Using Warnings to Make Local Decisions

2023 North Texas IWT

Warnings Are Binary; Decision Making Shouldn't Be

Low cost and
Low risk mitigation

High cost and
High risk mitigation

Sheltering a family in their well-built home

Activating outdoor warning sirens

Evacuating a football stadium

Moving ICU patients to shelter

Family in manufactured home seeking shelter

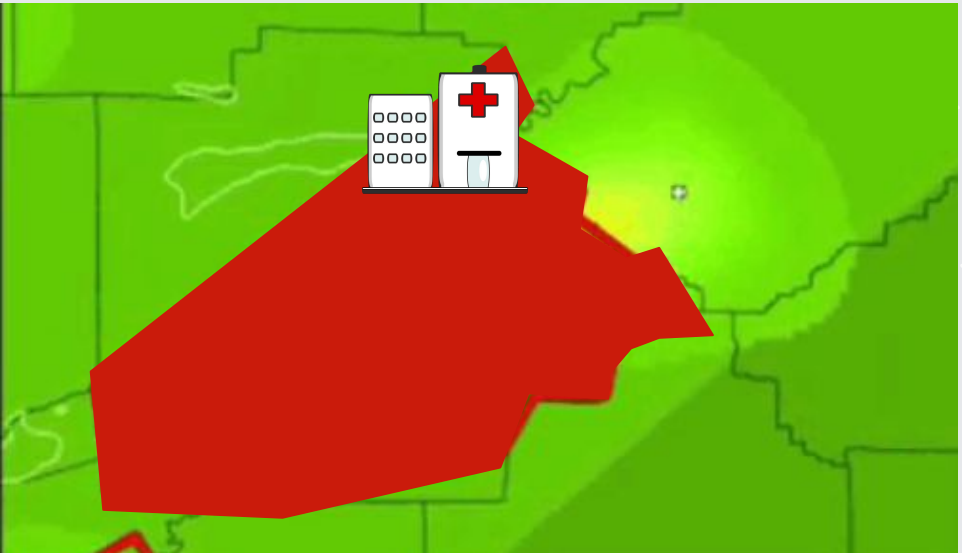
Cancelling court activities

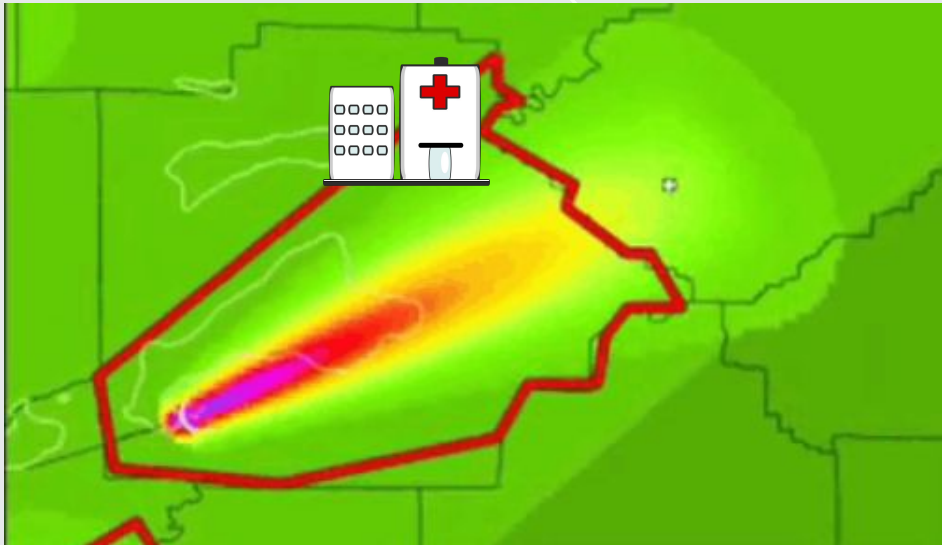
Cancelling airport operations to shelter people

How can your decisions go from binary to informed?

“Shelter the ICU because it’s in the tornado warning”

“Do NOT shelter the ICU at this time. The highest risk should pass to the south.”

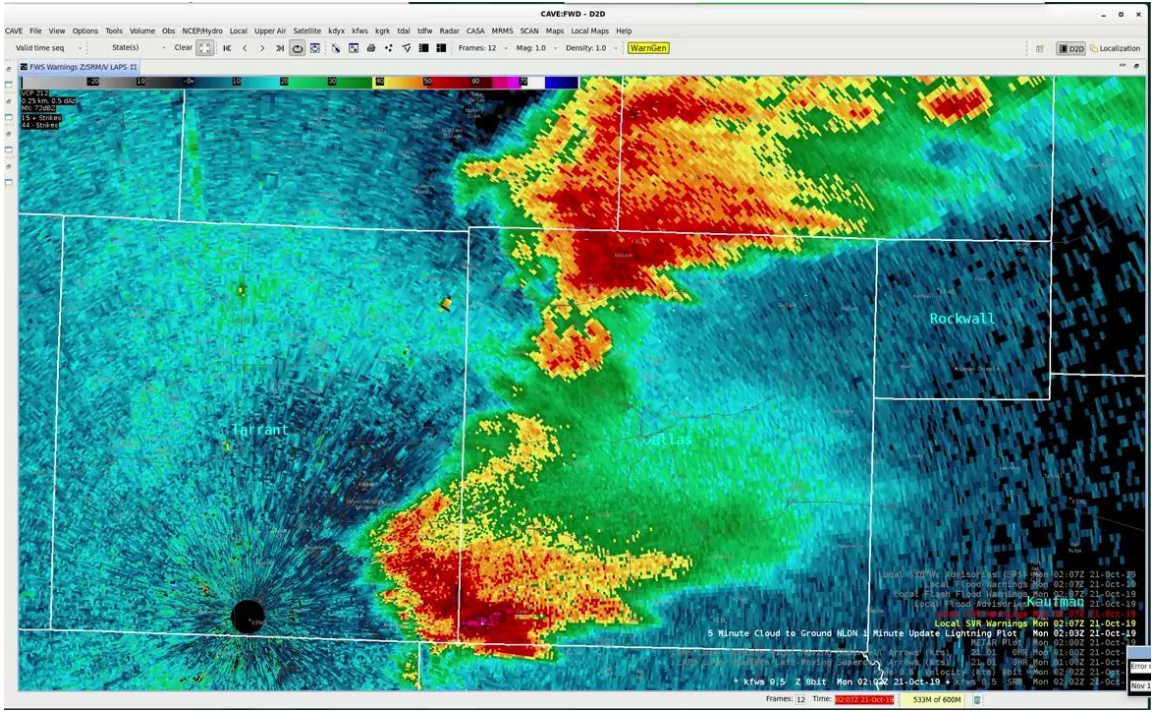




How can your decisions go from binary to informed?

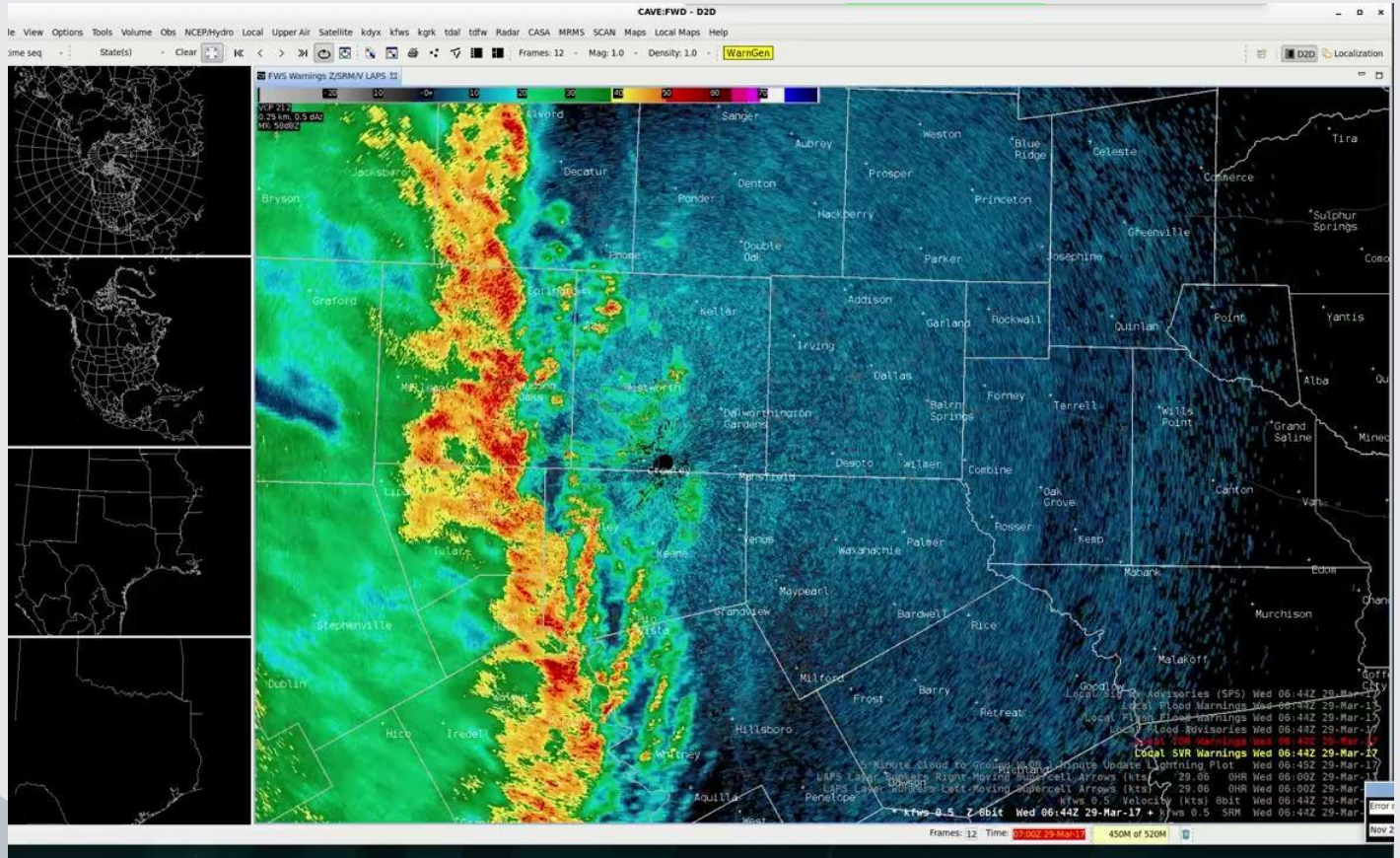
1. Know how warnings are created by NWS Meteorologists.
2. Infer context provided by radar and warning box.
3. Use the important information contained in warning text.

