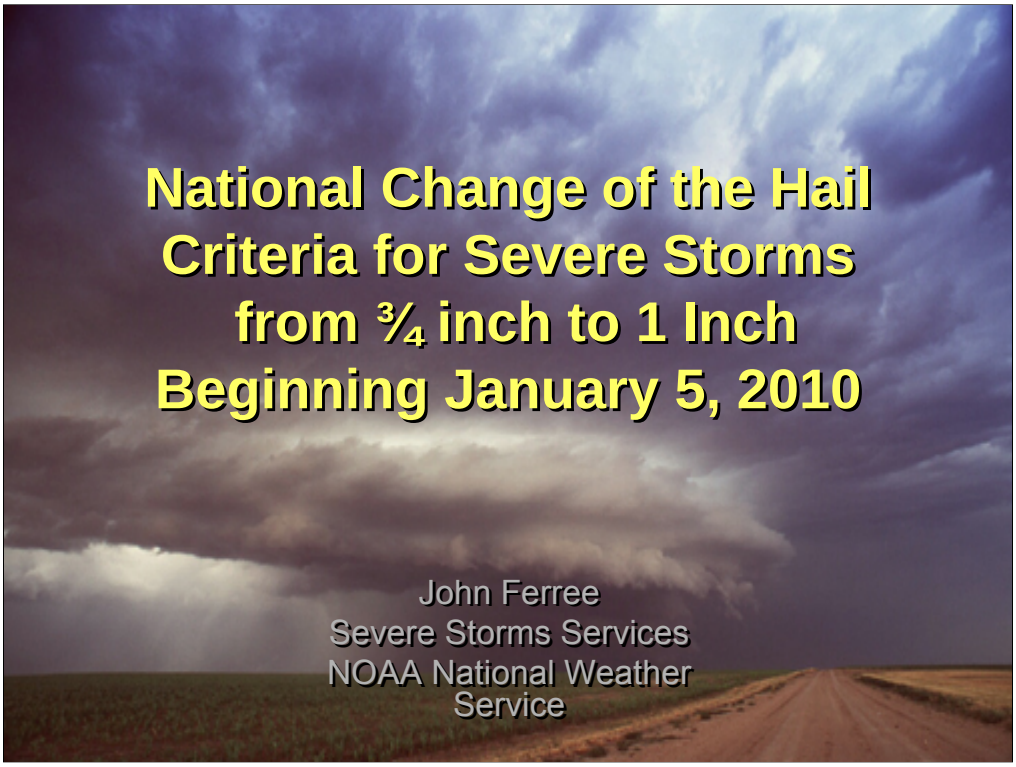


Hi, I'm John Ferree, the Severe Storms Services Leader for NOAA/National Weather Service.

This is an informational briefing concerning a change in the hail size criteria for severe thunderstorm warnings beginning nationwide on January 5th, 2010

Hail Size

- Pea = 1/4 inch diameter
- Marble/mothball = 1/2 inch diameter
- ➢ **Penny = 3/4 inch diameter**
- Nickel = 7/8 inch
- ➢ **Quarter = 1 inch**
- Half Dollar = 1.25
- Ping-Pong Ball (or Walnut) = 1 1/2 inch
- Golf Ball = 1 3/4 inches
- Hen Egg = 2 inch
- Tennis Ball = 2 1/2 inches
- Baseball = 2 3/4 inches
- Tea cup = 3 inches
- Grapefruit = 4 inches
- Softball = 4 1/2 inches

We are discussing the change in the hail size criteria for severe thunderstorm warnings – changing from a minimum of penny size to a minimum of quarter size

Why change to 1 inch?

- Key research -- *Hail damage threshold sizes for common roofing materials*
  - Marshall, T.P., Richard F. Herzog, and Steven R. Smith, 2002:, 21st Conference on Severe Local Storms, San Antonio, TX
- Numerous types of shingles tested
  - No damage at 0.75 inch
  - Some 11 year old shingles damaged at 1.00 inch
  - Several shingles (some new) damaged at 1.25 inch

Ice ball launching (IBL) device with light sensors (chronograph)

So…Why the change? It's primarily motivated by two drivers:

Scientific research indicates that significant damage to real property such as roofing materials does not occur until hail stones reach at least 1" in diameter. The results of these peer-reviewed articles are supported by damage reports from thousands of archived storm events.

Secondly, media partners and the emergency management community expressed concern about the numerous warnings being issued for marginal events – that is, storms which may well produce hail in the penny or nickel size range, but are not expected to pose any substantive threat to property. Their concern was that these warning were desensitizing the public to those events where there is a genuine risk of damage and a corresponding need to take protective action.

Damage to Cars

- It typically takes golf ball size hail (1.75 inch) to dent cars

7 Inch Hailstone
Aurora Neb. June 22, 2003

Definitive laboratory studies of hail damage to vehicles are not readily available, but comparison of hail size reports to damage claims indicate that golf ball size and larger hail are responsible for most damage claims. The National Weather Service will continue to warn for these extreme events.

Frequently Asked Questions

- Will there be any change to the severe thunderstorm wind gust criteria (58MPH)?
  - No
- What about significant, but less than severe thunderstorms?
  - Special Weather Statements are currently encouraged
- What about crop damage?
  - Even pea size hail can produce crop damage
    - Crop maturity
    - Wind speed
    - Persistence
  - Special Weather Statements are encouraged in these situations

Here are some frequently asked questions…

•Will there be any change to the severe thunderstorm wind gust criteria of 58MPH?

