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No challenge poses a greater threat to future generations than climate change. 2014 was the planet's warmest year on record. Fourteen of the fifteen warmest years on record have all fallen in the first fifteen years of this century. And the best scientists in the world are all telling us that our activities are changing the climate. The Pentagon says that climate change poses immediate risks to our national security. We should act like it.

Welcome to "Climate Change: A Global Reality." I'm John King. We've got a great group on hand to discuss this critical issue, but let's begin with a definition... That's a definition to get us started.

Holly Bamford, from the government perspective, the research perspective, the National Oceanic and Atmospheric Administration perspective, what does that mean? Make it real for people watching, that definition. Does that mean sea level is going up, the temperature is going up?

That's a good definition to start with. People confuse, sometimes, weather with climate, and they say, "Well, the weather today doesn't mean that the climate is changing." You have to look at it from a long-term, decadal, century perspective, and that's what we do at NOAA. And the reason we have to care is one word, and that's impacts: impacts that we see as a community, impacts we see to the environment, and impacts to the economy that we depend on. Straight up front, answer the naysayers, the person who says this is cyclical, this is not man-made, the science is phooey. Right. No, when you look at the trends, we are seeing, for example, the oceans are getting more sick, the sea is rising around the country and in the Gulf, the droughts are continuing, and we're seeing heat waves. So these aren't little spikes. When you actually get the long-term trends, scientifically we're seeing changes in ocean conditions and climate conditions. But the more important thing is not necessarily why it's changing, but those impacts we see as a community.

To give you a perfect example, back in the '80s, two storms cost this country a billion dollars. Today, we're seeing double digits, and even when you normalize it at the consumer price index, you are seeing double-digit, billion-dollar disasters caused by climate and weather events. As a country we can't afford billion-dollar disasters. We have to think about prevention and protecting communities for the future.

Dr. Mark Mitchell, you work in the public health sector, including being part of a pioneering study of healthcare professionals. From that study and your work, what's the headline? What is the single biggest impact on public health? Is it one particular illness?

George Mason University and the National Medical Association did a nationwide study of African-American physicians in the National Medical Association, and we

found that 88% of them are seeing health effects, and the effects are very, very different, and this is across the country. The number one issue that they're seeing is 88% are seeing injury from severe weather, which was quite a surprise to us. And they're seeing it from different severe weather in different parts of the country. For example, on the West Coast, we're seeing inhalation of fumes from the wildfires and also from dust that's blowing from the drought. In the East, we're seeing a lot more snow and injuries from backaches and shoveling more snow. In the Midwest, from the floods, getting the water out.

But we're also seeing a lot of other types of things. We're seeing the things that you expect, like the allergies increasing, the seasons are increasing, the number of people with allergies, and our physicians are complaining. So we're also seeing asthma from mold and also from air pollution. We're seeing increases in chronic disease, such as if you have a preexisting cardiovascular or respiratory disease. More than 80% of our physicians are seeing increases in that. They didn't see that ten years ago. Is this across the board, sir, or is it isolated among low-income people, a group that's at particular stress already, maybe older people? Well, it is across the board, but there are certain groups that are more at risk, and that is younger people, older people, people with preexisting illness, and low-income people tend to be at highest risk for these diseases.

Okay, we'll continue. Cynthia Cory, you're from what I'll call ground zero in this debate. You work with the California Farm Federation. We've seen in the state the horrible drought. You had a governor who already was trying to reduce greenhouse gas emissions who now wants to go even further. In conversations with farmers, you have tensions. The governor says we have to do these things: water restrictions, more greenhouse gas restrictions. What do farmers say? Can they survive with these restrictions?

We're looking at voluntary reductions on farms and ranches, and it's a much better way to go. The governor is very much behind it. When he announced his reduction, our 40% by 2030 below 1990 levels, which was just announced recently, he also gave \$80 million to agriculture, which is the first time this has happened. So it's very active right now, and we're seeing some very exciting things happening to give voluntary incentives to farmers and ranchers to make reductions on their operations.

You say exciting things happening. Are there scary things happening? Are farmers going out of business in large scale? Is that a risk?

Our farms and ranches are getting up and moving. We've lost 500 dairies in the past five years, and it's economy of scale, and it's a lot of things. It's a market; it's recession. It's not just climate change and water, but all these things together do make some very scary times. And we do have recognition that we want to continue to grow the fruit and vegetables that we supply the nation. Over 50% of the fruits

and vegetables for the nation come out of California. It's important for food security reasons that we support agriculture, and I think we're getting there.

Milton Bluehouse, you're a Native American from the Navajo Nation. Native Americans have a unique spiritual, cultural connection with the land. Do you see it in your community? Do people talk about climate change? Is that a subject of conversation?