Behind the scenes: How Warnings are created...

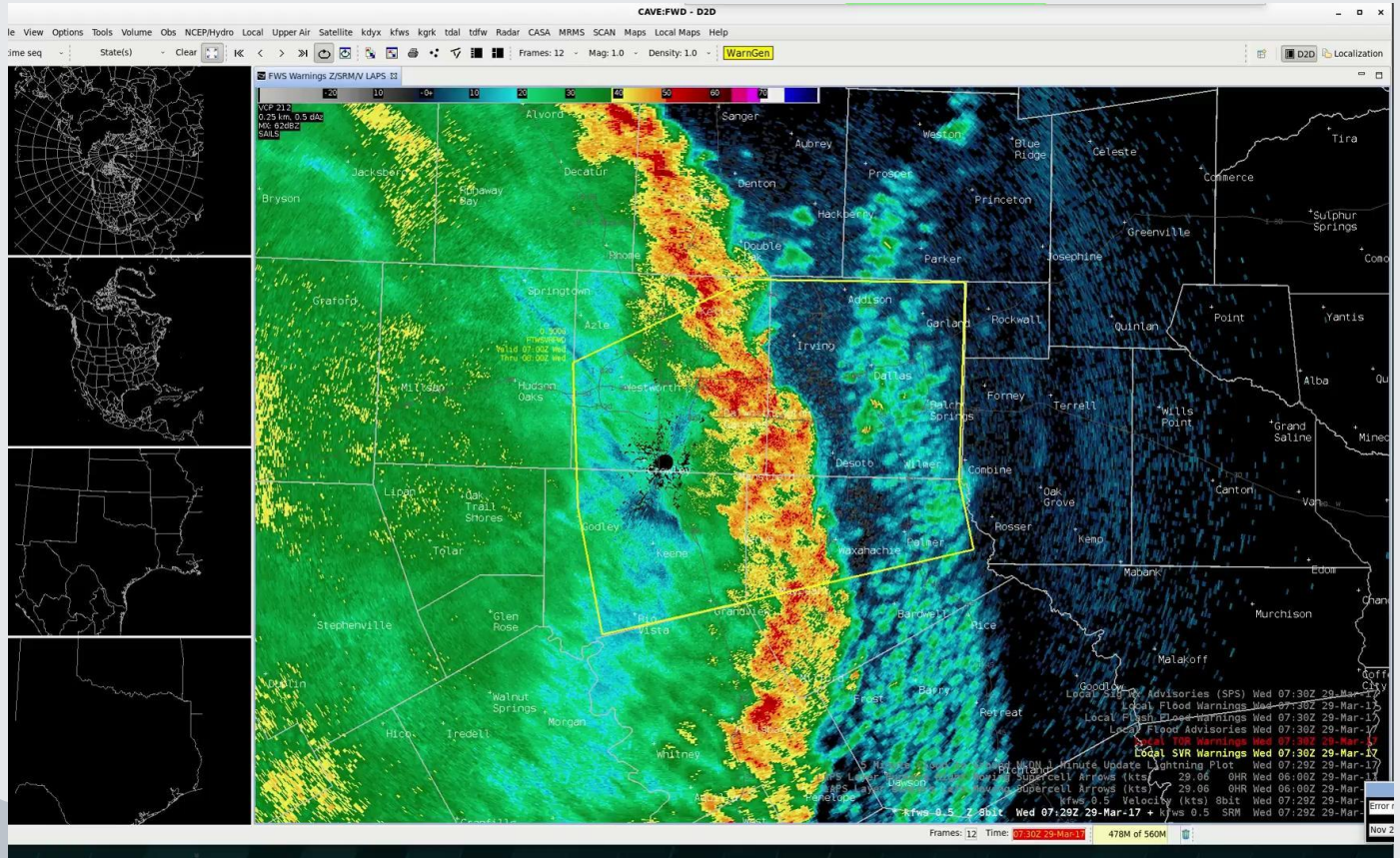


1. Select warning type
2. Put dot on most severe part of storm
3. Go back in time and put dot on storm to create extrapolated motion forecast
4. Adjust polygon for the expected area of severe hazard(s)
5. Select exact hazard(s) and other information from list
6. Generate text & send

