Results from an Assessment of the National Weather Service's Storm Data Loss Estimation Methodology

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Motivation

- Extreme Weather Sourcebook
  - Reliability and validity of data
  - Most data from Storm Data

- Not much information on Storm Data generation outside of NWS

- Storm Data and other damage data used to:
  - Examine trends in intensity and frequency of impacts
  - Ensure cost effectiveness of government-funded efforts
  - Resource for media & public

- Used without consideration of data quality issues

- Storm Data represents best infrastructure for a national monetary damage database
Goals of the Project

What we wanted to do

• Increase understanding of the process of making Storm Data monetary loss estimates
• Provide feedback to NWS to help improve Storm Data motivation and training
• Ultimately increase the consistency and quality of the data being entered in Storm Data

What we didn’t want to do do

• Pretend to be experts
• Undermine the hard work that goes into creating Storm Data
• Create more work for those entering Storm Data
Although this relationship is unconfirmed, an almost word-for-word similarity exists between the “Causality & Damage Statistics” section in both sources.

** Since at least 1987, use X2 Method.
Our Research – Overview & Methods

• Surveyed NWS personnel who generate Storm Data
• Worked with NWS Performance Branch
• Focused on events, not episodes

• Two part survey
  – Part A – Surveyed 122 Weather Forecast Offices (WFO) + Amer. Samoa
    • WCM gathered collective responses for WFO
    • Focused on how Storm Data process works at WFO
    • 81% response rate (100 WFO)
  – Part B - Quantitative survey of 647 events (out of 72,835) 8/07 – 7/08
    • Survey sent to NWS employee who created data for particular event
    • Focused on how data was generated and recorded for specific event
    • 41% response rate

• Pretested by NWS and societal impacts researchers
• Controlled access through external survey company
**Perceptions of Accuracy**

- **Significant underestimate**
- **Slight underestimate**
- **Fairly accurate estimate**
- **Slight overestimate**
- **Significant overestimate**
- **Don't know**

![Bar chart showing perceptions of accuracy with different estimates and their corresponding percentages.](image)
### Conditions when estimating $0 or no info for losses

<table>
<thead>
<tr>
<th>Response</th>
<th>$0</th>
<th>No Info</th>
</tr>
</thead>
<tbody>
<tr>
<td>You suspected there were monetary losses but did not have the . . .</td>
<td></td>
<td></td>
</tr>
<tr>
<td>. . . time</td>
<td>0%</td>
<td>31%</td>
</tr>
<tr>
<td>. . . information</td>
<td>23%</td>
<td>79%</td>
</tr>
<tr>
<td>. . . training or technical skill</td>
<td>12%</td>
<td>28%</td>
</tr>
</tbody>
</table>
Perceptions of Accuracy

- 81% of WFOs – insufficient access to needed information sometimes prevents them from making reliable loss estimates.

- 69% of WFOs – recorded “no information available” for loss estimate at least “sometimes” in the past year even though they knew or suspected there were monetary losses.  
  - 56% said insufficient information caused them to enter “no information available” for Part B event.
  - 21% expressed confidence for Part B estimate when entering no info.

- 52% of WFOs – recorded $0 for loss estimate at least “sometimes” in the past year even though they knew or suspected there were monetary losses. 
  - 48% said insufficient information caused them to enter “$0” for Part B event.
  - 53% expressed some confidence for Part B estimate when entering $0.
Types of impacts Included in loss estimates

Types of Losses Included in Storm Data Estimates

Loss type:
- Private property losses
- Cost of repair materials
- Public property
- Cost of repair services
- Insured losses
- Clean up costs
- Uninsured losses
- Agricultural losses
- Non-agricultural losses
- Natural resource losses
- Aid/relief during the event
- Initial aid/support after event
- Cost of preventative efforts

Percent:
0 10 20 30 40 50 60 70 80 90 100

Legend:
- Part A
- Part B
Training/Resources

- 36% of respondents reported that their WFO had received no formal training in estimating monetary losses.
- Yet 87% of respondents said it was “very important” or “extremely important” that all WFOs use a similar methodology to estimate Storm Data monetary losses.

**Most Common Lost Estimate Training Sources**

- 55% NWS training
- 18% insurance company
- 6% EMA
- 5% Building code/appraisal
- 0% Hazard outreach
- 16% NWS employee
Additional Resources

Mean Usefulness of Additional Resources

- Better access to insurance data: 4.5
- Better loss estimation training: 4.3
- Access to web-based damage guides: 4.2
- Loss estimation computer program: 4.2
- More detailed damage guides: 4.1
- More accurate damage guides: 4.1
- Training in loss estimation techniques: 4.0
- Damage reporting hotline: 3.3
- GPS cameras: 3.3

5 - Extremely useful
4 - Very useful
3 - Somewhat useful
2 - Not very useful
1 - Not at all useful
NWS Changes as a Result of Storm Data work

• Developing standardized software (summer 2010) to create more consistent and accurate loss estimates
  – Improve metadata
  – Improve use of data

• Creating new training modules
  – Using articulate presenter technology that combines PowerPoint slides with voiceover
  – Will be available on web site
  – Can track who has taken what classes

• Changing how Storm Data is entered
  – Will require employees to enter a confidence estimate
  – Will send employees a reminder to update their estimate
Conclusions

Summary of Findings

• WFOs perceive that they are underestimating the societal impacts of Storm Data events
• NWS employees are passionate, dedicated but don’t believe they have sufficient training, information resources, or time
• Time is far less problematic than training and better access to resources
• NWS employees feel that there’s a strong need for additional training and resources

Results

• NWS making changes in response to our findings
• We will continue to work with performance branch to provide additional recommendations
Questions?

Thank you!

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