Mr. Jones, we very much appreciate you being here today, and looking forward to your presentation.

STATEMENT OF JOHN E. JONES, JR., DEPUTY DIRECTOR, NATIONAL WEATHER SERVICE, NOAA, DOC

Mr. JONES. Thank you, Senator. Thank you for inviting me here today to join you and the illustrative panel——

Senator DEMINT. Pull the microphone a little——

Mr. JONES.—to join you and the illustrative panel you have gathered here.

I would like to spend a few minutes talking about the outlook for the remainder of the 2006 hurricane season, threats posed to South Carolina by hurricanes and tropical systems, and the roles and services of the National Weather Service.

We appreciate the support this committee has given to NOAA, which enables us to provide weather, water, and climate forecasts, to the American people.

Last year's hurricane season set records for the number of hurricanes and tropical storms.

However, whether we are predicting an above-average hurricane season, like last year, or below-average hurricane season, the message is the same, you have already heard it from everyone here on this panel: Prepare. Prepare. Prepare.

It takes only one powerful hurricane like Katrina last year, or Andrew in 1992, or Hugo in 1989, to expose our vulnerabilities.

The official hurricane season began June 1 and runs through November 30. The average peak of activity occurs with the warmest water temperatures, which is right now, the middle of August, through the end of October.

On August 8, NOAA revised, slightly downward, its prediction of tropical systems for the 2006 Atlantic hurricane season.

NOAA is now predicting a total of 12–15 tropical storms, with seven to nine becoming hurricanes.

Of those, we predict three to four will be major hurricanes, what we call category three or higher, pacing winds over 110 miles per hour. These category three storms are the ones likely to cause the most extensive damage. So far this year, there have been three tropical storms, none of which became a hurricane.

Our seasonal forecast comes from many favorable conditions, including warmer sea surface temperatures in the Atlantic Basin,

combined with low wind shear, lower surface pressures and an African easterly jet stream.

Many believe these favorable conditions, which came together around 1995, are part of a multi-decadal climate pattern that last peaked in the 1950s and 1960s.

This pattern could keep us in an active period for major hurricanes for another 10 to 20 years or more.

One question often raised is the role that climate change plays in hurricane frequency and intensity.

NOAA research suggests both natural- and human-induced climate change may impact hurricane frequency and/or intensity.

However, our science is not mature enough to determine what percentage of human-induced climate change and what percentage of natural climate variability impacts hurricane frequency and intensity.

In addition, our current state of science cannot attribute global warming to a particular storm or particular season.

Our meteorologists and research scientists are actively engaged in ongoing research to better understand how climate variability and change may affect hurricanes.

It takes only one hurricane to hit a community to make for a bad year.

Just recall Hugo, which hit South Carolina in 1989. Its center made landfall just north of Charleston with a large storm surge up to 20 feet high.

The impacts of Hurricane Hugo also reached well inland.

Heavy rain and strong winds devastated many portion of North and South Carolina, knocking down trees and disrupting power supplies for over a month in some areas.

Hurricane Katrina is a grim reminder that the greatest potential for large loss of life is from the storm surge.

Storm surge is very difficult to predict, because it depends on the exact hurricane track and wind field.

It is also affected by the slope of the ocean floor, topography, and natural and man-made barriers, such as dunes and roadways.

A slight difference in track or wind field can mean a huge difference in where the highest storm surge impacts the coast.

NOAA's Storm Surge Model, known as SLOSH, is used by emergency managers in their evacuation planning, and provided excellent guidance during last year's hurricanes.

Let's look at the potential storm surge from a hurricane making landfall near Beaufort, South Carolina.

The model we are showing on the screen depicts the storm surge from a category one hurricane moving to the north-northwest at 35 miles per hour.

The storm surge reaches about six feet high along the coast, and the high tide could increase the total water level by five feet.

This means the water level in Beaufort could be as high as about 11 feet.

Now we're looking at a projection of a storm surge from a category five hurricane. Notice how much farther inland the storm surge flooding penetrates. A landfalling category five hurricane could cause a surge of water almost 20 feet high, devastating ev-

erything in its path. A high tide could increase this even more, and the water could be over 25 feet keep in downtown Beaufort.

The Queen of the Carolina Sea Islands could be inundated, and its tabby ruins, historic forts, elegant homes, and majestic plantations damaged or destroyed.

Not only is the mission of the National Weather Service to forecast the potential hurricane surge threats you just saw, but we also forecast the inland threats from these storms.

The National Hurricane Center, or NHC, has been the centerpiece of our Nation's hurricane forecast and warning program for 50 years.

NHC is responsible for predicting the path and intensity of the system, issuing coastal hurricane watches and warnings, and describing broad effects to the areas impacted, including projected storm surge levels.

Local National Weather Service Forecast Offices, or WFOs, also play a critical role in this process.

WFOs use their local expertise to refine NHC advisories and provide specific, detailed information about the impacts from the hurricane to their local forecast area of responsibility.

WFOs issue inland hurricane and tropical storm warnings, describe the local impacts from the storms, and provide forecasts and warnings for all inland effects, including floods, flash floods, strong wind, and tornadoes.

The offices work closely with local emergency managers to ensure they are aware of the potential affects from the storms.

Local media relay National Weather Service watch and warning information to the public, providing a critical way to disseminate potential life-saving information.

Improving hurricane forecasting is a top priority for the Administration. NOAA has made great strides in improving hurricane track forecasting; our five-day forecasts are now as accurate as our three to four day forecasts were 15 years ago.

NOAA continues to improve our hurricane track and intensity forecasting through better observations and modeling efforts.

One of the tools we use to make observations in and near hurricanes is reconnaissance aircraft.

The Gulf Stream IV, which we have here today, is equipped to obtain data from the environment surrounding the hurricane.

This information is fed into our computer models, which then provide forecast guidance to assist NHC forecasters with predicting hurricane track and intensity.

Where will the next hurricane hit? Could it be the Gulf Coast again? Maybe.

How about New England? Or New York City? It's possible.

What about South Carolina?

The truth is, no one knows exactly what areas of the coast, or which states, if any, a hurricane may hit in 2006.

We must remember a hurricane is not just a coastal event. Storm surges, strong winds, heavy rains, and tornadoes from a hurricane or weakening tropical system can spread well inland and cause tremendous damage.

The message from NOAA is very clear: We want every business, every family, every individual, and every community on or near the coast to have a hurricane preparedness plan in place.

Thank you for your time today, and I am happy to answer any questions that you might have.

[The prepared statement of Mr. Jones follows:]

PREPARED STATEMENT OF JOHN E. JONES, JR., DEPUTY DIRECTOR, NATIONAL WEATHER SERVICE, NOAA, DOC

Mr. Chairman, and members of the Committee, I am John Jones, Deputy Director of the National Weather Service at the National Oceanic and Atmospheric Administration (NOAA) in the Department of Commerce. Thank you for inviting me here today to discuss the outlook for the remainder of the 2006 hurricane season, the threat posed to South Carolina by hurricanes and the work of National Weather Service (NWS) offices in forecasting inland threats from these storms.

First, I would like to thank you for your support of NOAA and our hurricane program. Your support enables us to make the best forecasts possible, helping to ensure the people of our Nation understand the potential effects from hurricanes, and what action they can take to protect their life and property. The FY 2006 Hurricane Supplemental Funding, approved by Congress, is being used as directed, including funding forecast model improvements, storm surge and inland hurricane forecasting improvements. Thank you again for your support.