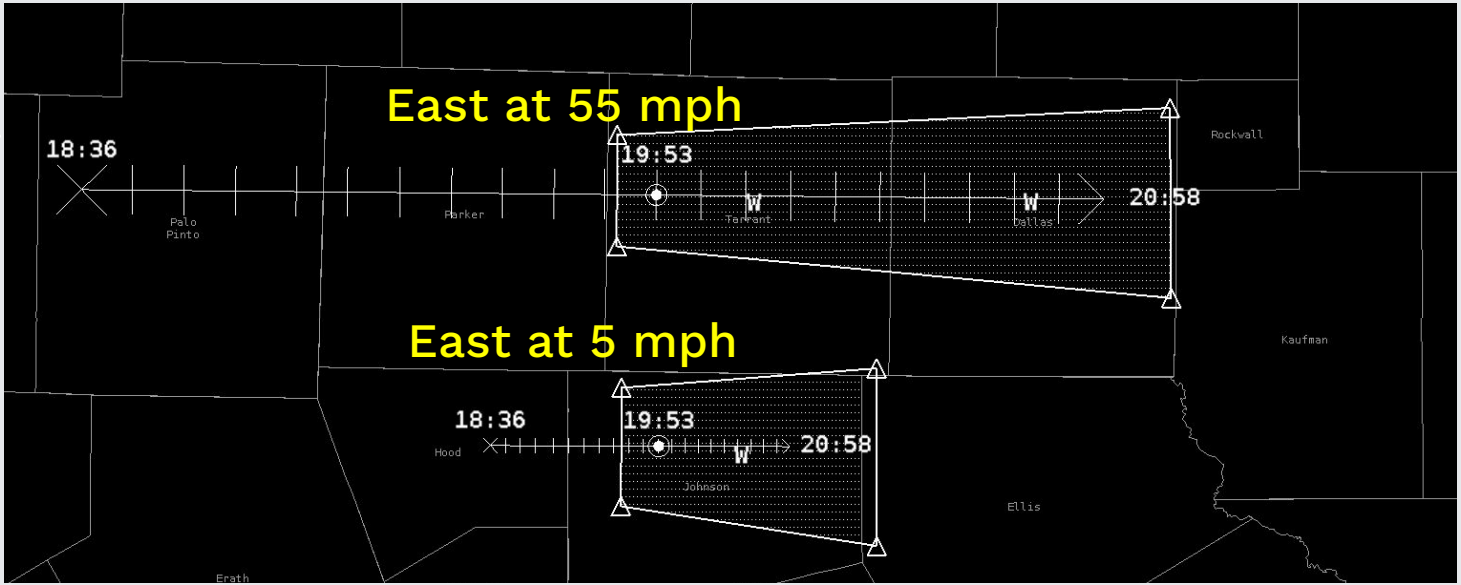
Line Of Storms



Updating Warnings

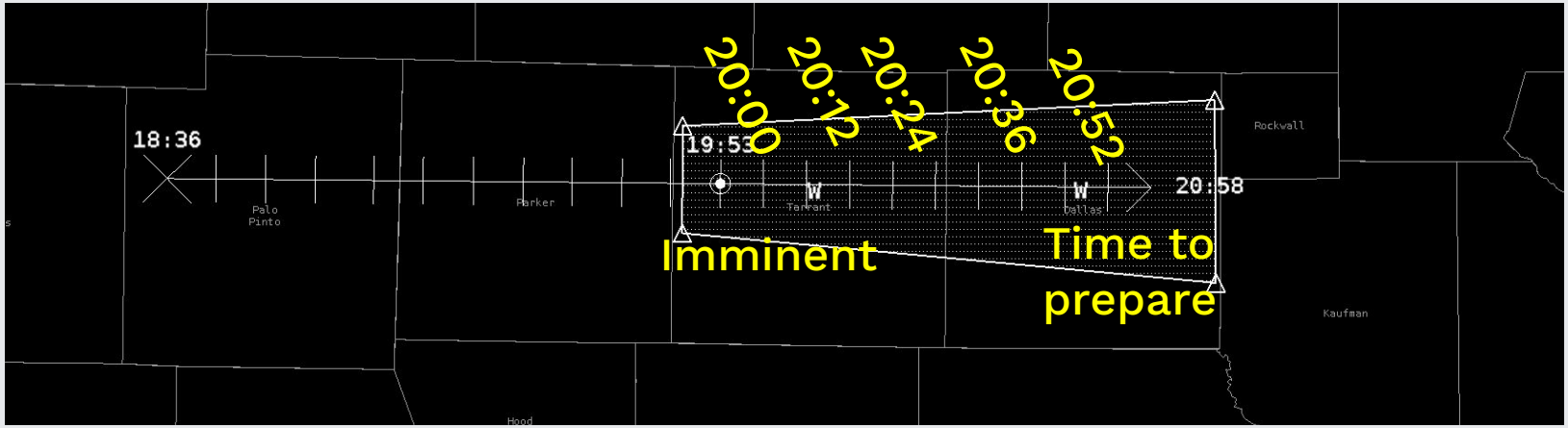


Warning Sizes & Timing

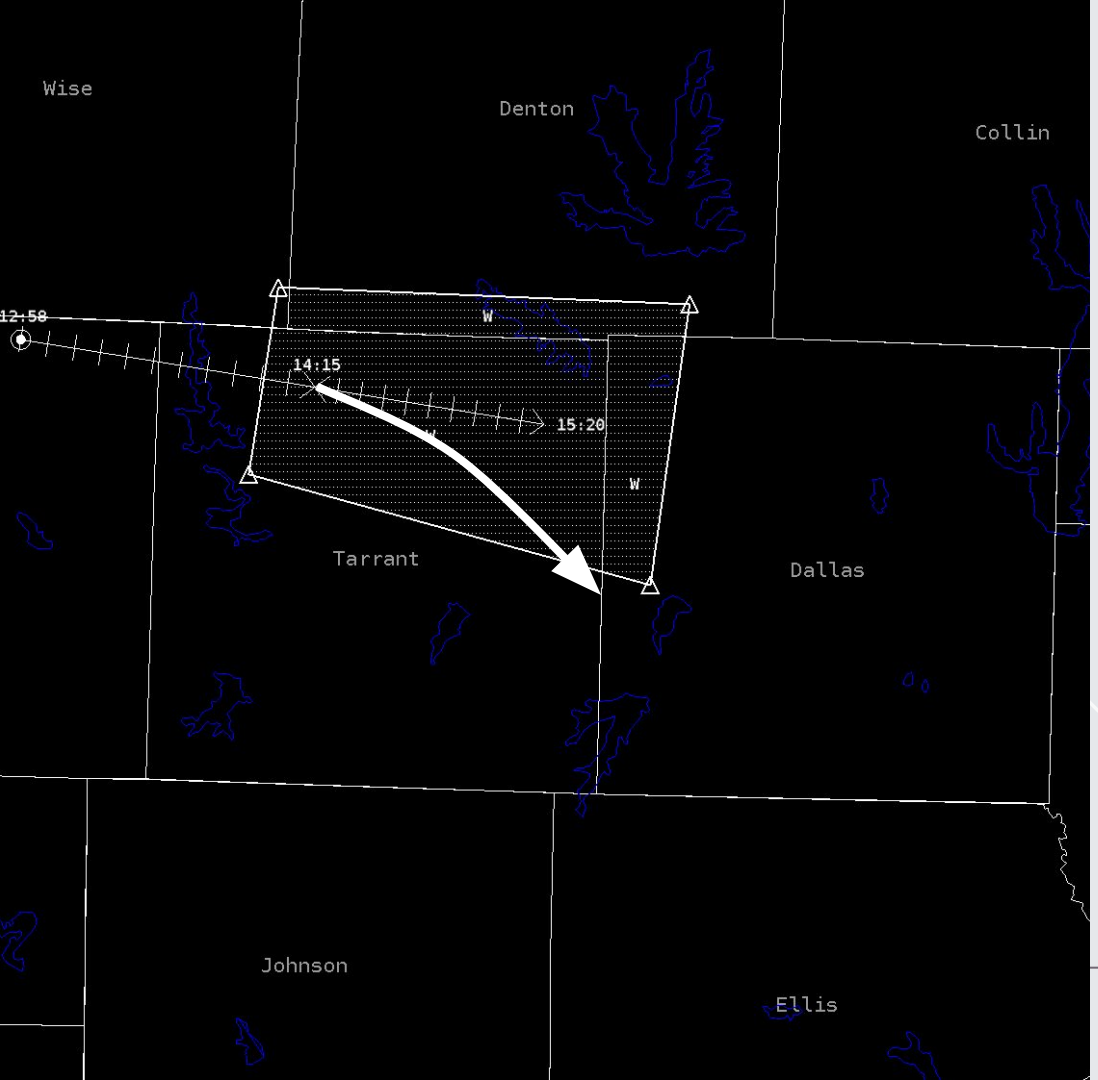


"Long" warnings are a sign of fast storm motion

Warning Sizes & Timing

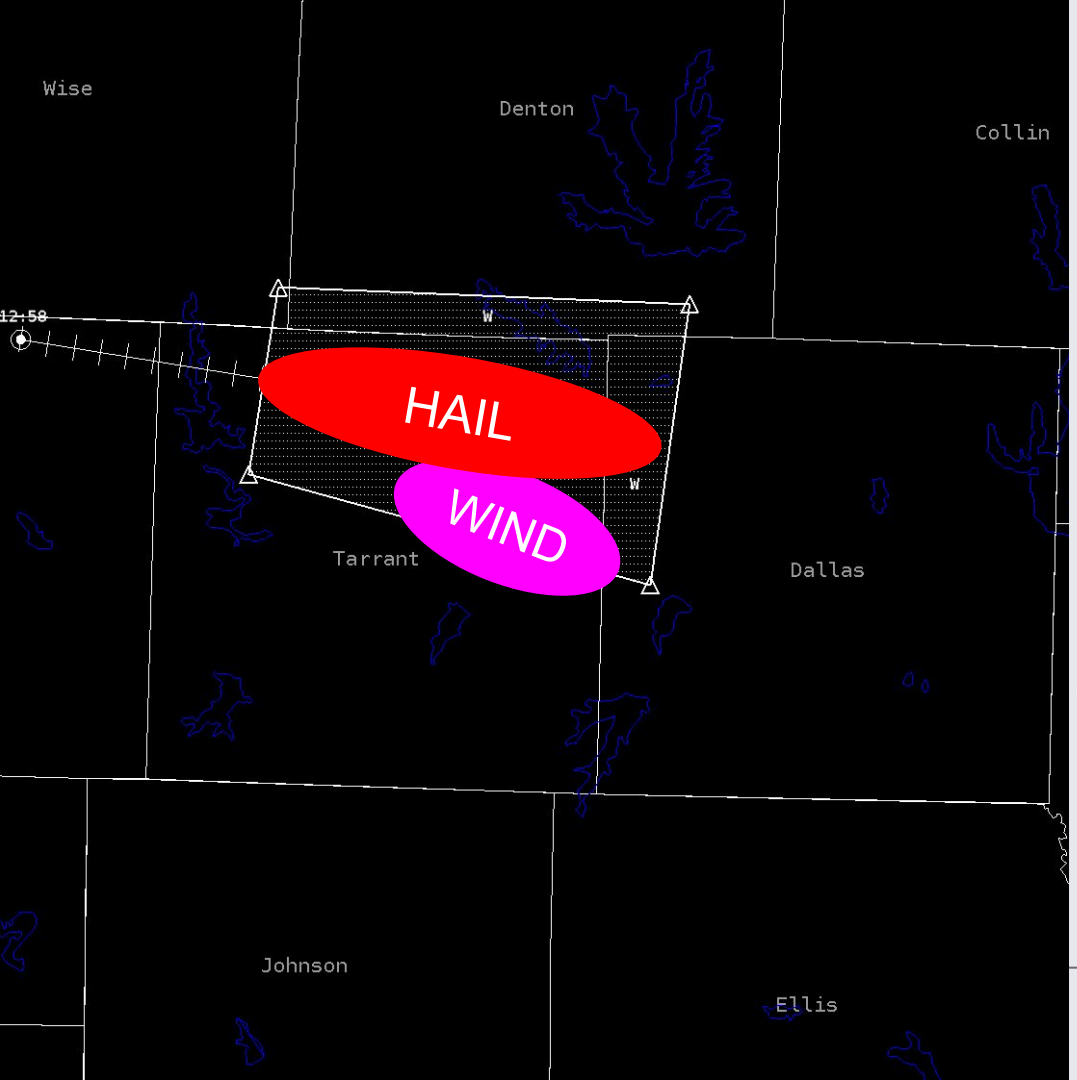


Each tick mark tells forecaster the location every 6 minutes



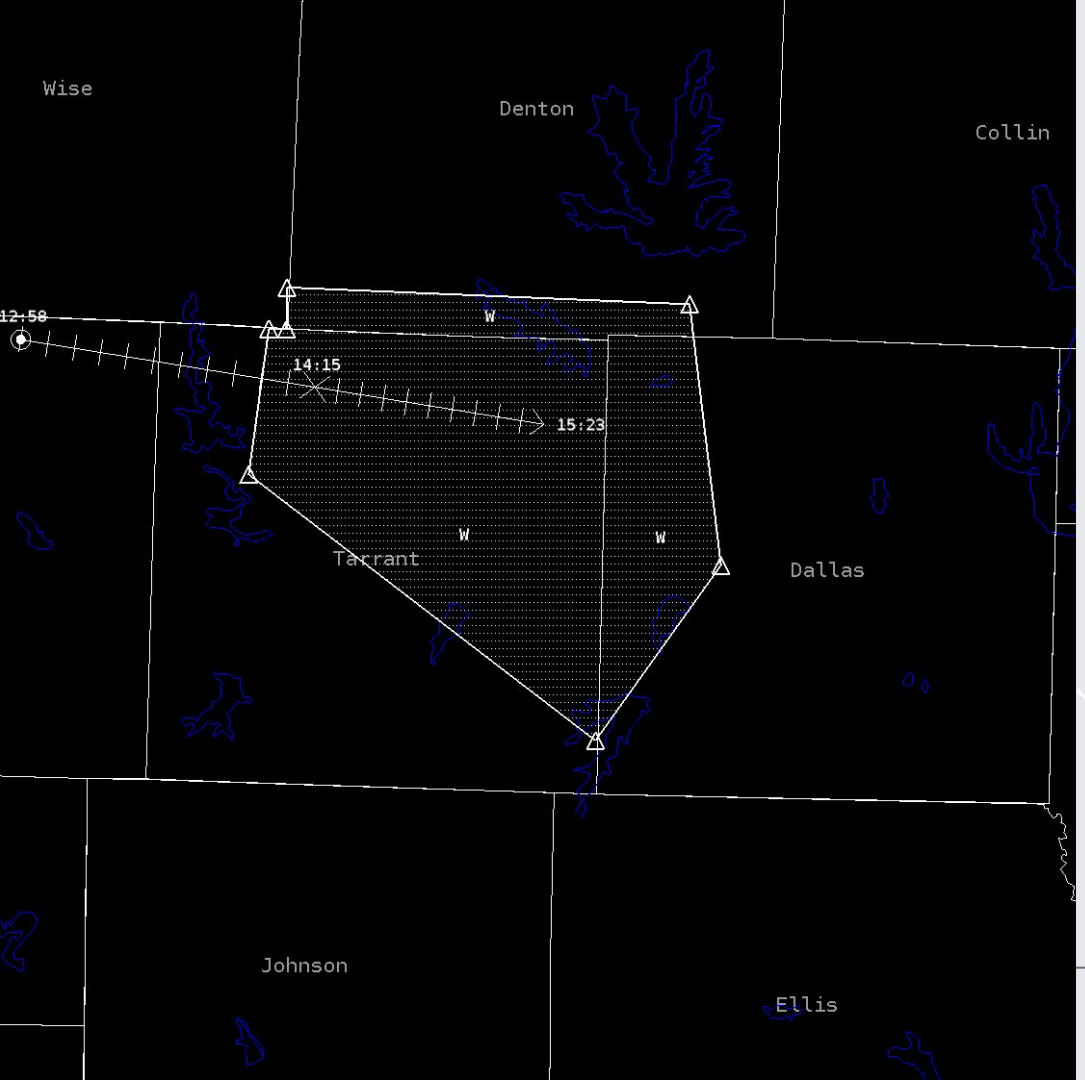
Deciding the final polygon extent

Forecasters assess uncertainties with current and future **storm motion**



Deciding the final polygon extent

Forecasters assess uncertainties with current and future **hazard types** and locations



