

## FEMA Launches Effort to Measure Impact of Climate Change on Flood Insurance

by *The-New-York-Times*

ORLANDO, Fla. -- Federal officials are struggling to calculate the fiscal impact that climate change could have on the nation's troubled public flood insurance program, amid predictions of intensifying downpours and more potent hurricanes. The mission is proving extremely difficult, according to one researcher, who said the effort so far has failed to reveal even "squishy assumptions."

The study, undertaken by the Federal Emergency Management Agency, which runs the insurance program, aims to determine how seawater will surge onto shorelines around the United States as warming oceans expand and rise. It also seeks to establish how warming temperatures will affect inland flooding nationwide, potentially revealing the likelihood of more damage in some riverine areas.

The results might raise policy premiums and mark a need to redraw flood lines that may place more homes in the riskiest parts of valleys and flatlands. Those changes are politically tricky, and the study could press lawmakers to make unpopular decisions that have an economic impact on their states.

Mark Crowell, a FEMA geologist who is overseeing the study, said it may be "one of the most important" analyses undertaken by the agency over the next several years. "It is imperative to understand how climate change can impact the National Flood Insurance Program," he said.

The insurance program has been criticized by environmentalists for offering policies -- and sometimes prices -- that encourage people to build homes in flood-prone areas. The study could answer complaints about the program's use of historical records to ascertain risk by providing future estimates of flood damage in a warming world.

That could drive changes to building codes, raise insurance premium prices and shift determinations of where development may be allowed -- all projected on potential impacts of climate change through 2090.

'Controversy regardless of the outcome'

The study will analyze three areas: the effects of global warming on inland floodplains and on coastlands, and the risks that sea level rise poses to the program. Each geographic area will be divided into regions, where specific outcomes will be modeled. The nation's interior, for example, will be divided into about 20 regions.

The findings are expected to be released next March. That could spur big changes. For example, the line where 100-year floods have traditionally stopped might encroach on new territory, pushing more residential areas into flood-prone zones regulated by FEMA. That can create headaches for citizens and developers by adding costly steps to construction. Public officials could make a flap about declining tax revenue and economic development.

But the project could also buttress the sprawling public program -- currently \$19.2 billion in debt from previous storm losses -- against taking on more climate risks. The study might also have some good news: It could predict less flooding in some areas. Overall, scientists predict the United States will become drier, while experiencing heavier rainstorms.

"The results could produce controversy regardless of the outcome," Crowell told a group of engineers attending the Association of State Floodplain Managers' annual conference.

First signs of planning for the future

FEMA is tackling the study as experts predict dire and expensive consequences. Inland areas might become drier overall, reducing vegetation along traditional water channels and making them less likely to contain flash floods from heavier rains, said Michael Anderson, a certified floodplain manager.

"You could expect your floods to be bigger," he said, noting that levees could be destabilized as vegetation disappears from the earthen mounds. "That could mean more failure of structures."

The study also seeks to establish the rise of seawater over storm surge levels. That could mean that waters whipped ashore during hurricanes might reach farther inland and higher into homes already exposed to damage.

It's unclear exactly what action, if any, could result from the findings. But defensive plans need to be laid soon, said Jerry Sparks, a certified floodplain manager with the consulting firm Dewberry.

The United Nations' Intergovernmental Panel on Climate Change predicted in 2007 that seas could rise between 7 and 23 inches by 2100. More recent computer models forecast higher water marks. That would leave some low-lying areas underwater, said Sparks, who recommends that states impose regulations to raise

structures above the reach of future sea levels.

Some huge unknowns

"If you want your house to last 50 years, you need to understand sea level rise and other things may change the hazard," he said. It's unclear how far the FEMA study will go to pinpoint specific effects of climate change on flooding -- let alone whether it will recommend specific policies for safer building.

Researchers are using data from the IPCC and the U.S. Climate Change Science Program to determine the climate risks to the insurance program. But there are glaring omissions in the overall knowledge needed to accurately depict the effects, says David Divoky, an expert with the consulting firm AECOM and the study's lead researcher.

Detailed information about population growth is unknown, for example. So are the frequency, severity and location of future hurricanes, all of which can create large variations on the impacts on the flood insurance program. "There may be no solid projections. We're not even coming up with squishy assumptions," Divoky told an audience at the floodplain managers conference. "This whole thing is not what a sensible person should do."

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