On August 8, NOAA revised its prediction for the 2006 Atlantic hurricane season. The official hurricane season started June 1 and goes through November 30, with the average peak of hurricane activity occurring with the warmest water temperatures, from now to late October. So far this year there have been 3 tropical storms (Alberto, Beryl, Chris). For the rest of the 2006 Atlantic hurricane season, NOAA is predicting 9–12 more tropical storms, with 7–9 becoming hurricanes, of which 3–4 could become major hurricanes. A major hurricane is a storm Category 3 or higher on the Saffir-Simpson hurricane scale, with winds greater than 110 miles per hour. Major hurricanes cause about 80 percent of the damage sustained from tropical cyclones.

Our forecast for the remainder of this season is based primarily on the continuing multi-decadal signal in the global tropics—a climate pattern in place since 1995. Since the mid-1990s, nine of the last 11 hurricane seasons have been above normal, with only two below normal seasons during the El Niño years of 1997 and 2002. This multi-decadal signal will likely keep us in an active period for major hurricanes for another 10 to 20 years or more.

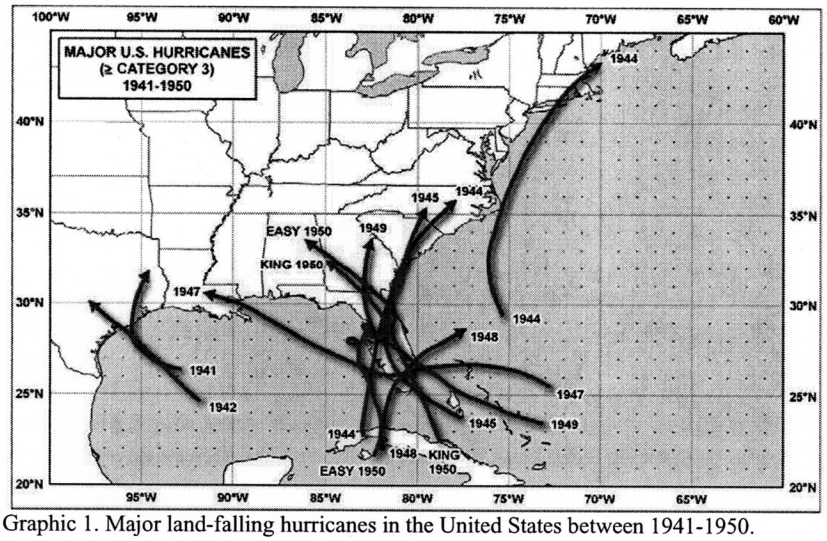
Warmer ocean water temperatures in the tropical Atlantic Ocean and Caribbean, combined with expected weaker easterly trade winds, and a more favorable wind pattern in the mid-levels of the atmosphere, are factors that collectively will favor storms in greater numbers and greater intensity. Warm water is the energy source for storms while favorable wind patterns limit the wind shear that can tear apart a storm's building cloud structure.

NOAA is actively engaged in research to understand how climate variability and change may affect hurricane frequency and intensity. For example, climate effects from outside the Atlantic basin, such as El Niño/Southern Oscillation (ENSO), can impact hurricane formation in the Atlantic basin. This year, however, NOAA scientists predict neutral ENSO conditions, which means neither El Niño conditions (which tend to suppress hurricane formation), nor La Niña conditions (which tend to favor hurricane formation), will be a factor in this year's hurricane season.

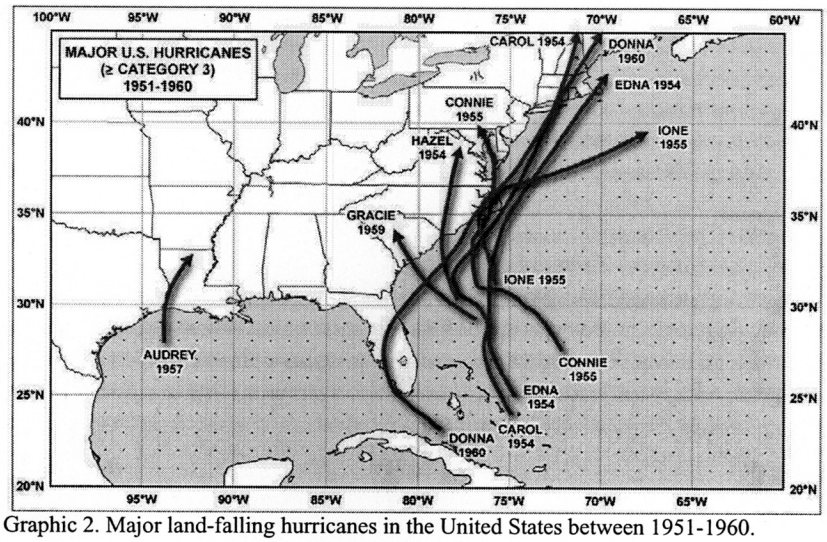
Last year was a record-setting hurricane season, with 28 storms and 15 hurricanes, of which seven were major hurricanes. We know all too vividly the destruction and devastation a *single* hurricane can cause. That is why it is important not to focus only on the total number of storms. The message is clear. We all need to be prepared.

Multi-decadal Climate Patterns

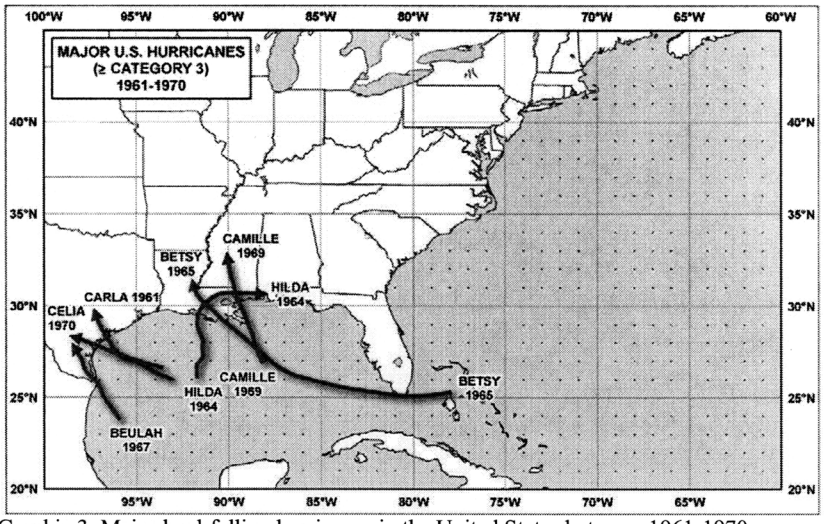
We observed that steering patterns for major hurricane landfalls can *sometimes* persist over several years. As shown in the three graphics below, during the 1940s, many major hurricanes hit Florida. During the 1950s, the focus of land-falling hurricanes shifted to the U.S. East Coast. During the 1960s, the central and western Gulf Coast was hit by the hurricanes.



Graphic 1. Major land-falling hurricanes in the United States between 1941-1950.



