THE DEVELOPMENT OF A STORM DAMAGE ESTIMATE CALCULATOR

Brenton W. MacAloney II
Performance Branch, Office of Climate, Water, and Weather Services
National Weather Service Headquarters, Silver Spring, Maryland

History of Storm Events Damage Estimate Collection

Storm data is the National Weather Service's (NWS) official record of severe and unusual weather events occurring in the United States (US) and territories. Each event logged in *storm data* has numerous attributes including location, date/time, and intensity, as well as estimates on how much property and crop damage was caused by the event.

Although *storm data* has been collected officially by the NWS since 1959, the amount of detail and accuracy of the property and crop damages entered has varied greatly throughout the years.

From 1959 to 1995, Storm Data Focal Points (SDFP) assigned a "damage category" to all events logged in *storm data*. Although the categories provided feedback on the order of magnitude of damage caused by the event, it allowed for a wide variance in the "real value" as shown in the table below.

Cat 0 = $0	Cat 5 = $50k - $500k
Cat 1 = $0 - $50	Cat 6 = $500k - $5M
Cat 2 = $50 - $500	Cat 7 = $5M - $50M
Cat 3 = $500 - $5k	Cat 8 = $50M - $500M
Cat 4 = $5k - $50k	Cat 9 = $500M - $5B

In the 1996, modernization of *storm data*, the NWS abandoned the categorical damage values and began requiring SDFPs to log actual values for damage.

Current Method of Collecting Storm Damage Estimates

The NWS currently uses a web-based application named "StormDat" to log all severe and unusual weather events. NWS policy on Storm Data Preparation[1] states: *"Property damage estimates should be entered as actual dollar amounts, if a reasonably accurate estimate from an insurance company or other qualified individual is available. If this estimate is not available, then the preparer has two choices: either check the "no information available" box, or make an estimate. The exception is for flood events. The Storm Data preparer must enter monetary damage amounts for flood events, even if it is a 'guesstimate.' The U.S. Army Corps of Engineers requires the NWS to provide monetary damage amounts (property and/or crop) resulting from any flood event."*

Below is a screen capture of the interface SDFPs use to log damage associated with each event.

[1] NWSI 10-1605, Storm Data Preparation, is available for download at:
http://www.weather.gov/directives/sym/pd01016005curr.pdf

Limitations of Current Storm Damage Estimate Collecting Method

Although the 1996 modernization of *storm data* greatly improved the damage estimates, a new challenge in estimating damages was introduced. SDFPs began experiencing difficulty securing damage estimates for the weather events they were responsible for entering into *storm data*. These difficulties stemmed from lack of information available to them at the time events were logged in StormDat.

In 2008-2009, in collaboration with the NWS's Performance Branch, a two-part survey was conducted by Emily K. Laidlaw, Jeffrey K. Lazo, and Nathaniel F. Bushek of the National Center for Atmospheric Research's (NCAR) Societal Impacts Program (SIP) on the NWS's *storm data* loss estimate methodology[2]. The survey was given to Warning Coordination Meteorologists (WCM) and SDFPs in the NWS. The main goal of the survey was to get a better understanding of the processes used to make monetary loss estimates in *storm data*. Once the process is better understood, NCAR would providing feedback to the NWS to help improve *storm data* motivation and training, and increase the consistency and quality of data being entered into *storm data*.

Of those who took the survey, results showed that 81% felt they sometimes had insufficient access to information needed for making reliable loss estimates. "No information available" was recorded for loss estimate by 69% of those surveyed at least "sometimes" in the past year, even though they knew or suspected there were monetary losses. Loss estimate of $0 were recorded by 52% of those surveyed at least "sometimes" in the past year, even though they knew or suspected there were monetary losses. Finally, 41% felt that they "significantly underestimate" damages estimates entered into *storm data* and 38% felt they "slightly underestimate."

When asked what additional resources would help with entry of more accurate storm damage estimates, an overwhelming amount pointed to better information sharing, training, software, and guidance as shown in the graphic below.