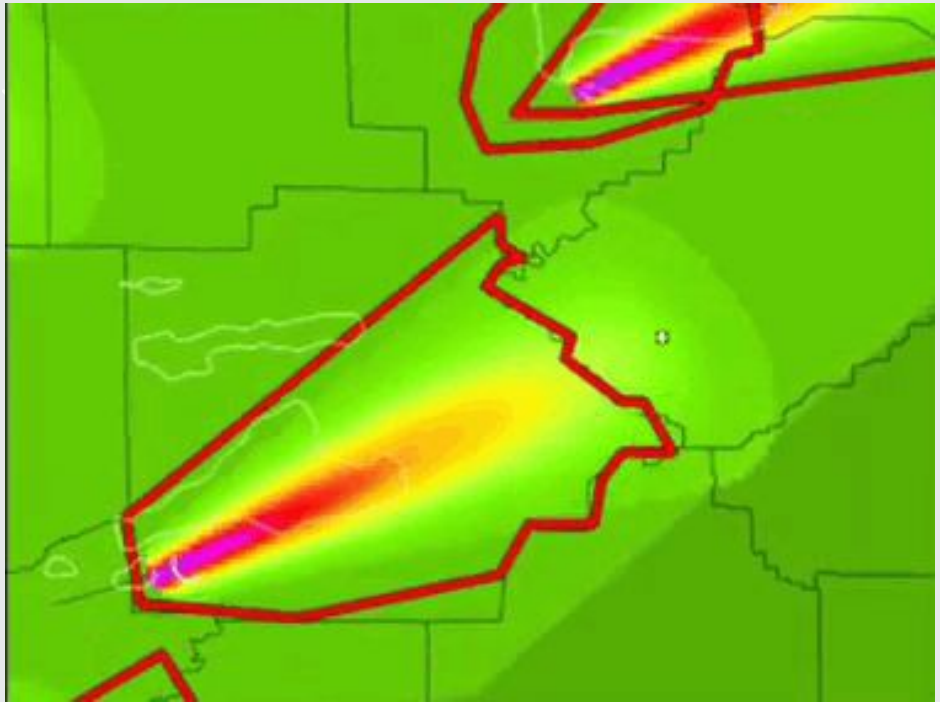
Deciding the final polygon extent

Warning polygons can't be expanded once issued, so forecasters tend to be more generous with size when uncertainty in movement, evolution, and hazard location is high

Review

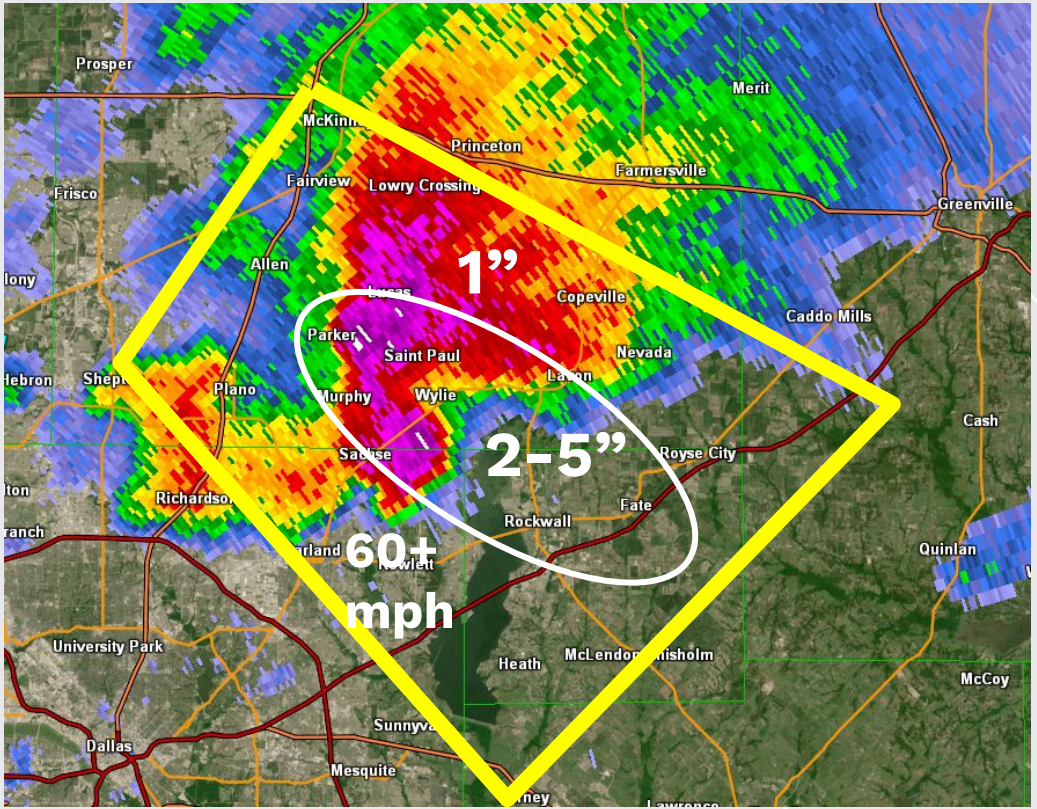
- Forecasters are tracking the worst part of the storm and using its previous motion to anticipate impacted areas.
- There is almost always more time to make decisions at the opposite end of a warning polygon.
- Forecasters can’t expand warning boxes so initial warnings tend to have a more generous buffer zone for uncertainties 30-60 min later.

