

WRITTEN STATEMENT OF

**William B. Gail, PhD
Co-founder and Chief Technology Officer, Global Weather Corporation (GWC)
President-Elect, American Meteorological Society (AMS)**

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A Hearing on: Restoring U.S. Leadership in Weather Forecasting, Part 2

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Chairman Stewart, Ranking Member Bonamici, and distinguished members of the Subcommittee: It is a privilege for me to be present here today and provide testimony to you. Thank you for your invitation. My name is Bill Gail. I am co-founder and Chief Technology Officer of Global Weather Corporation, a provider of precision weather forecasts to businesses within the energy, media, transportation, and consumer sectors. I am also President-Elect of the American Meteorological Society (AMS), and I was a member of the recent National Research Council study *Weather Services for the Nation: Becoming Second to None* that recommended future directions for the National Weather Service. My academic training is in physics and electrical engineering and I have nearly two decades of experience in the fields of meteorology satellites, weather services, and location-aware software.

Though I'm speaking to you today from my personal perspective, I wear two hats: first as a voice of the weather community through my AMS position, and second as a member of that community building my own startup company. My company has been successful in today's difficult economy precisely because high quality weather information is increasingly needed by businesses across many industries to serve their customers and improve operations.

Let me first commend you for the attention you are giving to the topic of weather forecasting. Support for our nation's weather infrastructure pays off many times in benefit to the nation, and

legislation to accomplish that is wise. Properly crafted legislation, sufficiently comprehensive in scope and not overly prescriptive, can help achieve what I believe is a broadly supported objective of elevating the nation's weather capabilities.

A REVOLUTION IN SERVICE TO THE NATION

This is a tremendous time to be part of the weather community. We have the opportunity to serve the nation – our citizens and businesses – far more effectively than has ever been possible. The reason is simple. Our work involves three basic activities: observing the current weather, converting that information into forecasts, and getting the information to the people who need it. Over the last fifty years, this three-step process has been revolutionized. Starting in the 1960's, the advent of advanced observing systems such as satellites and Doppler radar gave us new ways to view current weather. Then in the 1980's advances in both computing power and modeling techniques began to make possible far more accurate forecasts of future weather. More recently, rapidly expanding Internet access and now smartphone ownership have allowed us to make great progress in delivering the right information to people and businesses - at the time they need it.

For us, getting to this point is a dream. After fifty years, the fruits of the weather information revolution are now within reach. We can finally start delivering on the ultimate vision: individualized weather information matched to every user's need, time, and place. With that, we in the weather industry can do phenomenal new things, not only for the nation but also as leaders in the weather market internationally. NOAA's newly-developed strategy, the *Weather-Ready Nation*, is nicely aligned with this vision.

Why is this important? We have all been touched recently by the tragic tornados in Oklahoma and the devastation of Superstorm Sandy. With Sandy, we were successful in anticipating an unusual westward turn toward New York City – it made a huge difference in our preparedness. In Oklahoma, we forecast with over 30 minutes lead time, but more accurate track estimates and personalized communications would have helped. Getting the right information to people and businesses at the right time is critical.

A GROWTH ENGINE FOR THE ECONOMY

We know more can be done to protect lives and property, and we must do so. But often forgotten is the importance of weather information as a growth engine for our economy. A recent study showed that, on a state-by-state basis, variability in U.S. economic output due to weather-related supply and demand inefficiencies averages more than 3 percent. In some states, it is over 10 percent. A significant portion of this can be recovered as economic growth through improved weather information. Doing so would be a huge boost to the nation's welfare. As we seek ways to grow our economy, better use of weather information can provide large returns from small investments. This is true across virtually all business sectors.

Many of us today, from academia to NOAA to the private sector, are focused on ways to accomplish this. I would like to provide three examples from my own company's experience reflecting innovative approaches to business growth through better use of weather information.