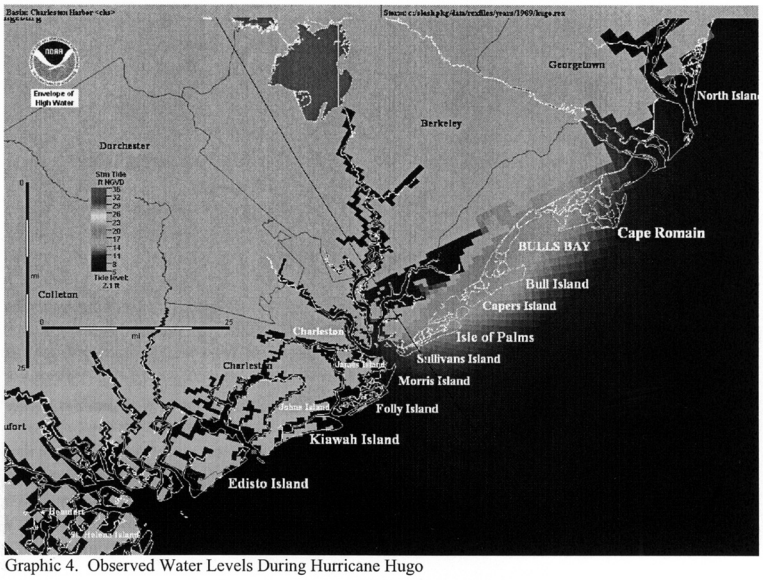
Graphic 2. Major land-falling hurricanes in the United States between 1951-1960.



Graphic 3. Major land-falling hurricanes in the United States between 1961-1970.

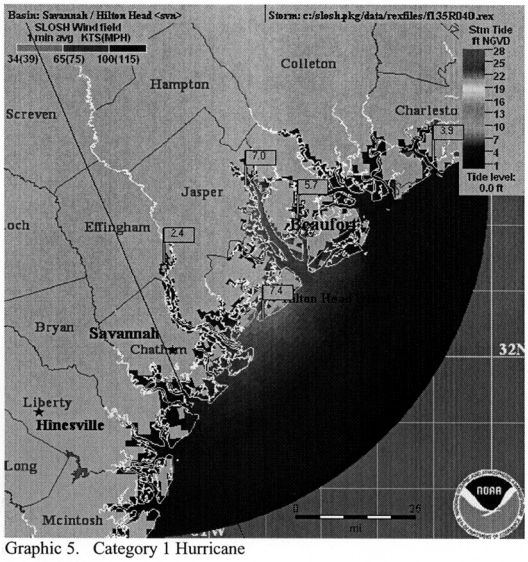
This pattern might lead one to assume that—given the recent major hurricanes like Charley, Ivan, Jeanne, Dennis, Katrina, Rita and Wilma in 2004 and 2005—Florida and the Gulf Coast are likely targets again this season. However, in each of these decades there were exceptions. For example, in the 1940s, while most storms hit Florida, two made landfall in the Gulf, and one made landfall in New England. In addition, in the 1930s, major land-falling hurricanes were relatively well distributed along the U.S. coastline—hitting the U.S. coast from Texas to New England. Consequently, while it is possible to observe these trends and make generalizations based upon these observations, it is important to understand that in any given year a hurricane can impact any part of the U.S. coastline from Texas to Maine. Coastal communities along the Gulf and East Coasts, including here in South Carolina, remain at risk for hurricanes, and the business community and the public must be prepared to respond if a storm approaches. South Carolina is no stranger to hurricanes or tropical storms. In 2004 alone, two Category 1 hurricanes hit the state—Charlie on August 14 and Gaston on August 29—and two other tropical systems crossed the state.

It takes only one hurricane to hit a community to make for a bad year. Just recall Hugo which hit South Carolina in 1989, its center making landfall just north of Charleston. The storm surge was large; up to 20 feet just north of Charleston (see graphic 4, below). The impacts of Hurricane Hugo reached well inland, with many portions of South Carolina and North Carolina devastated by heavy rain and strong winds, knocking down trees and disrupting power supplies for over a month in some areas.



Graphic 4. Observed Water Levels During Hurricane Hugo

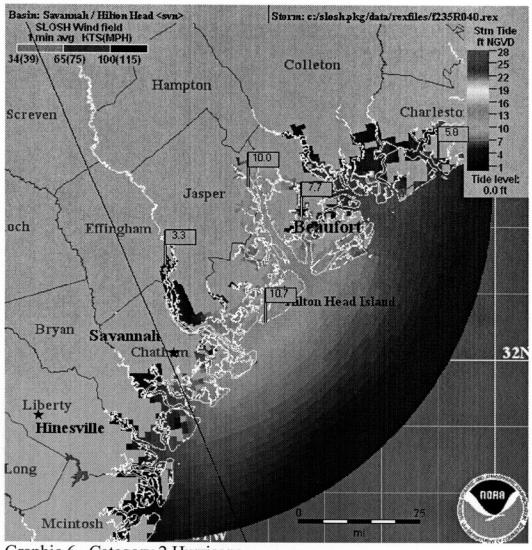
Let's now examine the potential effects from storms making landfall near Beaufort, South Carolina. The first graphic below (graphic 5) depicts the storm surge from a Category 1 storm moving to the north-northwest at 35 miles per hour. The track is similar to the one Hugo took and almost perpendicular to the coast, except it is shifted about 50 miles farther south. The storm surge reaches about eight feet along the coast. This is the amount of surge from the storm only. The astronomical tide would be added (or subtracted) from this value to obtain the water level. In the Beaufort area, the surge is about five feet and the astronomical tide could increase (or decrease) the water level by five feet.



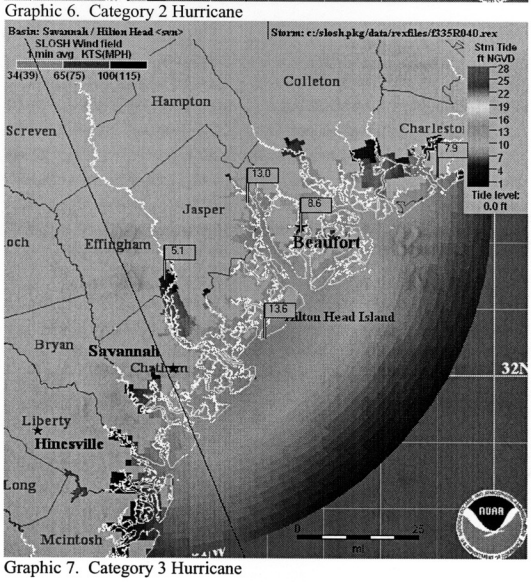
Graphic 5. Category 1 Hurricane

Notice how much farther inland the flooding penetrates with successively stronger hurricanes traveling along the same, hypothetical path (see graphics 6, 7, 8, and 9, below). A land-falling Category 5 hurricane could cause a surge of water near 20

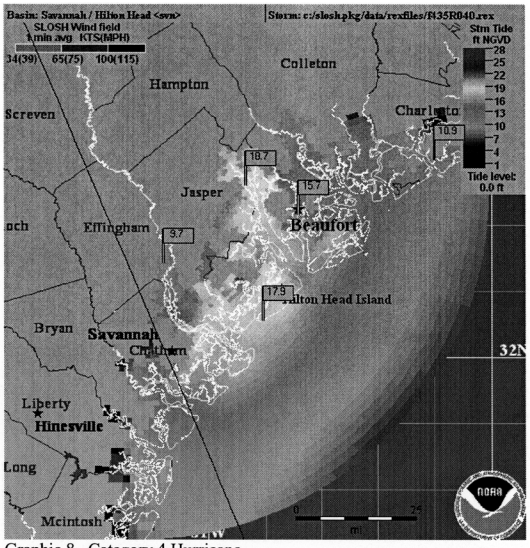
feet high, reaching well inland and devastating everything in its path. Add to this the astronomical tides, and water could be 25 feet deep in downtown Beaufort with a Category 5 storm.