Threats Inside a Warning Vary in Time, Space, and Magnitude



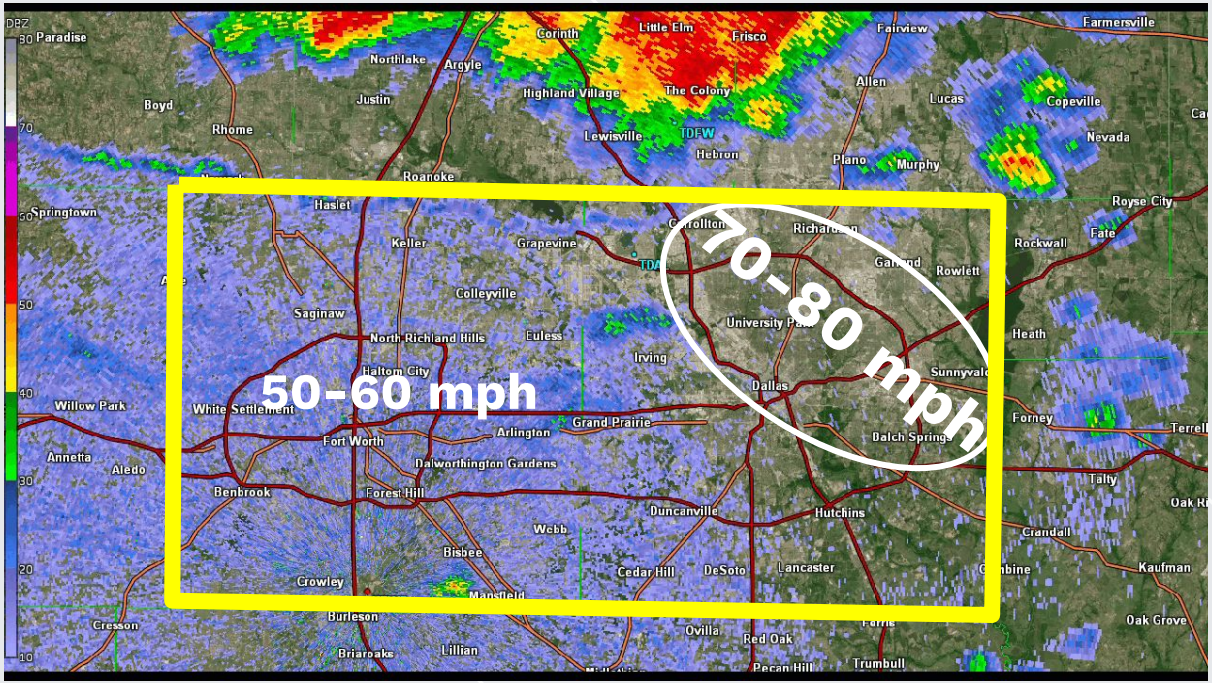
Could Be Multiple Severe Threats In One Polygon Box

- Softball size hail in core of storm
- Quarter size on north side of storm
- 60 mph winds on south side of storm



Different Magnitude Threats In One Box

- 50 - 60 mph winds with outflow boundary
- 70 - 80 mph winds with core of storm



Review

- **One needs to know a little about radar interpretation and storm structure to know where exact hazard types and magnitudes are expected.**
  - *We offer a basic radar interpretation course for EMs! (Video on YouTube already)*
- **NWS Meteorologists will provide updates in NWSChat of where and when significant hazards are located.**
  - *If they haven't, ask in NWSChat*

Warning Text

Type of Warning & What counties?

Until when?

