

by Kimbra Cutlip

Jack Hayes

Director of the National Weather Service

UNIVERSITY OF ILLINOIS FLOWS RESEARCH TEAM



John L. "Jack" Hayes is the Director of the NWS. He began his career as an Air Force Weather Officer and later became the Commander of the Air Force Weather Agency and the director of the World Weather Watch Department at the World Meteorological Organization. In December 2011, partly in response to the devastating outbreak of tornadoes last spring, Hayes initiated a national dialogue of more than 100 leaders and stakeholders to develop a plan for improving the nation's resiliency against severe weather.

The NWS strategic plan calls for the building of a "weather-ready nation." What does that mean, and how far along are we toward that goal?

First, I'm really proud of where the profession has come, but the number of avoidable deaths and damage due to extreme weather is still far too high. In 2011 alone, we had over 1,000 people perish in extreme weather, and there were 12 weather disasters that each cost the nation a

billion dollars in damage with over 52 billion dollars in aggregate costs.

I think when we talk about a weather-ready nation, it's more than what the weather service does alone. We can't simply say, "Well, we put out our warning 20 minutes before that tornado got there. We did our part." It's about getting Americans to appreciate that there is a threat, to prepare a plan in advance, to be monitoring the potential for extreme weather, and then when

we put out that warning, to make prompt timely decisions and take effective action.

What actions are you taking in that direction?

Well, I'm heading out to a workshop right now where we're initiating a national dialogue to look at the whole process. We're involving media, emergency managers, and social and behavioral scientists. We want to find out how people learn. Are there are gaps in the way we present information? Do emergency managers understand the full impact of our forecasts on the decisions that have to be made?

In the Joplin tornado [May 2011], some people had become desensitized to our warnings. People said, "Oh, we hear those sirens all the time." Some of them wanted verification from friends that there was a tornado coming. How do we change that behavior?

I have high hopes that this meeting can result in us rolling out some new ideas and laying out a results-based action plan so we can work in partnership with a broad cross-section to improve the benefit of our timely, accurate warnings to the American people.

As a nation, where do we stand in terms of our forecasting capabilities?

Well, my friends in the World Meteorological Organization say the United States sets the gold standard. When I got into the business, back in the 1960s, the weather service put out a 24-hour forecast and it was considered a good thing. Now, we have hurricane track errors that are less than 100 miles at 48 hours out. Thirty or 40 years ago, when we saw a tornado, we put out a warning. Now, on the average, we're putting tornado warnings out with near 15 minutes lead time with a very high degree of fidelity. In the 1980s, I think we had just a few minutes lead time on a flash flood. Now we're up over an hour. So, we've made great strides—much of the improvements as a result of the modernization that took place in the 1990s.

Now does that mean we're ahead in every area? No. The Europeans are ahead of us in mid-range predictions—10 to 14 days. The European center for Mid-Range Weather Forecasting led the consortium I think of 18 nations to ban together to get out ahead of the United States. It's a healthy competition, but they are acknowledged to be

ahead of us. Our constraint is high-performance computing. Those nations have invested heavily in upgrading high-performance computing.

How does the current economic environment affect our ability to keep up?

In fact that's probably the biggest challenge I have—continuing our growth in high-performance computing to enable more accurate, longer range predictions in a tight budget environment. You are probably aware of the challenge we have with the expense of the joint polar satellite system and the GOES-R series. We need to sustain that while continuing to improve in areas where there is a significant benefit in terms of life and property. I think my challenge is that we recognize that the nation needs to address its budget challenges, and we've got to do our part.

How do you plan to address the challenge?

One way is to increase the efficiency with which we produce forecasts and warnings. Things like enterprise IT and partnership with the private sector will help us become more efficient. For example, an FAA study says about \$40 billion in economic loss takes place every year due to air traffic delays. I think about two-thirds of those delays are due to weather. If we could, by improving the services we provide the FAA and the airlines, cut that by one-third, think of the economic benefits. So, those are the kinds of things we're trying to do to support the budget challenges in the United States.

And we are doing it. We ran an experiment in five New York City airports in October, November, and December of 2009. We dedicated three forecasters at our forecast office in upper New York. With just those three forecasters focusing on air traffic control missions, we were able to cut the air traffic delays into and out of Newark in half, and across the entire New York City area by something like ten percent. When you think about the 600,000 flights a year passing through those airports, you're talking economic impact.

That difference came solely from having NWS forecasters on site?

Yes, it's about understanding how weather impacts traffic management decisions, and being able to communicate, in terms that the controller can

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understand, the effect weather is going to have and what confidence we have in that forecast. The bottom line is, there's a lot you can do even if you don't have a multi-million dollar investment simply by having staffing where we can reach out to the key decision-makers. More and more state and regional operation centers want us to embed a forecaster so they can better understand the threat that an impending weather event would have on decisions they have to make.

In fact, FAA has asked me to engage in some discussions about putting our employees back into the command center in Herndon, Virginia. They were there maybe 15 years ago, and they are now looking at finding a way to put them back as part of the government team in their air traffic control centers.

Do you see that supplanting private sector weather services for the FAA?

We're never going to be staffed in the federal government to do everything we can do for America. The Weather Service sees a very complementary relationship with the private sector. Some of it is a gray area, but over the past 10 years we've strengthened our partnership with Weather Channel, with Accuweather, with many distributors of information. Generally though, when there's a warning that goes out that could affect life or property—a hurricane warning or tornado warning—there's no second guessing what the NWS does.

We got a lot of credit during the 2007 EF-5 Greensburg, Kansas, tornado, because Greensburg was destroyed and yet there were only nine or 10 deaths because the community was prepared. Broadcast meteorologists were using our forecasts, our warnings, our radar imagery in alerting the public. It prompted action by individuals. It prompted the hospital to get the ambulances to a place where they wouldn't be destroyed. Those kinds of things save lives. In the private sector, there was a company that had a contract with the railroad that runs south of Greensburg. They were working in partnership with us, and they called the dispatcher of that railroad in Omaha, Nebraska, and had them put a hold on the train for about 45 minutes. That saved lives. It saved the train. To

me there's a visionary partnership where public and private sector are working together.

Does the NWS have a responsibility to educate the public about climate change and its causes?

We do have a role. Americans look at folks in the weather service as a trusted source of weather information and I think we have a responsibility to help people understand what, scientifically, we know about climate change. And there's much that we do know. We know that the atmosphere has increasingly warmed over the past 100 years, and we know that over the past 30 years, the cost of extreme weather events has increased significantly. We know that over the past 10 years, there seems to be an increasing frequency of certain things and an increasing intensity.

Now the causative factors, whether anthropogenic or natural variation, I think is a research question. I would prefer our people stay out of those. It's a difficult question for us on the operational side to address.

Looking to the future, you have said that space weather is becoming increasingly important.

Yes, building a space weather capability is one of the key challenges that I'm trying to face because it is becoming increasingly important. It can knock out the electronics of a satellite system, which can result in a cockpit communications loss if you fly transpolar, say to China or Tokyo from Chicago. It can disrupt power distribution. For example, in 1987 there was a solar event that triggered a power distribution problem in Quebec. The province was without the ability to sustain electrical power transmission for about 36 hours. As technology has grown, our vulnerability to these geomagnetic storms has increased. We're building systems that are more efficient at distributing power, as we should, but if we're doing that in a way that makes them vulnerable to things that happen on the sun we have to be very careful. W

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