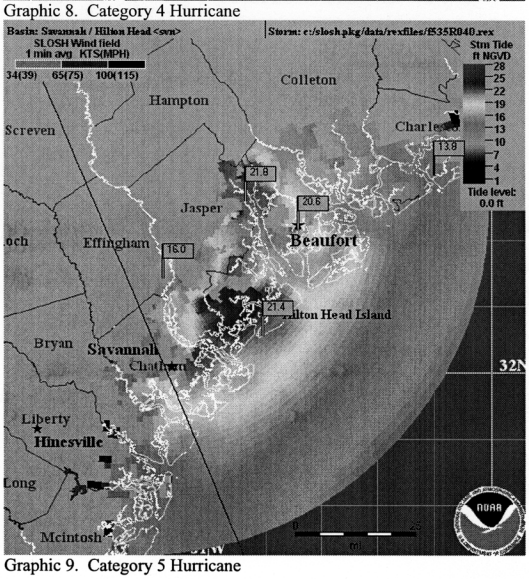
Graphic 6. Category 2 Hurricane



Graphic 7. Category 3 Hurricane



Graphic 8. Category 4 Hurricane



Graphic 9. Category 5 Hurricane

No one can say with any reliability, months in advance, when or where hurricanes are going to strike. The state of the science is simply not advanced enough at this time. The bottom line is that all coastal states from Texas to Maine, Hawaii, and other U.S. interests in the Pacific and the Caribbean are vulnerable to the devastation brought by a hurricane. The message from NOAA is very consistent. We want every business, every family, every individual, and every community on or near the coast to have a hurricane preparedness plan and have it in place.

The Role of the National Weather Service in Tracking, Forecasting and Communicating the Threats of Hurricanes

The mission of the NWS is to issue weather, water, and climate forecasts and warnings for the protection of life and property and the enhancement of the national economy. Nowhere is that more evident than in the hurricane program. Various components of the NWS play important roles in the overall hurricane forecasting and warning process. The National Hurricane Center (NHC), within the NWS, has been the centerpiece of our Nation's hurricane forecast and warning program for 50 years. The mission of the NHC is to save lives, mitigate property loss, and improve economic efficiency by issuing the best watches, warnings, and forecasts of hazardous tropical weather and by increasing public understanding of these hazards.

NHC tropical cyclone forecasts are issued at least every six hours, more frequently during landfall threats, and include text messages as well as a suite of graphical products depicting our forecasts and the accompanying probabilities and "cone of uncertainty," as it has become known. The NHC is responsible for predicting the path and intensity of the system, issuing coastal hurricane watches and warnings, and describing broad effects to the areas impacted, including projected storm surge levels.

Local National Weather Service Weather Forecast Offices (WFO) also play a critical role in this process. WFOs use their local expertise to refine NHC advisories and provide specific, detailed information about the impacts from the hurricane to their local forecast area of responsibility. Weather forecast office staff have detailed knowledge of the local terrain and effects, and provide this information through direct interactions with local emergency managers via their local forecast products and messages. This detailed information is used by local emergency managers when making their evacuation and other preparedness decisions.

Inland Effects of Hurricanes

The effects of hurricanes can reach far inland and it is the responsibility of the local WFO to issue inland hurricane and tropical storm warnings and describe the local impacts from the storms. Local WFOs work with NWS River Forecast Centers to forecast and warn for floods and flash floods. WFOs also provide forecasts and warnings for all other inland effects including strong wind and tornadoes. The offices work closely with local emergency managers to ensure they are aware of the potential affects from the storms.

Local media relay NWS watch and warning information to the public; providing a critical way to disseminate potential life saving information from the NWS.

Wind

Hurricane-force winds, 74 miles per hour or more, can destroy buildings and mobile homes. Debris, such as signs, roofing material, siding, and small items left outside, become flying missiles in hurricanes. Winds can stay above hurricane strength well inland. Hurricane Hugo in 1989 battered Charlotte, North Carolina—about 175 miles inland—with gusts near 100 miles per hour, downing trees and power lines.

Tornadoes

Hurricanes and tropical storms also produce tornadoes. These tornadoes most often occur in thunderstorms embedded in rain bands, well away from the center of the hurricane. Usually, tornadoes produced by tropical cyclones are relatively weak and short-lived, but still pose a threat.

Inland/Freshwater Floods

All tropical cyclones can produce widespread torrential rain. This rain can produce deadly and destructive floods. Heavy rain can trigger landslides and mudslides, especially in mountainous regions. Flooding is the major threat from tropical cyclones to people well inland. For example, Tropical Storm Allison, in 2001, was the most costly tropical storm in U.S. history, causing more than $5 billion in flood damage and causing 24 fatalities in southeast Texas and southern Louisiana. Allison then moved northeastward and weakened to a depression as it brought heavy rain to South Carolina. Hurricane Floyd, in 1999, brought extremely heavy rainfall to many locations in the eastern United States.

Flash flooding, a rapid rise in water levels, can occur quickly due to intense rainfall. Longer term flooding on rivers and streams can persist for several days after the storm. Intense rainfall is not directly related to the winds of tropical cyclones, but rather to how fast the storms are moving, and the geography of the area affected. Slower moving storms produce more rainfall. Mountainous terrain enhances rainfall from tropical cyclones and can lead to mudslides and debris flows. Inland flooding can be a major threat to people hundreds of miles from the coast.

Between 1970 and 2004, more people lost their lives from freshwater flooding associated with tropical storms and hurricanes than any other weather hazard from those storms. However, Hurricane Katrina provides a vivid reminder that potentially the most devastating component of tropical systems is still storm surge.

NOAA Efforts to Improve Hurricane Predictions

NOAA is focused on improving hurricane track, intensity, storm surge, and rainfall predictions. Research conducted by the Hurricane Research Division (HRD) improves our understanding of these elements, as well as helping to ensure that hurricane prediction models properly represent physical processes within hurricanes. HRD is part of the Atlantic Oceanographic and Meteorological Laboratory within NOAA's Office of Oceanic and Atmospheric Research (OAR). The accuracy of NOAA's hurricane forecasts is closely tied to improvements in computer-based numerical weather prediction models. This year NOAA implemented advances in its hurricane forecasting model that are expected to yield improved track and intensity guidance for our forecasters. The Geophysical Fluid Dynamics Laboratory, also within OAR, developed this hurricane model, which has been transferred to operational use at NWS's National Center for Environmental Prediction (NCEP).

NOAA's Central Computer System upgrade in FY 2007, will increase computational speed, memory, and storage capabilities. This allows more sophisticated numerical models to run and make use of available data, including data from NOAA's polar orbiting and geostationary satellites.