What's the Hazard? Source?

```
54 KFWD 290700
SVRFWD
TXC113-139-251-439-290800-
/O.NEW.KFWD.SV.W.5006.170329T0700Z-170329T0800Z/

BULLETIN - IMMEDIATE BROADCAST REQUESTED
Severe Thunderstorm Warning
National Weather Service Fort Worth TX
200 AM CDT WED MAR 29 2017

The National Weather Service in Fort Worth has issued a

* Severe Thunderstorm Warning for...
  Johnson County in north central Texas...
  Tarrant County in north central Texas...
  Northern Ellis County in north central Texas...
  Dallas County in north central Texas...

* Until 300 AM CDT.

* At 200 AM CDT, severe thunderstorms were located along a line
  extending from near White Settlement to near Covington, moving
  northeast at 50 mph.

  HAZARD...60 mph wind gusts.

  SOURCE...Radar indicated.

  IMPACT...Expect damage to roofs, siding, and trees.
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“Pathcast”

A description of locations and time the hazard will be near

“Tag”

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* Severe thunderstorms will be near,
  White Settlement around 205 AM CDT.
  River Oaks, Sansom Park, Lake Worth, Westworth Village and
  Grandview around 210 AM CDT.
  Saginaw and Blue Mound around 215 AM CDT.
  Haltom City, Watauga, Richland Hills, Venus and Maypearl around
  220 AM CDT.
  Hurst and North Richland Hills around 225 AM CDT.
  Fort Worth, Arlington, Euless, Bedford, Keller and Colleyville
  around 230 AM CDT.
  Grand Prairie around 235 AM CDT.
  Irving, Grapevine, Coppell, Waxahachie, Glenn Heights, Red Oak and
  Oak Leaf around 240 AM CDT.