When we talk about native peoples, we really are looking at a perspective in which the earth and the environment heal and that the environment is a religious, cultural resource. And so when we see the impacts of the science and what changes are occurring in the land, it really has an impact on who we are as native peoples, our religion, and our faith.

Take me to the ground on that point. Do you see specific plants or species that are critical to your faith and community that others might not understand? Is it water?

Yeah. For example, we had a young lady come back from Afghanistan and another young gentleman come back from Iraq, and from Navajo cultural and religious perspectives, people who come back from combat are to be healed before they come into the community, primarily from posttraumatic stress disorder, and these religious practices go way back when, in terms of indigenous understandings of how the world came to be. And a plant that is very central to that ceremony is no longer available where my grandfathers and my uncles, who are medicine practitioners, had gone to pick these plants. We have to go higher now. They are no longer readily available in places where we used to pick them. But when we look, say, in Alaska, there are nearly 200 Alaskan native villages who are now impacted by climate change, and it is quite dangerous for these Alaskan native peoples to go out onto the ice for fear that it would break through. It is something that we think about constantly in terms of what is going on to the earth, what are the observations we're making to the impacts on our religious and sacred items that we use for ceremony. That's fascinating.

Jack Moyer, your expertise is in infrastructure, specifically water systems. Mm-hmm. Are we prepared?

After 9/11, there were Homeland Security conversations about infrastructure. Is our water-delivery system-- and tell me if I can't nationalize this-- but is it resilient? Is it adapting to what scientists tell you is coming down the road? The short answer is no. There are a number of ways in which our infrastructure is not prepared for climate change. Like a lot of critical infrastructure sectors, we have a \$1.3-trillion price tag on infrastructure upgrades we already need to do, the aging infrastructure. The great news in our business is water mains last for a hundred years in the ground. The bad news is a lot of 'em are a hundred years old now. According to the American Water Works Association and the American Society of Civil Engineers, it's going to cost us \$1.3 trillion to catch up. Then many of our utilities have

undercharged for their water and wastewater services. They charged for treating and pumping, but they weren't charging for reinvestment in the infrastructure, so they're financially behind in order to do that. Then we have traditional preparedness work, the Superstorm Sandy's and events like what just happened in Texas, where a drought suddenly turned into a flood, that we need to continue to prepare for. That's the space in which I primarily work. Many of our facilities are near water. We're taking water out, putting it back, so our facilities are vulnerable to sea level rise.

Finally, the great swings we're beginning to see in supplies with droughts like in California. We have a long way to go to be prepared for those swings. And in terms of awareness among the influencers, if you're a water system and need to raise rates to pay for infrastructure, politicians have to approve that. If you need state money or national money, politicians have to approve that.

How much does the political debate about whether the science can be trusted or to what degree man is responsible get in the way of the 10-, 25-, 30-year infrastructure plan you say is necessary? Whether you agree on the big concept of climate change and global warming or not, we all at least need to agree that we face a problem we need to work together on.

Dr. Ragster, you're with us from the Virgin Islands, beautiful and one of our territories. Give me the island perspective, your neighborhood's perspective. Are your challenges and your needs different than, say, Charleston, South Carolina, or I grew up in Boston, Massachusetts, or Native American land somewhere out in the West?

I think one of the biggest challenges when you start talking about the territories is that none of them are very near to the mainland. So Guam, American Samoa, Puerto Rico, U.S. Virgin Islands, all of us have issues that you would find in small coastal islands on the mainland, but you can't drive across on a bridge to do some of the fixes that may be necessary. So all the islands, both on the Pacific and on the Atlantic side, have to deal with severe climate change issues that are beginning to show up very fast. Our islands are small enough so that the entire island is a coastal area. So even though there may be a mountain in the middle, all of it basically is coastal. You have to figure out what you're going to do with people if you lose space. It's a discussion that the country isn't ready to think about yet, but people in those places need to think about it.

Does the fact that the islands, most of them, are so dependent on tourism dollars, does that make it easier to get people's attention to do things, or does it make it harder because changing that coastline, stopping things maybe, stopping development, or slowing development is economic impact?

Well, I probably will get in trouble for saying that we are very high on the list of people that are in denial. Because tourism requires you to have the infrastructure,

the environment in place, the coastal areas to be working, you would think that we were thinking about doing something different, and we are not thinking about it that way. We should be thinking about economic diversification in a different way. We should be thinking about where you're going to move people. Those questions are going to start coming up. So it's beginning to show up on people's-- in their backyard or on their doorstep. But I think we haven't, as a community, come together to figure out exactly how to address this, and that's one of our biggest challenges.