Predicting hurricane intensity remains one of our most difficult forecast challenges. We are all aware of the improvements made in predicting hurricane track forecasts, and this has been where NOAA and the research community have placed their emphasis. Within the past few years, the emphasis on improving intensity prediction has increased. Leading the way, in FY 2007 NOAA plans to introduce a new hurricane modeling system developed by NCEP's Environmental Modeling Center called the Hurricane Weather Research and Forecasting model (HWRF). We expect improvements in intensity, precipitation, and wind distribution forecasting from the next generation operational modeling system. Congress supported our model improvement effort in the FY 2006 Hurricane Supplemental Funding, and HWRF implementation and development are included in the FY 2007 President's Budget request.

Hurricane Katrina is a grim reminder that the greatest potential for economic destruction and large loss of life is from the storm surge near the coast. Storm surge is also very difficult to predict because it depends on the hurricane track and wind field, but it also is affected by bathymetry, topography, and natural and man-made barriers, such as dunes and roadways. A slight difference in track or wind field can mean a huge difference in where the highest storm surge impacts the coast.

NOAA's Storm Surge Model, known as SLOSH (Sea, Lake and Overland Surge from Hurricanes), provided excellent guidance during last year's hurricanes. We realize many other storm surge models exist, and NOAA recently formed an assessment team to re-examine our users' requirements for real-time storm surge information and products, to direct storm surge modeling within NOAA, and to plan for future enhancement of, or the replacement of, the SLOSH model.

Our local NWS offices work closely with the research and academic community to improve our understanding of tropical systems; using that information to improve forecasts and warnings. Recent efforts include improved detection of tornadoes associated with tropical systems and forecasting the location of heaviest rainfall from tropical systems. Efforts also continue to improve communicating the severity of the impacts and communicating the level of certainty in our predictions.

Aircraft Reconnaissance Data

NOAA aircraft, the W–P3 Orions and the Gulf Stream IV, provide essential observations critical to NHC forecasters, and supplement the U.S. Air Force Reserve Command's 53rd Weather Reconnaissance Squadron ("Hurricane Hunter") flights. A specialized instrument flown on both of the W–P3s, the Stepped Frequency Microwave Radiometer (SFMR), was developed by NOAA researchers at the HRD and provides essential data on hurricane structure, surface wind and rain rate to hurricane forecasters. The SFMR allows forecasters and researchers to see fluctuations

in hurricane intensity not observed before. *The Military Construction Appropriations and Emergency Hurricane Supplemental Appropriations Act,* 2005 (P.L. 108–324) provided $10.5 million to the Air Force to outfit the complete fleet of Hurricane Hunters with this instrument.

NOAA Encourages Everyone to Prepare

We work year-round with federal, state, and local emergency managers; we educate them about weather effects from hurricanes, and they educate us about response issues and their challenges. It is a constant learning process and the key is working together to ensure the public takes appropriate action. Most preparedness activities and outreach takes place outside hurricane season. Last spring, as part of our ongoing mission to enhance economic security and national safety, NOAA conducted a Hurricane Awareness Tour along the Gulf Coast. The tour helped raise awareness about the potential effects from a hurricane landfall. The NWS forecast offices arranged the tour events with the Federal Emergency Management Agency, local governments, emergency managers, schools, the public, and the media in a team effort to increase hurricane awareness and encourage preparedness in this vulnerable area of the Nation. On May 5, 2005, the Hurricane Awareness Tour stopped in Charleston, where 1,000 school-aged children, and many others, toured the plane and were informed about hurricane preparedness.

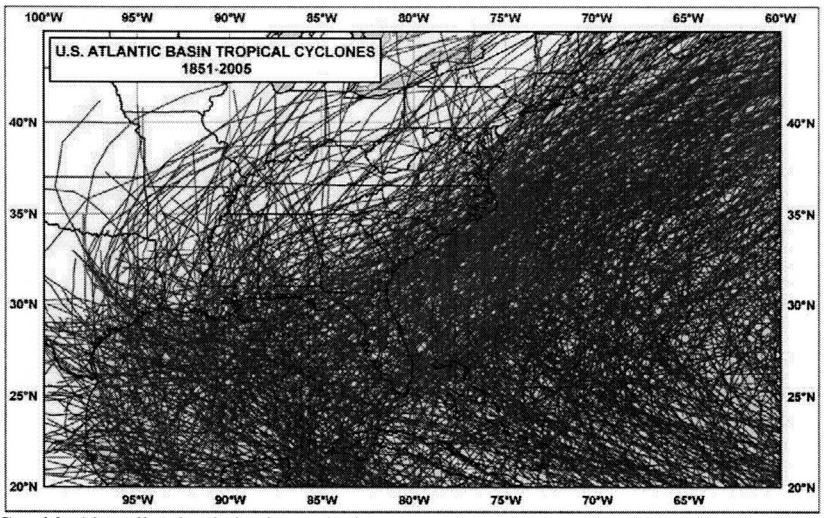
One way a community could prepare is to become StormReady. StormReady is a nationwide community preparedness program to help communities develop plans to handle all types of hazardous weather events, from hurricanes to tornadoes. South Carolina has 42 StormReady designations, 36 counties and 6 communities.

During land-falling storms, it is essential for the emergency management community and the weather community to have one message for the public so businesses and people can take appropriate action. Nowhere is this more critical than in areas most vulnerable to the impact of a hurricane. Our local NWS offices in South Carolina work very closely with local emergency managers to ensure we all speak with one voice. During the past year, NWS offices in Greensboro, Columbia, and Charleston, South Carolina, as well as the NWS Office in Wilmington, North Carolina, gave numerous presentations, online "hurricane chats," and training classes to people in South Carolina, to discuss weather and the potential impact from hurricanes and tropical systems. These outreach efforts raise awareness and hopefully allow people to prepare for the storms long before they happen.

Conclusion

The truth is, right now, no one knows exactly what areas of the coast, or which states or locations within those states, if any, another hurricane will hit in 2006. Could it be the Gulf Coast again? Maybe. How about New England or New York City? What about South Carolina? They're all possible, but, right now we just don't know. We also need to remember a hurricane is not just a coastal event. The strong winds, heavy rains, and tornadoes from weakening tropical systems can spread well inland and cause tremendous damage.

The chart below shows the tracks of tropical storms and hurricanes since 1851. I think most people can look at this graphic and understand that the United States is vulnerable to hurricanes. The bottom line is that all coastal states from Texas to Maine, Hawaii, and other U.S. interests in the Pacific and the Caribbean are at risk. Everyone along the coast, as well as communities susceptible to the inland effects from tropical systems must be prepared to protect their lives and property in the event of a hurricane. Thank you, and I am happy to answer any questions that you might have.



Graphic 10. All Atlantic basin tropical storms and hurricanes, 1851-2005.

Senator DEMINT. Thank you, Mr. Jones.

I particularly want to thank you and all the crew of the Gulf Stream Hurricane Hunter we saw this morning.

I think it looks luxurious from the outside; but inside, obviously, it is a working airplane. It's encouraging to see the progress we have made with, particularly, predicting the tracks.

You showed us what would happen if Beaufort was hit with the category one and five.

I don't know if you have available to just look quickly at two, three, and four, just to give the folks an idea.

Mr. JONES. I think we have a couple of pictures of different categories of storms.

VOICE. We have, two, three, four.

Senator DEMINT. If you can just go through that.

Because the likelihood of a two or three seems—I think Mr. Fowler said it's not a matter of if, it's just a matter of when.

