

Congressional hearings: Science, infrastructure are needed for El Niño

by Marsha Freeman

At a hearing on "Preparing for El Niño," held on Sept. 11 by the Subcommittee on Energy and Environment of the House Committee on Science, it was made clear that while the causes of the periodic weather fluctuations known as El Niño are not known or understood, it is the case that research, analysis, and improvement of basic infrastructure, can help mitigate its effects, saving lives and reducing damage to property.

Responding to both indications of the start of an El Niño cycle from scientific observations, as well as hyperbole and scare stories in the press, the leadership of the committee invited scientific experts and government officials to inform the members as to what can be expected over the next year, in terms of weather effects from El Niño, and what can be done.

The Congressmen were also responding to the latest assault on the scientific resources of the nation by the Conservative Revolutionaries, who have already emasculated the capabilities of government-funded institutions, such as the U.S. Geological Survey.

After the House of Representatives unanimously passed House bill 1278, which authorized full funding for the global weather programs carried out by the National Oceanic Atmospheric Administration (NOAA), the Commerce, State, and Justice Subcommittee of the House Committee on Appropriations cut \$4.9 million from the Tropical Ocean and Global Atmosphere (TOGA) program, through which the observations of weather anomalies, such as El Niño, are monitored.

In opening the hearing, subcommittee chairman Ken Calvert (R-Calif.) reported that he is working with the leadership of the Appropriations Committee "to ensure the funding is included in the final version of the bill." All of the witnesses, and a bipartisan representation of committee members present, encouraged the chairman to do so.

At the hearing, Rep. Zoe Lofgren (D-Calif.) said she would introduce an amendment to the appropriations bill to restore the money, if the full funding for the National Oce-

anic Atmospheric Administration is not included. Lofgren stated that in the 1982-83 El Niño event, the severe weather resulted in 14 deaths, and an estimated \$265 million in damages, in the state of California.

Lofgren said that she thinks it is wise to take appropriate steps to prevent such as tragedy, since the coming El Niño could be severe. "The Army Corps needs to gear up to clear flood control channels," and take other steps to prepare for severe weather, she said.

As all of the witnesses agreed, scientists can only make general predictions about the possible effects of El Niño. But, as Douglas Wheeler, secretary of the California State Resources Agency, said, "We are planning for the worst, and hoping for the best."

Investment in infrastructure

Scientists from the Scripps Institution of Oceanography, Woods Hole Oceanographic Institute, and NOAA testified that there is a 60-70% chance that southern California will receive between 150-300% of normal rainfall in the coming year. This estimate is based on a comparison of the 4-10°C rise in Pacific Ocean temperature that has been measured this summer, with the effects produced in previous El Niño events. The large spread of estimated change over normal rainfall is a reflection of the fact that there is little agreement among the models being used.

California provides a good test case for making sure that sensible investments are made to mitigate the effects of increased rainfall next year. In his testimony, Wheeler stressed the need for Federal support for preparedness. He pointed to the fact that the state had called on the U.S. Geological Survey earlier this year to "expand its surface water data collection program so that we might obtain better, early data about flood threats. Unfortunately, the Federal government indicated that such expansion was unlikely due to budget limitations."

The state does seem to be getting better cooperation from the Army Corps of Engineers. It has requested that the

Corps use its "PL-84-99 Advance Measures" authority to restore portions of the Sacramento/San Joaquin Flood Control System, damaged in the January 1997 floods, that have still not been repaired.

Representative Calvert also stated at the hearing that work is being done by the Corps on the Santa Ana River, where one dam is being improved, and a new one is being built. Clearly, this is the kind of reinvestment in infrastructure that is the only protection, at this time, from severe weather. Otherwise, the best that was suggested at the hearing was that people be given an incentive to purchase flood insurance.

Research needed

NOAA, along with other Federal agencies, most notably the National Aeronautics and Space Administration, has pursued a long-term research program to gather data in order to understand the coupling between the oceans and the atmosphere, and how weather and climate are created.