- The BH Media Group, owned by Berkshire Hathaway, has recently acquired nearly 100 small- and mid-sized newspapers. Their vision is that newspaper companies are not dying, but rather the best source of critical local information, which will be delivered by these companies increasingly over web and mobile. Accurate weather forecasts are often the most important information they provide to smaller communities. The move to web and mobile allows them to customize forecasts for each reader, creating new ways for businesses to become more efficient and individuals more productive. My company is helping them implement the vision.
- Xcel Energy is the off-taker utility for 10 percent of America's wind farm capacity. Starting in 2009, Xcel privately-funded R&D at the National Center for Atmospheric Research (NCAR), focused on improving the accuracy of wind forecasts. The resulting forecast system has since been successfully transitioned to my company. Its operational use saved \$22 million for Xcel ratepayers in 2012 alone.
- Telogis is a provider of information services to the commercial vehicle industry, including back office and in-cab navigation. They support nearly a million trucks in the

US. In 2011, this industry lost nearly \$18 billion dollars to weather-related accidents and delays, yet weather information is not routinely used by trucking companies. My company is working with Telogis to change that, providing atmospheric weather and road surface conditions for every mile of major road through interfaces that can be easily and safely used by truckers.

THE REMARKABLE WEATHER ENTERPRISE

None of this could happen without a remarkable collaboration between three organizational sectors: research entities including academia, government agencies such as NOAA and the DoD weather services, and the private sector. We refer to this as the American weather enterprise. Academic and research organizations are the foundation, providing the basic knowledge that drives innovation and the education for our workforce. Government agencies including NOAA provide the core data and forecast capabilities used across the enterprise. The private sector customizes information for end-users and delivers it across many channels. For example, though NOAA is the original source for virtually all weather information in this nation, today 95% of delivery occurs through television, websites, and apps from the private sector. By working together, this enterprise has greatly improved the quality of weather forecasting and the ability to deliver that information effectively. Collaboration allows us to be bigger than the sum of our three parts – a key reason for our success. Barry Myers of AccuWeather, in prior testimony to this committee, described the American weather enterprise as “better than anywhere on Earth”, and I fully agree with his statement.

This shining example of how government works productively with the academic and commercial sectors can be held up to other industries to help them do the same. But it has not always been this way. We have worked hard at making this happen. Indeed, we are entering what might be called the third phase of our enterprise. The first phase, through the 1990’s, was characterized by mistrust and competition, particularly between the government and commercial sectors. A decade ago a National Research Council report called *Fair Weather* laid out a process for fixing the situation, and the result has been dramatic. It led us into a second phase of the enterprise characterized by communication and mutual respect. We have made much progress as a result.

As we enter the third phase, much deeper collaboration is needed. We are just beginning to build the mechanisms that make this possible, such as a recent AMS-led pilot effort to identify enterprise-wide priorities for forecasting improvement. We need more collaboration like this if we are to meet the nation's growing needs.

AN ENTERPRISE-DRIVEN PATH FORWARD

A common criticism of our community has been the lack of a unified voice and clear priorities. It is a valid criticism. For nearly a century, the American Meteorological Society (AMS) has been the primary professional organization for those involved in weather. Other organizations, such as the National Weather Association (NWA), the American Weather and Climate Industries Association (AWCIA), and the American Commercial Space Weather Association (ACSWA) have more recently taken on leadership roles in various aspects of the community. AMS provides objective informational advocacy, but does not cross the line into legislative processes. Doing so would compromise our membership, a third of which works in the government sector. Though individual weather companies and organizations have long advocated for their particular needs, the enterprise has not had an organization that can bring Congress a unified plan with clear priorities.

We as a community recognized this shortcoming, and a proposal was put forth last fall to form a congressionally-chartered Weather Commission, similar to the successful Oceans Commission about a decade ago. This, some believed, would allow us to address policy issues at a level appropriate to their national importance. A group of community leaders, representing the private sector, academia, and non-profits, met in March at a summit in Dallas to consider this along with alternatives. AMS co-sponsored and facilitated the meeting. The Dallas group recently released a proclamation in which we agreed to a two-prong approach. In the near-term, we will build an advocacy organization called the Weather Coalition and use that as a voice for the community, particularly with regard to possible legislation. For the longer-term, we will pursue options for foundational change, including the possibility of a Weather Commission. The Dallas meeting was a milestone in our ability to speak with a unified voice. You will be hearing from the

Weather Coalition in the near future, and they will work with you on this legislation as it progresses.