Mr. JONES. Yes.

Senator DEMINT. Let me ask a couple of questions while we are waiting.

Colonel, and I think I want to ask Mr. Winn the same thing, how much notice do you need to effectively evacuate and carry out your plan?

Colonel LANHAM. Sir, is this with or without the four-lane highway?

Senator DEMINT. That is like a ten-year notice. We don't have that. But just give it at the current situation; how much advanced notice do you need to effectively evacuate the base?

Colonel LANHAM. It's hard to say exactly, sir, you know, 48 hours is a reasonable timeline for most people.

But it's probably too short for us, in the way we would have to do it, given the access to these areas.

So, we really do emphasize self-evacuation early for the majority of the military families here; have a plan, have somebody you know or somewhere you can go, and get out of here early.

Because if we have to wait two to three days, even that is going to maximize the infrastructure that we have in place to get folks evacuated safely in a timely manner.

Senator DEMINT. You don't have an arrangement within the schools, auditoriums or whatever—you folks just don't have anyplace to go—if they could go to some emergency shelter for a few days.

Colonel LANHAM. Well, we do. But the problem is, that if we are talking anything above a category one that doesn't hang around in the area very long, wherever we have the shelters in Beaufort County are not going to provide shelter adequate to the need.

Senator DEMINT. Right. But inland, you don't have an agreement with anyone 100 miles in or something?

Colonel LANHAM. For none other than our essential personnel that are going to plan and participate in the recovery efforts, we don't, sir.

Senator DEMINT. Mr. Winn, how much notice do you need to get people off Hilton Head Island and out of Bluffton and off of Lady Island and——

Mr. WINN. If ten years was an offer, sir, I'll take it.

Our hurricane evacuation studies, and the current update we just did, show category five evacuation time is approximately 25 hours, from the time we say "go" to get everybody out.

Category three, we run anywhere from 16 to 18 hours.

But in the South Carolina hurricane plan, if our increased rates are implemented by the state, we start about four days out from when we perceive the threat.

A lot of that is given to us by the Hurricane Center or the Charleston Weather Service Office, and the time sequence that we use it, usually takes us about four days to do all the increased readiness steps we need. So we have to jump through a lot of hoops, whether we know the threat or not, but the actual evacuation for the public, range anywhere from 18 to 25 hours.

Senator DEMINT. Two days out, if we told everyone to evacuate, I imagine we would have a pretty serious traffic jam on 278 and other arteries getting out of here.

Mr. WINN. We also say we can guarantee we can get you to the county line. I'm not sure I can get you much past that. The evacuation problems we have seen inland into Jasper and Hampton County, because we only have two routes that are assigned to the Lowcountry of South Carolina. So, we have to move the entire evacuation over those two routes. And they are just not adequate enough to do that, that is what strings the time out. The actual problem is further inland.

Senator DEMINT. Let's take just a second to look at category two, three and four. Because knowing what to expect is, I think, a very important part

VOICE. These are still images.

Senator DEMINT. Whatever is easiest. I think the aftermath, how much water do we have, given category two.

Mr. Jones you may want to walk us through this.

Mr. JONES. John, let's go to the movies, since they saw the movies for one and five, if you don't mind. I think that would be easier.

So here is the category two. Again, the hurricanes are all going north-northwest at 35 miles an hour.

And the bar in the upper right-hand corner shows the depth of the water.

Johnny, please go to the Category 3 storm.

Now we start getting into some of the yellows. Yellow is 16 feet, when we get to a Category 3.

This next loop is for Category 4. You can see the yellow goes much farther inland.

Senator DEMINT. That yellow is 10, 12 feet?

Mr. JONES. 16 feet.

That is a lot of water. If it comes at high tide, you add another five feet, and that makes it about 20 feet of water from the storm surge with a category four. Category five was up to 25 feet.

Senator DEMINT. Mr. Winn, even with the new codes of building-up higher, that just takes you up to eight or ten feet, doesn't it?

Mr. WINN. Well, what I use in my presentation, Senator, is when you get to a category five, the Town of Yamassee is an island. And I own a farm that is just on the other side of Mt. Beaufort, I will have oceanfront property for about 20 minutes.

Senator DEMINT. That was another question: We are not going to have sitting water for very long. Water is just going to come up, pass by, and pretty much be gone—relatively quickly, right?

Mr. WINN. In most cases, yes, Beaufort County has done a tremendous job in advancing our draining problem in the county.

A lot of downed trees, that is going to clog—a lot of water will come out in low tide, that is one of the advantages we have.

Senator DEMINT. Would this contaminate the drinking water, to have that much water run across the whole Beaufort County area?

Mr. WINN. Much of our drinking water comes out of the Savannah River. It depends on the amount of damage to the canals, the impact of the water. There will be some contamination of some of the shallow wells.

Senator DEMINT. A lot of the saltwater will push up the river a ways under that condition, right?

Is it possible we will have salty drinking water for awhile?

Mr. WINN. It could affect some of our wells in the back part of the county.

We looked at the model real close, we have just as much flooding, in some case more flooding on the backside of Beaufort than we do on the front side.

And if you look at the great storm of 1893, Beaufort County being the—having the second largest number of deaths in the United States history from a hurricane in 1893, most of the deaths were in the backside of the county; that is true today.

Senator DEMINT. A lot of that water might sit?

Mr. WINN. Some of that water will sit in places, yes.

Senator DEMINT. Let's talk about communications. Colonel, we talked a little bit about your ability to communicate with Mr. Winn, and our ability to communicate with the people who live here.

And I think, Mr. Winn, you mentioned the auto-dialing system. How long will it take you to get to everyone in the county through this auto-dialing system?

Mr. WINN. Depending on which version we use, and the efforts we take, it could be as much as six hours—six to seven hours, depending upon which system we activate.

What we try to do, Senator, is to phase it in as much as we can and only hit certain areas first.

We have found in our past history of evacuation, if we surge it too much at one time, it puts more traffic on the highway than we can handle.

So, we try to phase it in, in our evacuation, through the coastline, and moving back in some of our announcements.

We have even stopped sending out some of our truck warning sirens. We are putting too much of a surge on the highways.

Senator DEMINT. Would it be helpful if you could send warnings to cell phones, Blackberries, and mobile devices?

Mr. WINN. Yes, sir. The system which we propose would be of a great advantage to our local emergency management folks, giving us the ability to set it off with a message that we need, and be able to target specific areas.

Even the emergency alert number systems where we can dial the residents, it only hits land-lines and goes through the Internet, we can do that.

But the actual cell phone technology of contacting them, that has not been achieved yet, sir.

Senator DEMINT. My hope is that we can design this system in a way even if someone was on Hilton Head from New York, with their cell phone, that our warning system could actually communicate with anybody who's on the system here; that has got to be part of the problem. People are here and might not even answer the phone if they are renting a place, getting visitors off or out of the county has got to be a pretty big challenge.

Do we have a plan for, perhaps lower-income people who live in the area—might not have telephones and might not have transportation to move out. Couldn't that be a big problem?

Mr. WINN. As of today, sir, we have the capability and maintain what we call a "lift capacity" of moving 3,700 people in one trip to our hurricane shelters in Hampton.

We are in the process now of upgrading that capacity, by adding 20 more buses as reserve.

