

## **Why did Juan hit so hard? Scientists baffled why storm's impact so much greater than forecasters predicted**

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By Murray Brewster / The Canadian Press

Scientists in Canada and the United States are struggling to unravel the mystery of why hurricane Juan caused damage far above its reported strength.

As it made landfall near Halifax last September, Juan was designated a Category 2 storm but ended up causing a level of damage more consistent with a stronger Category 3 storm, said Peter Bowyer, a senior meteorologist with Environment Canada.

For decades, hurricanes have been measured on the Saffir-Simpson scale, which ranks storms from one to five based on intensity.

"Everyone's asking why this scale didn't work for us and we don't know," said Bowyer.

The scale was developed to help predict the level of damage and localized flooding.

"If we aren't able to give people some idea of what the impacts are going to be, there's no point in even categorizing a hurricane," said Bowyer.

"You may as well just tell them: Look, there's a hurricane coming, the wind are going to be 170 kilometres an hour. But people want to know what that means. What's that going to do to my house? What's that going to do to my trees?"

Researchers at the U.S. National Hurricane Center in Miami have done their own analysis of the storm but focused more on why the hurricane didn't lose strength as it approached cooler Canadian waters. They expect to further review the data with the aim of explaining the level of damage.

Juan brought winds of 158 kilometres an hour, with gusts reaching up to 185 kilometres. It caused over \$100 million in damage - toppling huge trees, downing power lines, destroying wharfs and barns, and forcing storm surge evacuations along the coastline.

All those conditions fit what scientists classify as Category 3 damage.

Yet when it came to wind speed, Juan was barely a Category 2 storm. That's defined by sustained winds of 154 to 177 kilometres an hour, causing "considerable damage to shrubbery and trees with some trees blown down."

Bowyer suggested that the composition of the province's forests, such as the age or density of tree stands, might have contributed to the exaggerated level of damage.

But those in the forest industry discount that theory, saying there is nothing in the makeup of the trees - or the soil - that would explain what happened.

Dave Sutherland of the Nova Forest Alliance said the storm seemed to target mature or overly mature trees and certain varieties.

"Red spruce seemed to catch the wind during the hurricane and were blown down (more often)," said Sutherland, whose organization runs a model forest in Stewiacke.

While it's too early to draw conclusions, Sutherland said foresters have noticed that areas of silviculture - woodlots that have been managed and thinned - took a beating more so than uncultivated areas.

But he said that the peculiarities of the storm contributed most to the damage. "We noticed how some stands were completely flattened, but others a few yards away were left standing," said Sutherland.

The hurricane produced "wind bombs" - or mini-storms within the storm - according to research by the province's Natural Resources Department.

Sutherland said the phenomenon can best be described as a series of mini-tornadoes that appeared and disappeared as the storm plowed over Nova Scotia and P.E.I.