•The answer is that there will not be a change to the wind gust criteria for severe storms. Most severe thunderstorm warnings are for the potential for wind related damage (this is particularly true in the Eastern U.S. and along the Gulf Coast).

•What about significant, but less than severe thunderstorms?

•The National Weather Service currently issues special weather statements for strong but less than severe storms, we are strengthening policy in this area to make these statements common practice.

•What about crop damage?

•Hail size is not the only factor when it comes to crop damage by a severe storm. Even very small hail can destroy crops depending on the crop maturity, wind speed or speed of the hail stones, and persistence. A few very large stones can do less damage than a lot of small stones. We don't currently issue warnings specifically for the potential of crop damage, nor are there plans to change that. Again, we do issue special weather statements for storms that don't reach severe criteria.

Frequently Asked Questions

- Will aviation products change?
  - Decisions on any changes to Convective Sigmet products are in discussion with FAA
  - Airport warning hail criteria (variable but generally ≥ ½ inch) will not change
- Will there be impacts to the historical database?
  - NWS will continue to collect reports of 0.75 inch (penny) and 0.88 inch (nickel) size hail for Storm Data

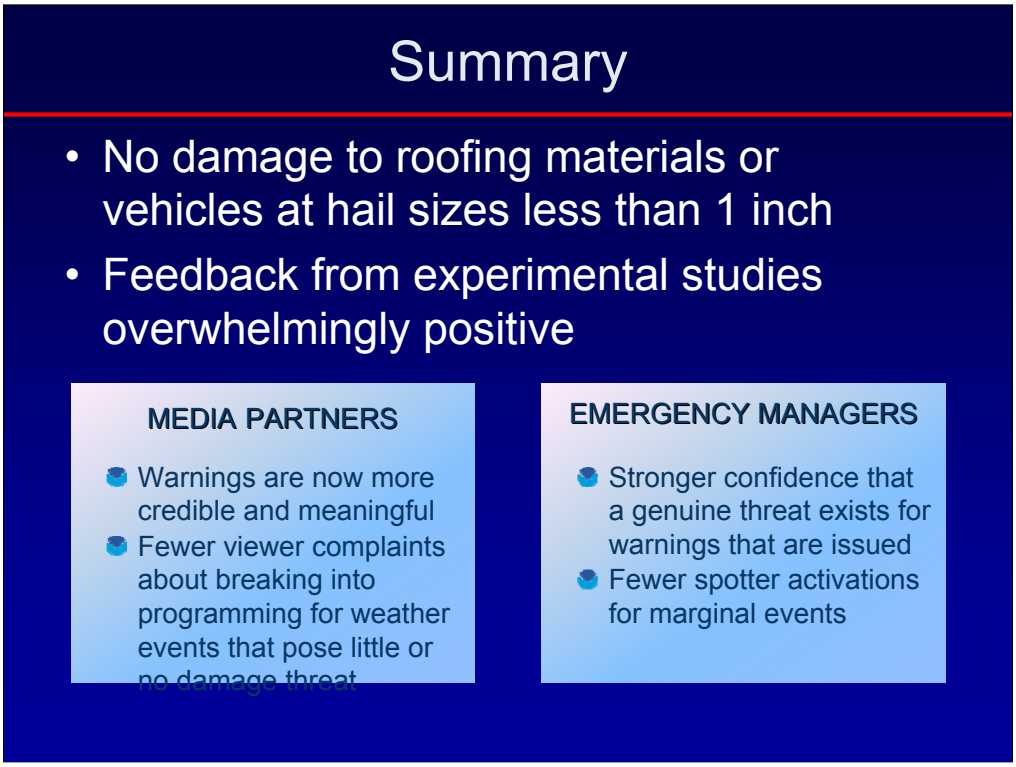
•Will aviation products change?

•No changes in aviation products are currently planned. There are ongoing discussions between the National Weather Service and the Federal Aviation Administration on potential changes to the Convective Sigmet criteria.

•Local Airport Warning criteria will not change

•Will there be impacts to the historical database?

•The NWS will continue to record and encourage reporting of hail of less than 1 inch in diameter. So we ask that spotters and the public to continue to send reports of penny and nickel size hail.



So in summary. Research has shown that penny and nickel size hail does not significantly damage roofing materials or vehicles.

The NWS has been experimenting using a 1 inch criteria in Kansas for four years, and in other parts of the country during the past year.

During these experimental periods, both our media partners and emergency managers have expressed widespread approval. Surveys suggest individuals believe the warnings that are issued are more credible and meaningful – that a severe thunderstorm warning means the threat of significant damage is genuine. Television networks have also reported receiving fewer complaints about breaking into programming for weather events that pose little or no hazard to property integrity.

Emergency managers have also shared in supporting this change to the 1 inch criteria for severe hail.

Finally, the public is better served by a policy that allows forecasters to focus more intently on the most dangerous storms, those that have the strongest potential to threaten life and property.

Contact Information

John.T.Ferree@noaa.gov

Manufactured home damaged by wind driven hail (estimated tennis ball size) near Callison, South Carolina, on 15 March 2008.
- Image courtesy of Greenwood County Emergency Management.

If you have further questions, feel free to contact your local National Weather Service Office or you may e-mail me at the address listed here.

We welcome your questions, and are providing a forum for frequently asked questions on this web page.

Thanks for listening!