And I would just request 10 extra buses with 20 drivers from the state, which would give us a "lift capacity" of around 4,000, 4,500.

If we have enough time to run two trips, that gets my capacity to about 9,000, sir.

I think that would adequately move the people out of Beaufort County.

As for the notification, I will tell you that the people who want to leave, Senator, can leave. And I'm absolutely confident that anyone who wants to leave, no matter what their economic situation, whether they have their own transportation, we can get them out of Beaufort County.

The problem is, the people who perceive there is no threat or little threat, and are going to stay in the county, we estimate that

could be anywhere from 5,000 to 8,000 people, and that's going to be a significant search and rescue operation after the storm.

Senator DEMINT. So it's not a matter of them not knowing, or us not warning them and giving them means to leave, it's just that it may be their own decision not to leave.

Mr. WINN. They make their own decision. And then that opens up the whole Pandora's box, how do we deal with that in that process.

Senator DEMINT. Are we doing things through local schools to help students understand dangers and the preparation, and that process; is that something we are doing?

Mr. WINN. As for a direct program, we have—no, sir; we have no program that goes directly into the schools.

We have used educational programs outside of the schools to the public. We offer programs like Mr. Fowler going into the schools and talking when he's invited. But as for a full education program; no, sir, there is not one.

Senator DEMINT. What we are looking for are ideas of things that we can do at the Federal level, just like the warning system, something we can do to support what you're doing locally. And as you think about the role of the Federal Government, whether it's supporting a warning system like that, whether what we do with NOAA, what FEMA might do, I would like to maybe ask all four of you panelists: What do we need to be doing on our committee and in the Congress, and at the agency level—the Federal Government, to get prepared and to assist the local communities, on the whole, warning, predicting, evacuating, recovery process?

Where are we, Colonel? I'll start with you. What comes to mind?

Colonel LANHAM. It's hard for me to really address the Federal role in this because, really, our focus here has been on local coordination of issues.

And the first thing that jumps into my mind, sir, is the support at the Federal level of information sharing. Both the lessons learned and, if we move our focus from storms, for just a minute, to broaden that to any kind of mass-casualty scenario, the planning and predicting of those, as well, terrorist tracking, things like that, but sharing information at the national level is still an area that we—I think we need to continue some improvement on.

The more that we can do that, the more that we can encourage the quick-share flow of information. Lessons learned, planning ideas, alternatives and resources available, I think the better off it will be for the local planners to tap into what they need and tailor what is available at the Federal level to their specific circumstances and localities across the country.

Senator DEMINT. We talked this morning about communication. You're communicating with Mr. Winn. Are our systems interoperable? Are these going to work together, just between the base and what we have here on the civilian side?

Colonel LANHAM. Only because the county provides us a lot of that support. The 800 megahertz radios that we use are provided and maintained by contract vehicles that the county owns. And that works very well for us here.

Interoperability is something we continue to work on here, but it's not a given. And it has potential, when everybody has a good idea, to go in one direction.

Unless everybody goes with them, we are not going to stay interoperable over time.

Senator DEMINT. Mr. Fowler, I know when we have a hurricane coming in, do you get enough information updated enough?

I know the weather service is probably in constant communication. But as far as evacuation routes, problems with traffic choke points somewhere; do you get enough?

Mr. FOWLER. We do. I think Floyd, obviously, for many folks including media was a major lesson for us to learn, as well.

Obviously, some changes have been made in South Carolina from the Governor's office down to the local level, about how to get people out. And when they are going to get them out, what roads will be reversed. So our role is to just get that information out to the public.

I like the idea of the text-ahead, we as a TV station do that personally, contracting with a service. And after the first tropical storm, Alberto, of this year, we had about 400 people sign up that first day.

So, we constantly send out text alerts. And it has been very advantageous for us, and people have kind of responded to that as well.

If you go do that on the government level, that would be excellent. Not just hurricanes, but Amber alerts, other things as well. We try to get the information out as quickly as we can.

We are lucky that we have a great weather service office, a forecast office in Charleston, that they have—they will contact us in advance of a potential threat and say: Here is what our inside thinking is.

You know, we, as the media, it's our responsibility to kind of syphon that information down to the public, so we don't want to show everything that we have got. Because, you know, people really are hanging on your every word. And they can see it in your eyes if you're scared or not.

So you have to try to keep a low profile and calm, you know, persona on the air.

But they usually call us beforehand: Here is what we are thinking, or watch is going to go up the next update, or warning the next update.

And then that helps us ramp up our presentation, exactly what we need to hit on, what is most important and what message we need to send out to our viewers.

Senator DEMINT. Do you get information from the highway department reminding people of evacuation routes?

Mr. FOWLER. We do. They have done a great job. Again, I think Floyd was really the catalyst for this. I have been in Charleston since 1987, and went through the Floyd debacle sitting in a TV station, not realizing what was going on on the highways.

Now, with the traffic cameras that are instituted by the Department of Transportation, the Highway Patrol, obviously, there is a good link there to the media. We have good liaisons in that respect. So we get the information that we need to get out to the public.

Senator DEMINT. Do you know if the local—until we get the WARN Act implemented, the folks in their cars leaving, their only information that is probably on radio; do you know if the local radio stations have the same information you do available from, looking at cameras and things like that?

Mr. FOWLER. I'll tell you, we learned a hard lesson during Hurricane Hugo. The almighty television station is not almighty when you have a hurricane coming through. So we were still broadcasting a signal, but nobody was picking it up.

So, what has happened in the radio business, and I'm sure you are familiar with this, is the fact that you have big groups of bought clusters of radio stations in different markets.

We have Clear Channel Radio. They own six powerful radio stations. So we have formulated an agreement with that group that if, and when a threat occurs, that we will broadcast over their airwaves as well.

So, basically, what they may do is, they may simulcast our signal, as we are what we call wall-to-wall coverage; or we, as a meteorologist will update them for people in the car.

And we had an instance this spring of many tornadoes in our area, and there was one person who called me after hearing tornado warning on the radio station that we were broadcasting on, telling me they saw the tornado on the Donnough Bridge over by Westvaco.

That person, just by listening to the radio, was able to understand the threat was there, and they are driving over the bridge, not knowing on the other side of that bridge was a tornado—possible tornado had touched down in that area.

So, radio stations are a site link to what we do.

Senator DEMINT. Are the emergency management folks in Charleston involved with your working with radio stations and communicating? Is that something that goes on here, Mr. Winn?

Mr. FOWLER. Yes. I think, absolutely. We go—we frequent so many seminars and conferences together, we get to really interact with each other.

And then when it does hit the fan then, you know, we have that good working relationship.

With that, they know to call us, and we rely on them, and they rely on us to get the word out.

We have had good relationships over the years with the folks in charge in Charleston, specifically, and some of the other counties that we serve.

Senator DEMINT. That is encouraging, Mr. Winn.

What do we need to do that we are not doing?

I know you mentioned the roads. I have taken note of that. We are working on road money.

Mr. WINN. First, like the comments say, some of the things meteorologist's office in Charleston, the Weather Service, they just held a meeting within the last three months of the Local Emergency Management Directors and media folks, and we sat down with the Weather Service Office in Charleston, and we talked through a lot of items: What's working? What's not working? What do we need to do differently?

And I think that type of leadership, specifically, with the Weather Service Office out of Charleston is a step in the right direction.