Mean Usefulness of Additional Resources
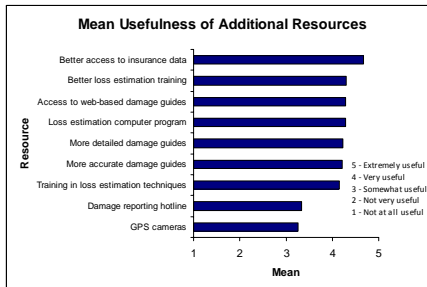
[2] Laidlaw, E., Lazo, J., and Bushek, N. (2010, April). *Results from an Assessment of the National Weather Service's Storm Data Loss Estimation Methodology.* Presented at the 2010 Storm Data Users Meeting, Ashville, NC.

Storm Data Users Meeting

Since 2004, the NWS has been holding Storm Data Users Meetings (SDUM) annually at various locations around the Nation. The meetings are typically two to three days in length and are free to attend for anyone who currently uses or has an interest in *storm data*. The SDUMs serve as a forum for NWS employees to interact with internal and external users of the *storm data*. Topics typically discussed at the SDUM include:

- How *storm data* is used by those in attendance
- Methods in which *storm data* can be improved from an accuracy and usefulness dissemination standpoint
- New technologies being developed for the collection, storage, and dissemination of *storm data*
- Evolving needs of *storm data* users
- Recent studies and analyses using *storm data*

Results of the 2010 SDUM Regarding a Damage Calculator

2010 Annual Storm Data Users Meeting
April 27 - 29, 2010
Asheville, NC

Based on the findings of the NCAR SIP survey, the NWS decided the first step that should be taken is to design a Storm Damage Estimate Calculator (SDEC) to be implemented in a future version of StormDat. The SDEC would give every SDFP an extensive categorical reference guide to assist in generating damage estimates. In addition to assisting SDFPs in the derivation of better storm damage estimates, the SDEC would allow the database to show greater detail in the type of damage occurring. The method on how to best develop the SDEC was discussed in detail at the 2010 SDUM in Asheville, NC.

The SDUM attendees decided there should be three basic categories, with several sub-categories under which all storm event damage reports should be organized. These categories are outlined in the table below.

Main Categories	Sub-Categories
Personal and Non-Profit (Private) Property	Automobiles / Vehicles
	Homes / Residences / Structures / Contents
	Land / Property
Commercial Property	Agriculture
	Transportation / Vehicles
	Construction Equipment
	Utility
	Structures / Contents
Public Property (GOV)	Structures / Contents
	Infrastructure
	Public Transportation / Vehicles

Within each category, pre-populated estimates of how much it would cost to fix or replace damaged items. For example, if an area experiences an ice storm and the office receives a report of 200 telephone poles damaged, the SDUM would have the ability to go into the SDEC, enter that information and an estimate would be produced on the cost to replace 200 telephone poles by the utility company.

The Next Steps

In spring 2011, the NWS will form a team to develop an initial version of the SDEC. The team will consist of those in the weather, insurance, academic, social science, agriculture, emergency management, and disaster assistance communities. The team will be led by the Storm Data Program Manager in the NWS's Performance Branch.

The first task for the team will be to review the damage categories brainstormed by the attendees of the 2010 SDUM meeting. After the list of damage categories has been finalized, the team will begin organizing a list of damages typically seen as a result of weather. This list will include a monetary range of values typically incurred to fix or replace the items damaged by weather. For example, "The cost to completely replace a telephone pole is in the range of $500 - $1500."

The team will also explore various avenues in which monetary loss estimates and damage reports can be made more readily available to the SDFP at the NWS. The desired outcome is a partnership in which damage estimates associated with weather flow into and out of the NWS.

Finally, the team will work to develop training to be given to SDFPs on how to use the SDEC.

How You Can Help Improve Damages in Storm Data

Improving the usefulness and accuracy of information logged in *storm data* begins with the development and implementation of a robust storm damage estimate calculator in the StormDat program. The development of such a calculator cannot be done without the help of those involved in the insurance, academic, social science, agriculture, emergency management, and disaster assistance communities.

If you are interested in playing a vital role in the development of the storm damage estimate calculator, which in turn will lead to more meaningful damage estimates, the NWS wants to hear from you. Please contact Brent MacAloney using any of the contact methods found below.

Contact information

Brenton MacAloney II
Meteorologist, Performance Branch
National Weather Service Headquarters

Mailing:
1325 East West Highway
SSMC2, #14401
Silver Spring, MD 20910

Telephone:
301-713-0090 x135
E-mail:
Brent.MacAloney@noaa.gov