From 1984 to 1994, the TOGA program brought together oceanographers, atmospheric scientists, meteorologists, and others in this effort. Eighteen countries participated in TOGA, which set up an observational system spanning 10,000 miles of the equatorial Pacific Ocean, to support real-time monitoring of ocean surface and underwater temperatures, using a complex of moored buoys, drifting buoys, tide gauge stations, ship-based observations, and satellite data.

It is the data from this set of observing instruments that has been used to forecast the outline of the current El Niño, by comparing new information developed through TOGA to El Niño cycles of the past.

The TOGA program formally ended in 1994. In 1995, NOAA wanted to move its capabilities from the research to the operational stage, but the Republican Congress cut \$14 million from the overall NOAA budget, making that impossible. The \$4.9 million request in this year's budget is to move the TOGA technology into the operational stage. This would free up research money for the establishment of observing systems in the Atlantic and Indian oceans, and to develop more advanced technology for observation.

As spokesmen from NOAA and the science institutes stressed at the hearing, the most dramatic effects of El Niño are seen in South America and Asia-Australia, not in North America. J. Michael Hall, director of NOAA's Office of Global Programs, stressed that there are two other "modes of variability," beside El Niño, that affect changes in the weather in the United States. These are the Pacific Decadal Oscillation and the North Atlantic Oscillation, which are "very poorly understood at present."

Countries that could be the worst affected by an El Niño event are trying to pool their resources. While the estimates of damage in the United States in 1982-83 were \$2.5 billion, the global damage was estimated at over \$8 billion. At the

suggestion of the National Research Council, NOAA has convened a forum with 40 countries to launch the International Research Institute for Climate Prediction. In addition, during the week of Sept. 8 there was a meeting in Zimbabwe to discuss the Southern African Climate Outlook, and determine whether it is possible to forecast any anomalies in the dry and rainy seasons upcoming.

Global warming is *not* the cause

One of the scare stories that is being promoted in the press, is that not only will this El Niño cause all manner of death and destruction, but it is being driven by man-made "global warming."

Chairman Calvert asked the witnesses at the hearing whether there had been an "overreaction in the media." *Time* magazine, he pointed out, had published an article warning of landslides, floods, and more.

Dr. Tim Barnett of the Scripps Institution of Oceanography replied, "This worries the hell out of me. What's lost [by the media] is the statement of uncertainty. There is an overreaction, and I worry about that."

Rep. Dana Rohrabacher (R-Calif.), who has been very skeptical of global warming and other climate catastrophe predictions, asked the witnesses whether El Niño is a new phenomenon, come in modern times. Dr. Barnett replied that it had been "written about in the logs of the Spaniards when they came" to the New World. He added that there is evidence of these severe weather shifts in ice core data.

Pursuing the point, ranking Committee Democrat George Brown (Calif.), until now, an enthusiastic promoter of global warming and other climate change scenarios, agreed with Dr. Barnett, that "global warming, if it does exist at all, is more recent" than El Niño. Dr. Barnett responded that there was a "mammoth" El Niño in 1918, "and no one would argue that this was global warming."

In the future, NOAA hopes to expand its long-term observations in other tropical regions, in order to encompass the major precipitation regimes of the globe, including the monsoon regions of the Americas, Africa, and Asia-Australia. The data that are collected will all be worthwhile for studying El Niño.

At present, forecasts can be made regarding El Niño, only once the warming of the equatorial Pacific Ocean region has started. Because the cycles come on an *average* of four years, but can occur in intervals from three to seven years, there is no possibility of doing any long-term forecast until there is an understanding of the cause of the phenomenon.

As was stated by Dr. Barnett at the hearing, "There is no agreement on what causes it. What sets it off, no one knows."

Dr. Hall from NOAA concurred, saying, "There is a great deal about global climate effects that is not known."