The highway infrastructure is important. I tell you, one of the main complaints I get from people is fear of being stuck on the highway.

And the three-lane completion of 278, out of the county, is critical for us.

So, the highway infrastructure and asking the Federal Highway Administration to put more consideration in their funding for new highways based on hurricane issues, which they do not.

What has gone on in Beaufort with our three military bases, Senator, I found is unique. I have received more calls from around the country: How did you all do that? What did you do in Beaufort to get the military to participate with you?

And what you are seeing here is something you will not find in a lot of places. I give a tremendous amount of credit to Headquarters Marines for trying something new in Beaufort. I think we have proved, Colonel, that it works. I can't give enough credit to LT COL Nick Fabrise from Parris Island, who sat down with us three years ago and said: This is something you need to do; and helped us find ways to do it.

But it's something that needs to be expanded around the country, linking more of the counties to their military facility, as we have done.

It has been an adventure on both sides, but we have shown you, sir, that it works. And this is something we would like to see expanded.

Funding of warning systems, particularly systems that you mentioned, we encourage you to make sure there is input, because what works in South Carolina may not work exactly in North Carolina.

We have been implementing phase two for wireless 911 in South Carolina. We are one of the first counties to do that, and that has been quite a chore with the cellular companies.

And we find there is a wide difference between the technical abilities of those companies.

So, I caution you, as you put that together, to make sure you understand those.

Number two, I ask that you have local input, as you all put that system together, and bring some of the county directors in for that local experience.

As for getting information, the FEMA Hurricane Liaison Team, the National Hurricane Center does a good job in providing some of those coordination calls with the states, and in some cases for the county, that is a tremendous step forward.

Hurricane evacuation studies need to be updated, like Beaufort County just received. It would help us pinpoint what's safe and what's not.

The other growing problem that we are seeing, Senator, is Red Cross shelters. And the problem is just not enough of them. I lose all my shelters after category one. So my nearest hurricane shelters are 50 miles inland.

After this year, we are going to exceed our capacity. So, now we are going to have to go further in. And this is producing quite a

challenge for us in getting our folks that far away in the storm, and it may deter some of our people from wanting to leave.

As for your WARN program, yes, sir. I recommend it. Yes, sir. I think it's a step in the right direction. I think it's something that would benefit us, not only in hurricanes, but something simple that can be so terrifying as an Amber alert.

My agency is responding quickly for that, they are responsible for putting that out. To be able to get an Amber alert out on a system like that, would be tremendous. I have only activated an Amber alert one time in Beaufort County.

To give you a degree of its effectiveness, within 10 minutes of putting out the Amber alert, we found the little girl, because of that system.

So, when you develop a WARN System, I urge you to please consider Amber alert as part of that; it would make a tremendous difference in a lot of peoples' lives, sir. Thank you.

Senator DEMINT. Well, just so you know, as part of the WARN Act, that there is a section that basically requires state and local collaboration to put these systems together. And the cellular companies have to disclose the degree to which they have the capability to implement warnings, maps and those.

Our hope is that the cellular companies will have to compete with that system. And people are likely to get the cell phones or Blackberry that is going to offer them the greatest capability as far as warning. So we will be counting on a lot of input from you.

Mr. WINN. Thank you, sir.

Senator DEMINT. Mr. Jones, what do these folks need to do that they are not doing to use your information to prevent and predict?

Mr. JONES. There are a couple of things that you have already mentioned. At the very beginning, you talked about why you felt it was important for the community to be here.

I think you coming in here yourself has brought heightened awareness to the potential impacts and danger from hurricanes. And you coming here yourself, you brought the press.

So, colleagues of Mr. Fowler will now have stories tonight that, hopefully, people here—either living here or visiting—will even think more about: Well, do I really have a plan in place, what do I do if the worst comes?

We cannot say that enough. I think that that is number one.

You talked about one of the biggest challenges that I have seen in my almost 35-years; career, human behavior: the social science.

If we give people the perfect forecast, we tell them it's going be here, and these are the consequences that are going occur, there are always going to be problems, because everyone is not going to respond the same way.

I don't know of anyone who really has an answer for that. But I know we need to do more research. I don't know if it's the way we communicate the information or what it might be. I think the information is communicated clearly, but the whole human behavioral reaction to storms, and wanting to experience it, rather than getting out of the way is the basic issue. If they could understand the type of complexities it puts on the First Responders, they might make a different decision.

First, the first responders must get to the people who are really in danger, those who couldn't go and get out of the way. Then these first responders keep putting themselves at risk to recuse those who didn't—who wouldn't get out of the way because they chose to ride it out.

Mr. Fowler talked a couple of times about Hurricane Floyd. When Hurricane Floyd came up the East Coast and the Governors of Florida, and South Carolina, and Georgia made their decisions to evacuate, and we had the problems with too much traffic on the road, I had a serious question about whether or not you would ever see mass evacuations like that again.

But people did evacuate from Katrina. People did evacuate from Rita. And although Rita didn't go to Houston proper—a lot of people in the Houston area may have thought, I really do need to evacuate, so they did, causing massive traffic jams.

So, we still have people's attention, and we need to keep that awareness as high as possible.

And Max Mayfield, as you have heard, Senator, says he's more busy in the off season then during the hurricane season. Always going out, trying to talk to people about needing to get prepared, needing to have a plan.

So, the more that we can do and bring more attention to the hurricane and storm surge issue, the more people will learn about their own risk. I think we provide enough information for people to react to the information and take appropriate action.

Mr. Winn talked about the hurricane liaison team. I know it has been a big boom for the emergency managers. They help us get the word out.

We just need to get more information to the public. Always the idea of danger from hurricanes needs to be at the top of their minds: They need to have a plan in place and be ready to react when it's time to take action.

Senator DEMINT. We want to make sure that Mr. Winn, this gets back to your point, and highway infrastructure, that we don't have people who are trying to decide whether they want to ride out the storm or spend 30 hours in their car in traffic backed up.

That doesn't need to be a consideration. Folks who want to get out, we need to make sure we can do it effectively.

And we want to make sure no one doesn't evacuate, because they didn't know. And I think the system we have set up, unless someone is just hiding out somewhere, they should be able to find a way out. But we want to make sure we are doing everything we can.

But this has been a very informative hearing. And I think, Mr, Jones part of it, as you said, is just to draw attention to the public, of the need to be prepared, and the fact that we are preparing.

But the big missing link is always how people will respond when we warn them.

So, I think as much as we can continue to do that through the media, through our emergency response system, perhaps even through our schools, people need to know that 20 feet of water—it doesn't matter what kind of facility you're in—it's hard to live through that.

And I think they sure found that out in the Gulf last year.

Is there anything that needs to be said that hasn't been said? Anyone like to make a comment before we adjourn the hearing?

Again, Colonel, I thank you for your hospitality. The Marines are first class, as usual. And thank you for your briefing this morning.

Mr. Jones, thank you for bringing the plane down.

And, obviously, Mr. Winn, we know you are doing a lot of planning, and it all gets to the public through Mr. Fowler and his colleagues. So we have the beginnings of a good system. I hope we can do our part in Washington to make sure we give you the resources you need.

So, if there is nothing else that needs to be said, this hearing is adjourned.

[Whereupon, at 11:15 a.m., the hearing was adjourned.]

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