The Weather Coalition, however, will be only the face of a much larger community-driven planning activity. Much of the planning input to guide the Weather Coalition will come from professional organizations such as AMS which have the broad membership to access and organize community thinking. For example, the AMS-led forecast improvement group, which I mentioned previously, brings together our three sectors to explore development of a joint plan for the nation's forecast capabilities. The resulting recommendations will be publicly available soon.

SELF-IMPROVEMENT

We are not without flaws as an enterprise. Over the last decade and more, we have struggled with our satellite system and worked to stay competitive with our European counterparts in weather forecast models. We have labored to build mechanisms that help us collaborate across the enterprise and speak with a single voice. NOAA in particular has faced challenges in areas such as the transition from research to operations. These issues have been openly documented in reports from the National Research Council, the National Academy of Public Administration, and NOAA's own Science Advisory Board.

Such reports reflect broad input from the community and professional advisory groups. To progress, we do not need to wait for more studies. It is time to build on those we have and start implementing the changes needed to fulfill the vision, including NOAA's *Weather-Ready Nation*. Legislation that can accelerate this, and in particular motivate the cultural and organizational changes within NOAA recommended in these reports, is welcome. Moving forward, additional planning guidance will become available from the Weather Coalition and other sources.

STRENGTH IN OUR BREADTH

I have talked mostly in terms of weather for the sake of simplicity, but it is important to realize how our strength derives from a breadth of disciplines. For example, we increasingly recognize that space weather is a fundamental counterpart to atmospheric weather. Hydrology and oceanography are key sister disciplines. Disciplines such as coastal meteorology have specific but essential roles.

Climate must be included. For the real world in which my company operates, weather and climate can't be separated. There just is no good place to draw a line between them. Should we forecast weather out to two weeks, but no longer? Businesses would not like this - forecasts for coming seasons are enormously valuable to companies in energy and agriculture. The travel and leisure industries take an even longer view; they can benefit directly from improved forecasts of the El Niño cycle even years ahead. Construction companies need to anticipate flood zones and coastal erosion decades out. Businesses want to anticipate weather on time scales from months to years, human influence or not. Our commodities markets – from heating oil to orange juice – could not function without seasonal climate forecasts. Whether it is a military strategist analyzing regional vulnerabilities, or simply one of us planning a sunny day for our daughter's wedding a year ahead, information about climate and its variability is central to the nation's wellbeing.

Put simply, understanding the fundamentals of climate variability is essential to forecasting weather. What we learn from climate modeling significantly improves our weather forecast skill. Arbitrarily distinguishing between weather and climate makes no sense. Rather than dividing the weather and climate communities, we need to bring them together to improve forecast accuracy at ever-longer timescales.

EFFECTIVE LEGISLATION

The issues we must address to make progress are not simple. The problems are interlinked and the solutions require collaboration across many elements of NOAA. Increasingly, this collaboration must be extended to include the enterprise as a whole. The proposed *Weather*

Forecast Improvement Act of 2013, while admirable for taking on an important part of the problem and furthering the goal of forecast improvement, is both too limited in scope and too prescriptive to accomplish what the nation deserves. I urge you to consider legislation that broadens what you have started - building it on existing recommendations from advisory bodies such as the National Research Council, reflecting ongoing input from community-based organizations such as the Weather Coalition, and coordinating across other Federal agencies as needed.

In saying this, I do not want to preclude passage of more focused legislation as a step toward that broader goal. Either way, the leadership of our community, including those within NOAA, should be encouraged to innovate and to bring forth new ideas for improving how we work. A truly novel approach to public-private partnerships that enables low-cost use of commercial data – not just the old data buy paradigm - is but one example. Rather than prescribing specific methodologies, legislation that promotes broad innovation in response to community guidance, and provides the resources to accomplish it, would produce results.

IT'S THE PEOPLE

Unlike most people who have the honor to serve as AMS president, my career has not been entirely within the field of weather or climate. In addition to weather, I have also worked in consumer software and satellite construction, serving commercial, scientific, and military customers. That gives me a bit of an outsider perspective. My experience is that the people in this field – and I enthusiastically include those in NOAA – are the most dedicated, passionate, and innovative people I have ever met. To a person, they have one focus: make the nation safer and more productive. That commitment to integrity is a rare quality today. In your role as legislators, this can be leveraged to improve our nation. Give these people your legislative support, and they will return the favor many times over.