Other locations impacted by these severe thunderstorms include Pecan
Hill, Buckingham, Briaroaks, Rio Vista, Westover Hills and Garrett.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

For your protection get inside a sturdy structure and stay away from
windows.

&&

LAT...LON 3254 9653 3239 9649 3219 9746 3247 9753
      3279 9755 3298 9709 3298 9652
TIME...MOT...LOC 0700Z 244DEG 46KT 3273 9753 3224 9732

HAIL...<.75IN
WIND...60MPH

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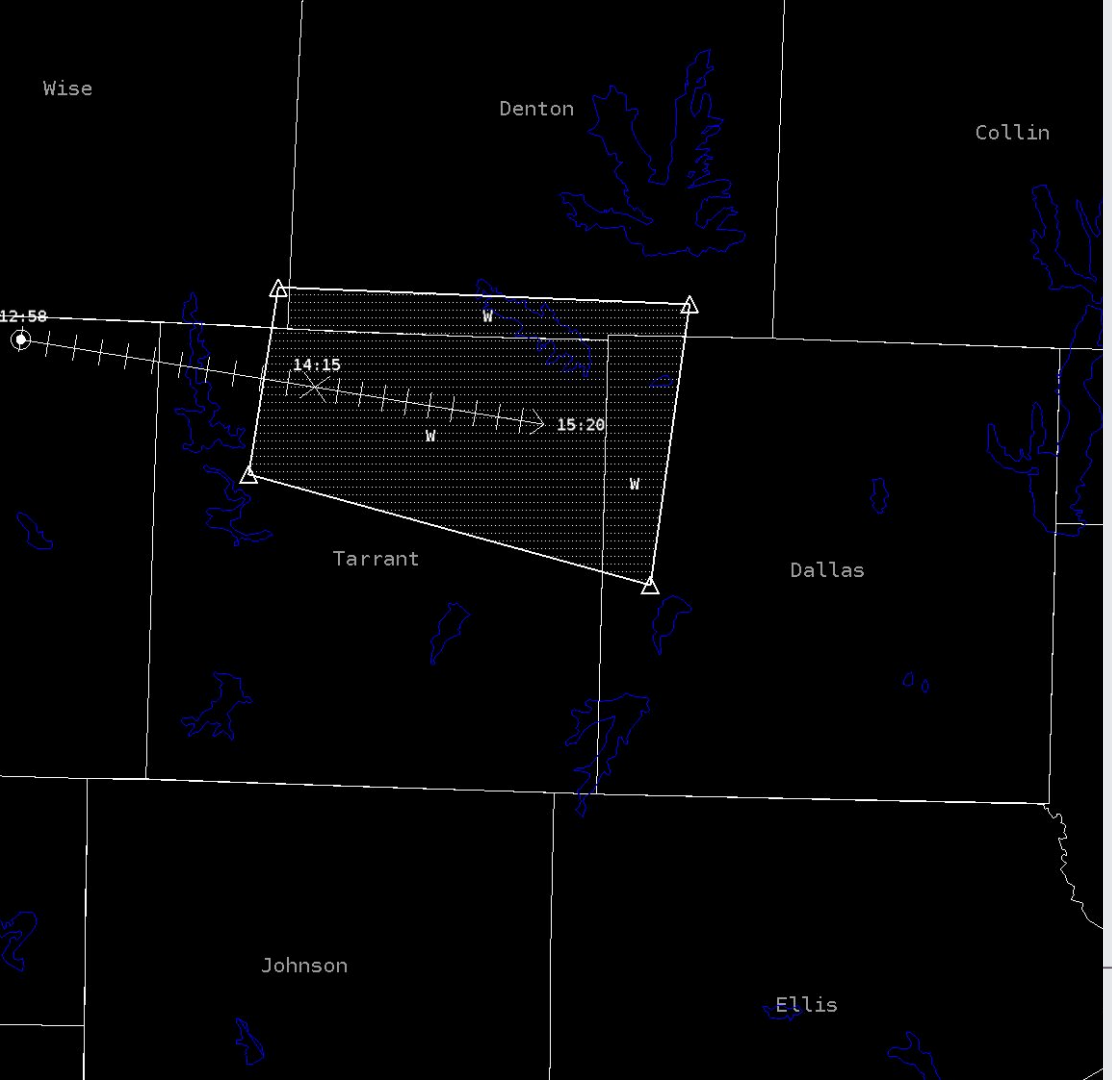
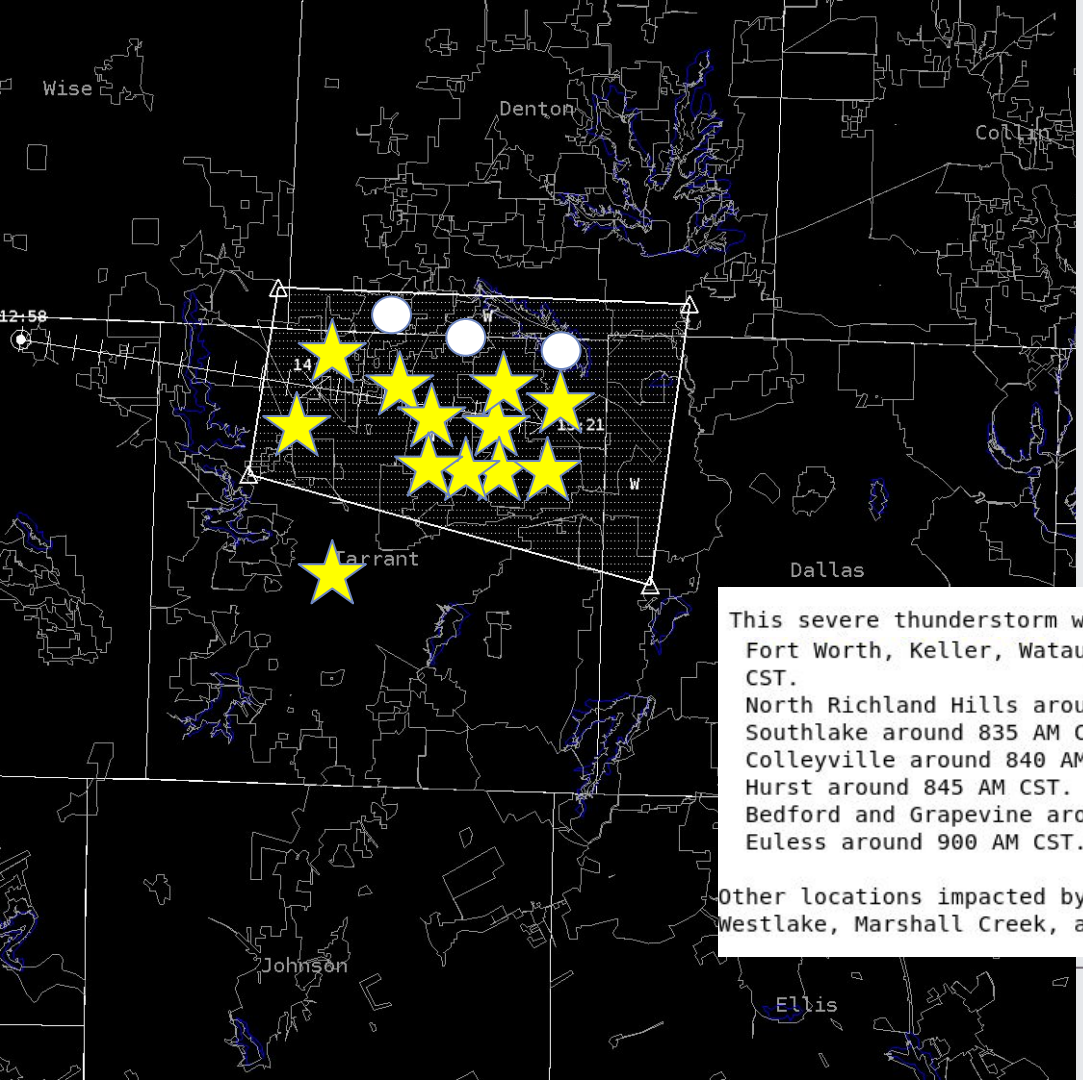


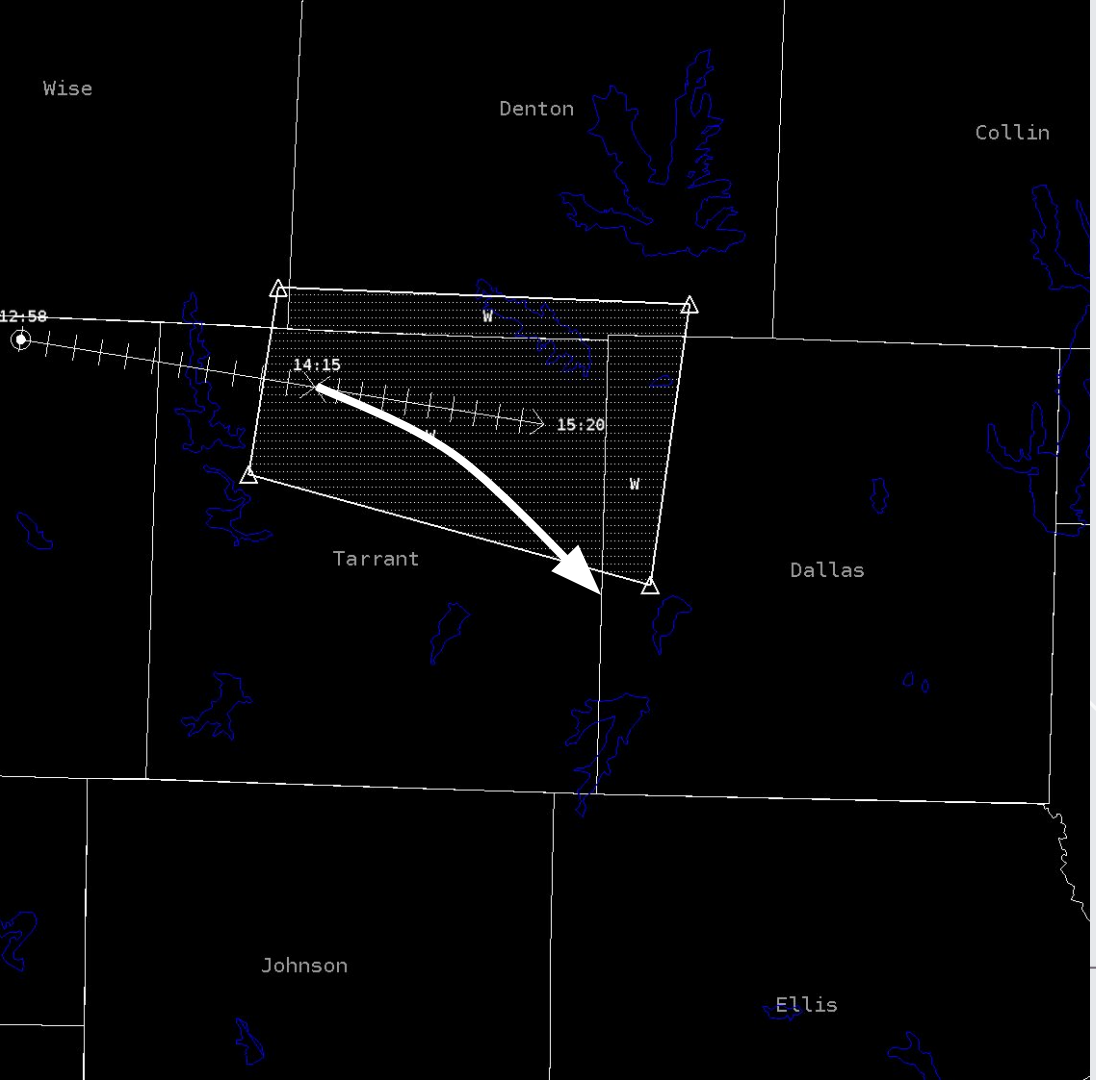
How does the pathcast get generated?



How does the pathcast get generated?

This severe thunderstorm will be near...
Fort Worth, Keller, Watauga, Saginaw, and Haslet around 825 AM CST.
North Richland Hills around 830 AM CST.
Southlake around 835 AM CST.
Colleyville around 840 AM CST.
Hurst around 845 AM CST.
Bedford and Grapevine around 855 AM CST.
Euless around 900 AM CST.

Other locations impacted by this severe thunderstorm include Westlake, Marshall Creek, and Grapevine Lake.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Tarrant
Dallas
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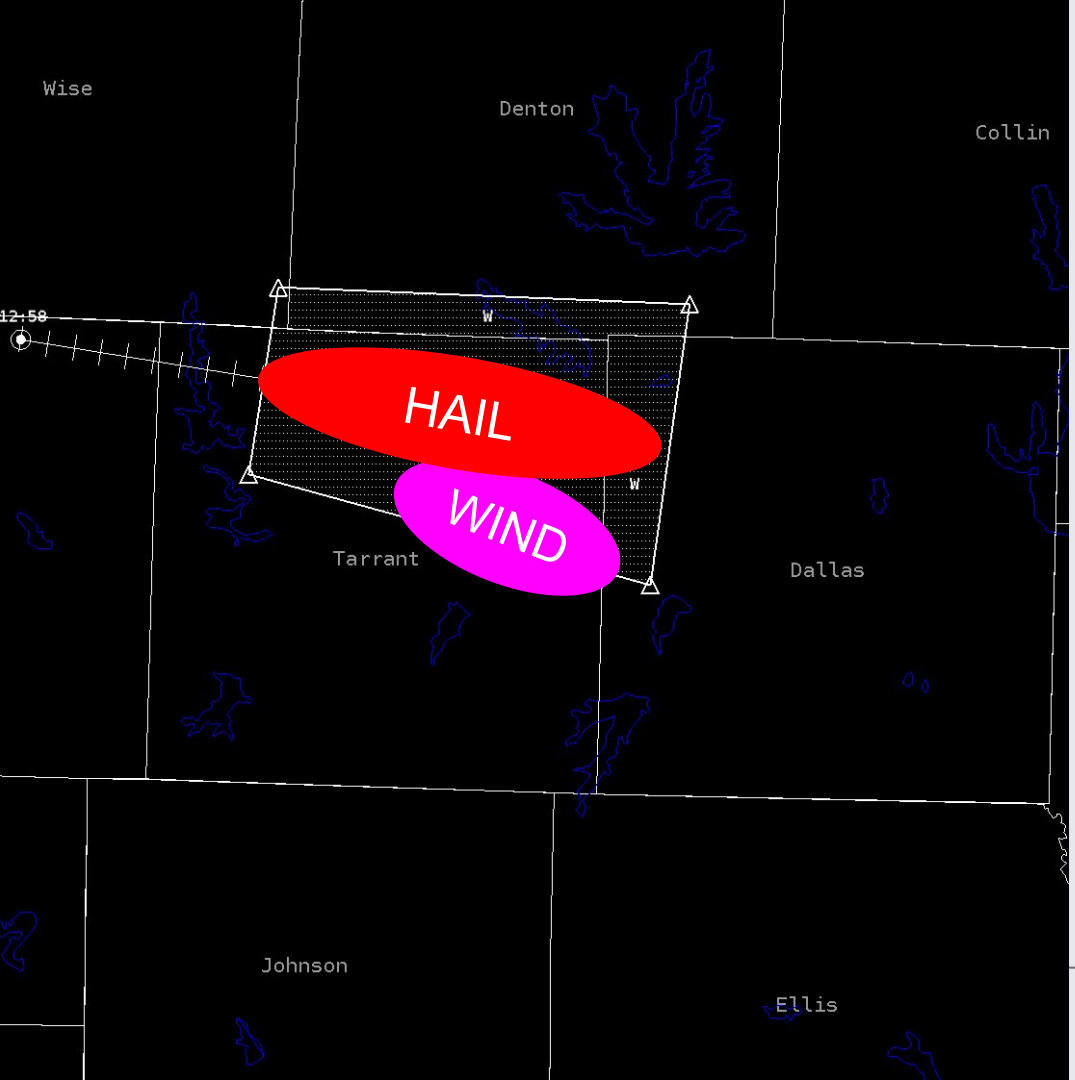
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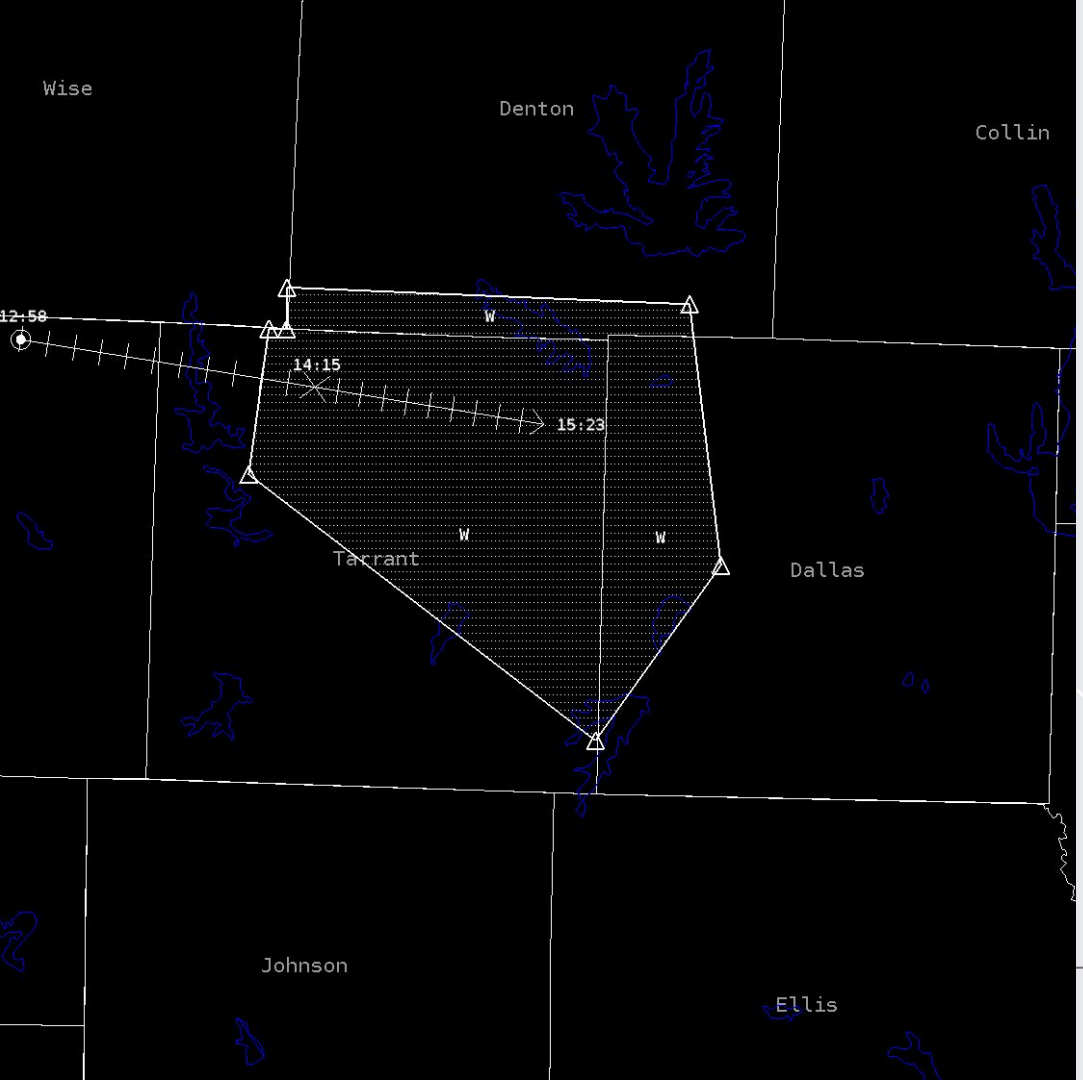
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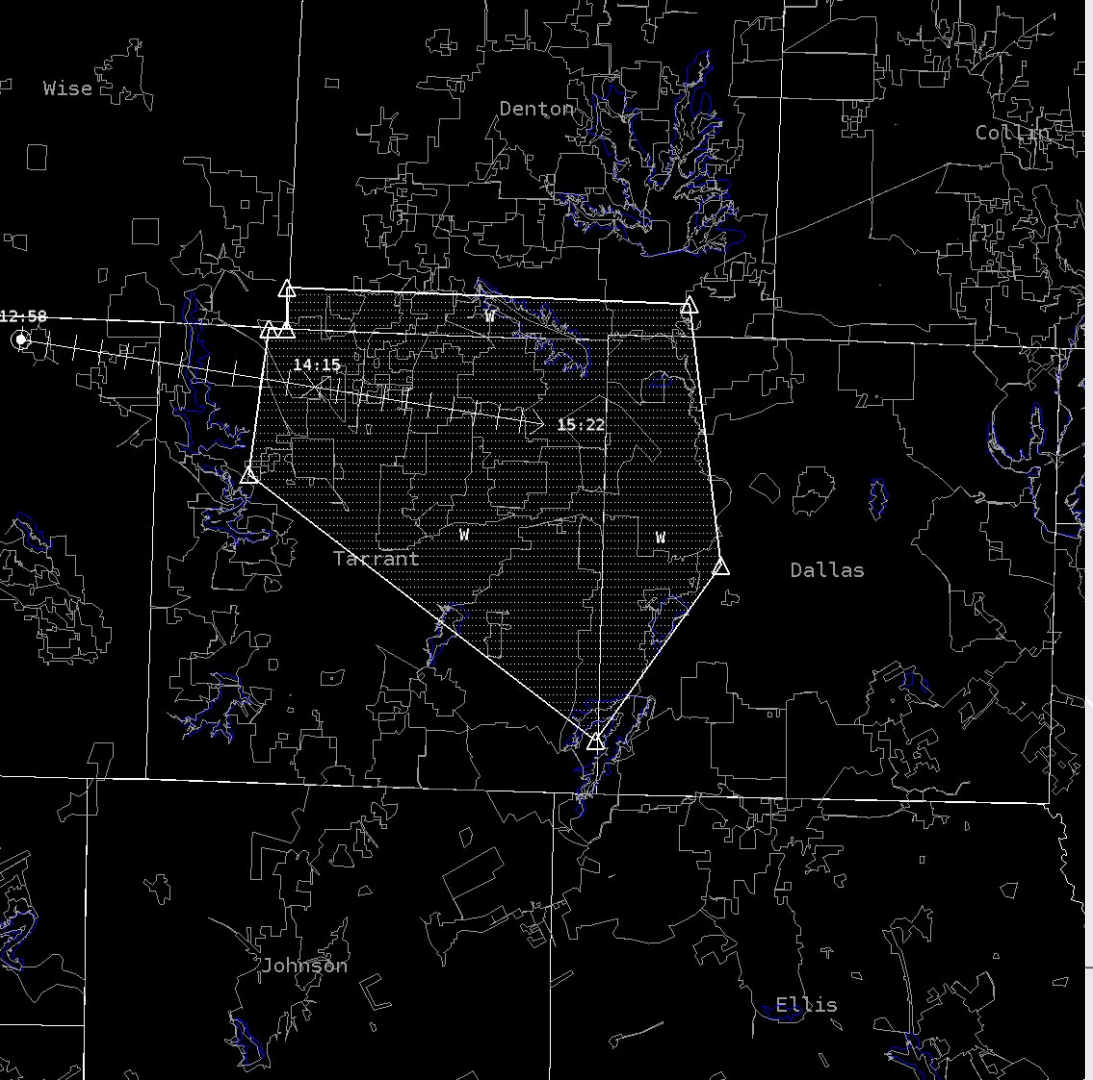
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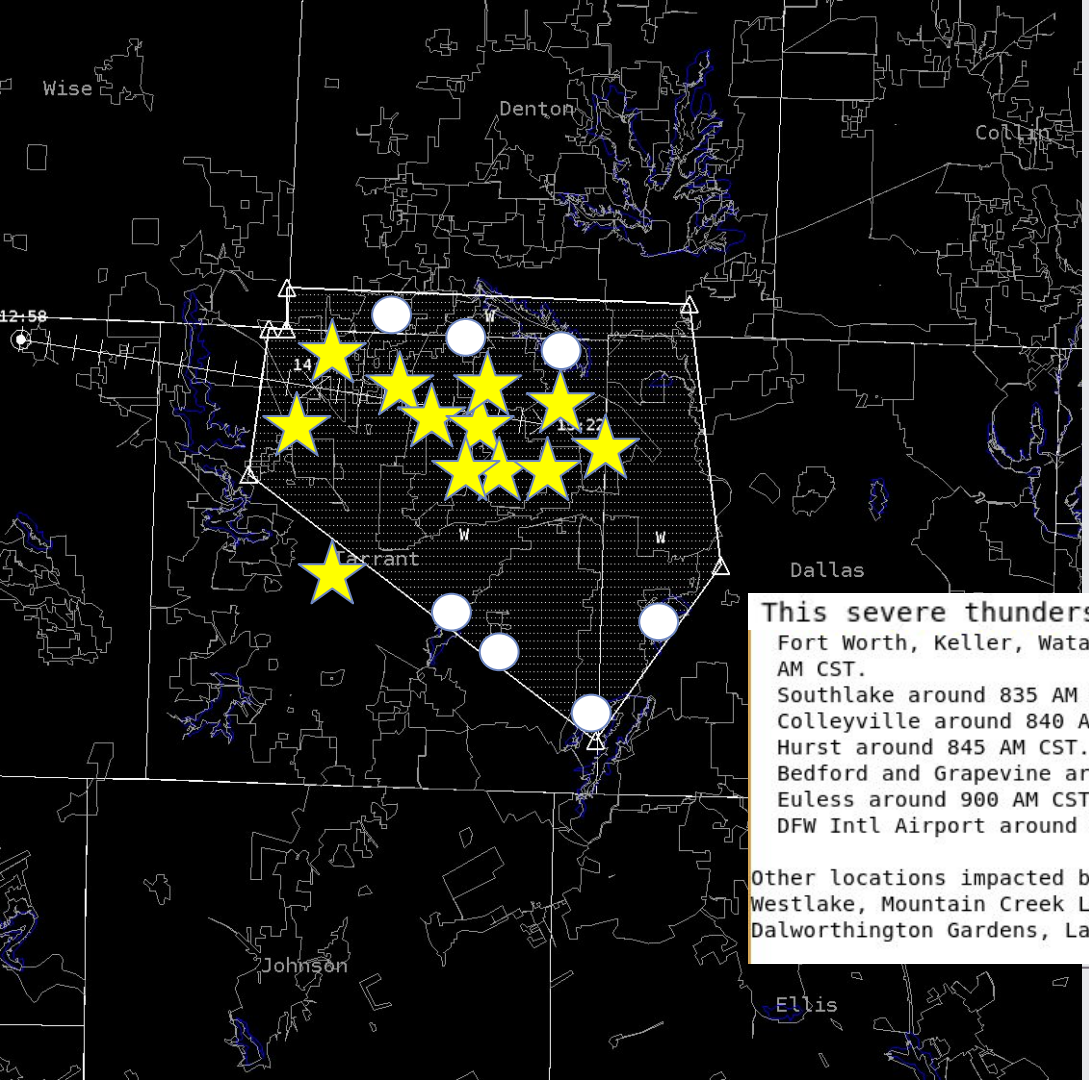


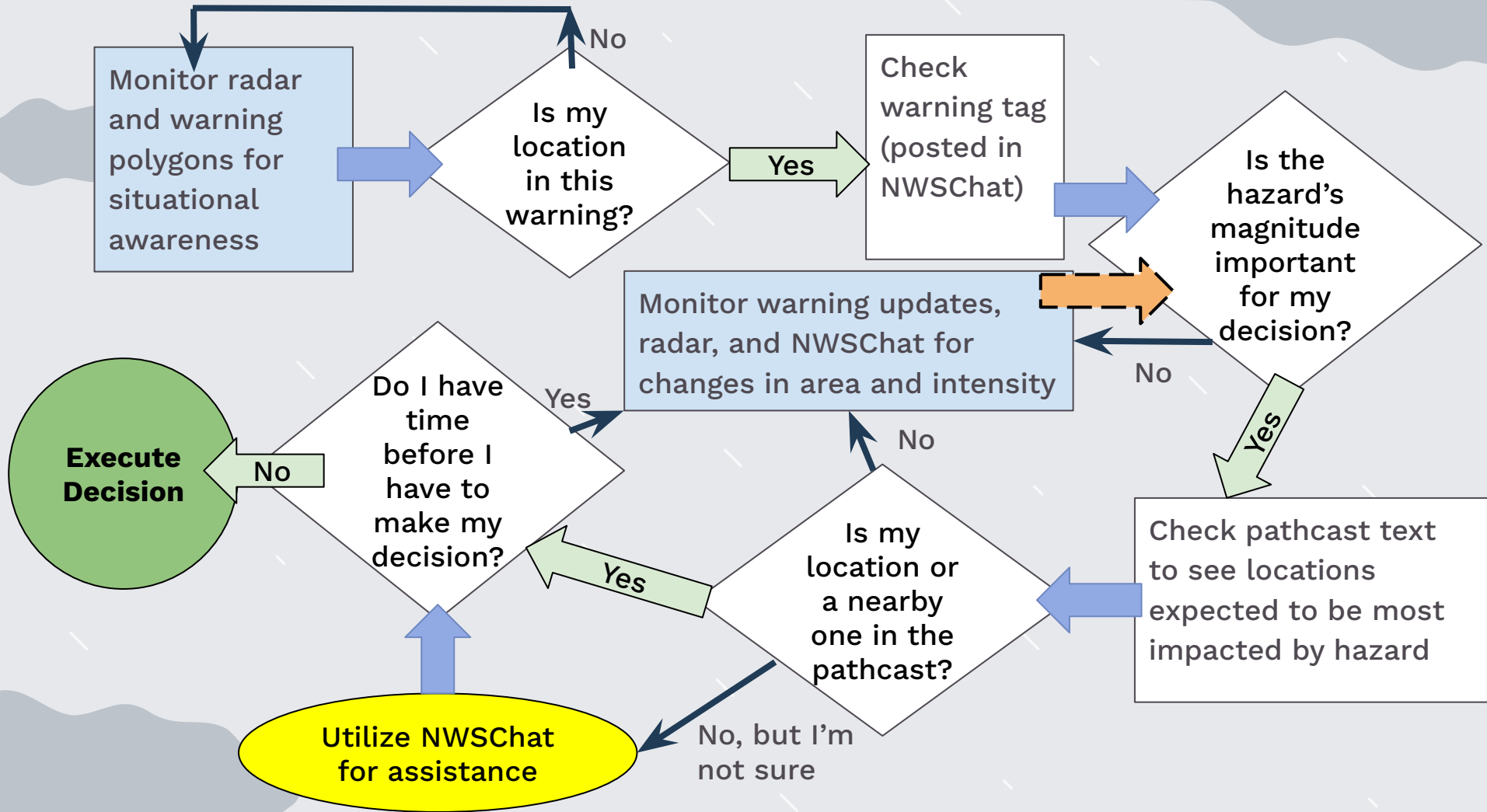
