



# The Art of Surveying Tornado & Straight-line Wind Damage

Trisha Palmer, NWS Greenville-Spartanburg

Phil Hysell, NWS Blacksburg

Nick Petro, NWS Raleigh



# Outline

- Preparing for Survey(s) (Trisha)
- Drone Accessibility and Tips for Discerning Straight-line vs. Tornado Damage (Phil)
- Damage Assessment Toolkit and Database Live Demo (Nick)





# Part 1

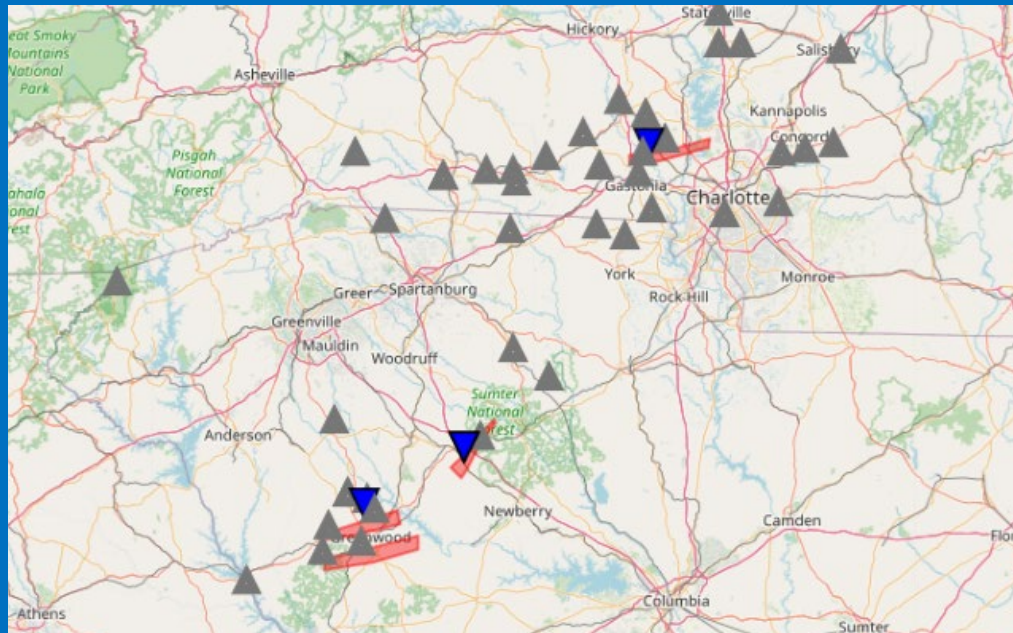
Preparing for a Storm Survey

Trisha Palmer, NWS Greenville-Spartanburg, SC



# After The Event...

- Location of warnings?
- Damage reports\*?
- Forecasters will draw initial “polygons” based on rotation tracks

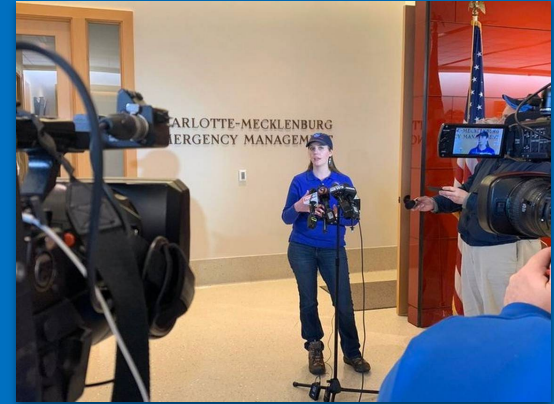


\*Lack of damage reports doesn't mean there wasn't a tornado



# Plan Survey Teams

- Extent of damage (CISM?)
- How many teams
- Who needs to be on which team
  - Survey experience
  - Media experience
  - VIP interactions



NC  
VIP →



# Prepare Survey Teams

Coordinate with EMs for every damage path to be surveyed

- Meet EMs and survey together (bigger events, EM preference)
- Survey and report results to EMs (smaller tornadoes)
- In rare situations, EMs survey and report results to NWS\*







# Digression: Media Coordination



How to pre-coordinate media interviews?



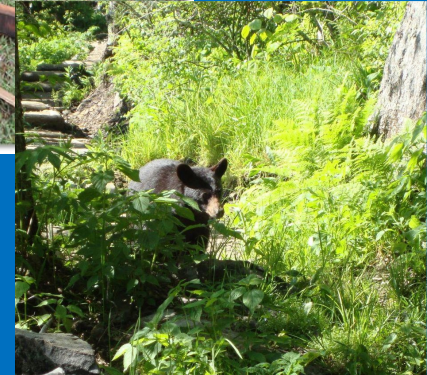
- County PIO coordinate press conference
- Media liaison at WFO
- Survey teams handle themselves
  - “Can we follow you?”





# Hit The Road

- Equipment
  - Backups in case of signal loss
- Properly dressed
- Safety, safety, safety
- Be ready for a long day
  - Maybe multiple days





# Part 2

## Drone Accessibility and Tips for Discerning Straight-line vs. Tornado Damage

Phil Hysell, NWS Blacksburg, VA



# How Do We Determine A Tornado?

The pattern of damage determines if it was a tornado NOT how much damage was caused.

Tornado damage often has a chaotic appearance, with larger uprooted trees often crossing each other.

Especially in our area, tornadoes AND microbursts can cause the same amount of damage.



Smaller branches/snapped trees are not as helpful, as they may fail based on the tree itself and not where the wind was coming from.

Convergent (tornado)

Divergent (straight-line wind)

Widening with distance = straight-line wind

Fairly Consistent Width = tornado

We conduct surveys to find out exactly what happened. This helps us to improve our warnings for the future. This is also important for historical reference.

# Tornado Damage

- Convergent pattern with distance
- Trees will typically be perpendicular to the storm motion
- Width of damage fairly consistent with distance







# Straight -Line Wind Damage

- Divergent Pattern with Distance
- Trees will typically be parallel to the storm motion
- Width of damage usually expands with distance
- Twisting of branches can still occur due to shape of tree canopy





# You Make The Call!





# What Appears to be Minor Tree Damage On the Ground ...





# Can be Part of a More Significant Path of Damage from Above



# Who has Access to a UAV?

- Quickly determine pattern of damage (helps us decide if survey is needed)
- Most valuable at beginning and end points - this is important
- Capture damage in locations that cannot be access by ground survey



Yadkin County May 26, 2022





# We Will Contact You When...

- Tornado Warning Issued, no initial reports of damage
- Damage suspected to be caused by a tornado
- Need someone to accompany us on survey
- Someone feel strongly a tornado caused damage



Rockingham County May 6, 2022

# Please Contact Us When...

- Any damage you feel may have been caused by a tornado
- Credible reports of a tornado
- See photos/video of possible tornado



Wilkes County August 2021





# Part 3

Damage Assessment Toolkit and  
Database Live Demo

Nick Petro, NWS Raleigh, NC





# NWS Damage Assessment Toolkit / Survey 123 Demo





# Quality Control

QC is done through the NWS DAT internal Operational Database Web Editor.





# Partner Access



NWS partners can access NWS storm survey data, tracks, and other info via this link:



<http://apps.dat.noaa.gov/StormDamage/DamageViewer/>



# Thank You



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