Cities listed in Pathcast are where the worst of the hazard is extrapolated to track over

This severe thunderstorm will be near...
Fort Worth, Keller, Watauga, and North Richland Hills around 830 AM CST.
Southlake around 835 AM CST.
Colleyville around 840 AM CST.
Hurst around 845 AM CST.
Bedford and Grapevine around 855 AM CST.
Euless around 900 AM CST.
DFW Intl Airport around 905 AM CST.

Other locations impacted by this severe thunderstorm include Westlake, Mountain Creek Lake, Marshall Creek, Grapevine Lake, Dalworthington Gardens, Lake Arlington, and Joe Pool Lake.

Review

1. View warning polygon and warning updates for situational/spatial awareness
    a. Does this warning cover my area?
2. Check the “tag”
    a. Does this criteria meet my decision making threshold?
3. Check pathcast section for the expected most impacted locations and time
    a. Is my location or a nearby one listed?
    b. Do I have time to wait and see how the storm evolves before making some of my decisions?
    c. If in a downstream gray area, monitor NWSChat or ask if you have questions.


Monitor radar and warning polygons for situational awareness
Is my location in this warning?
No
Yes
Check warning tag (posted in NWSChat)
Is the hazard's magnitude important for my decision?
No
Yes
Monitor warning updates, radar, and NWSChat for changes in area and intensity
Check pathcast text to see locations expected to be most impacted by hazard
Is my location or a nearby one in the pathcast?
No
Yes
Do I have time before I have to make my decision?
Yes
No
Execute Decision
Utilize NWSChat for assistance
No, but I'm not sure