

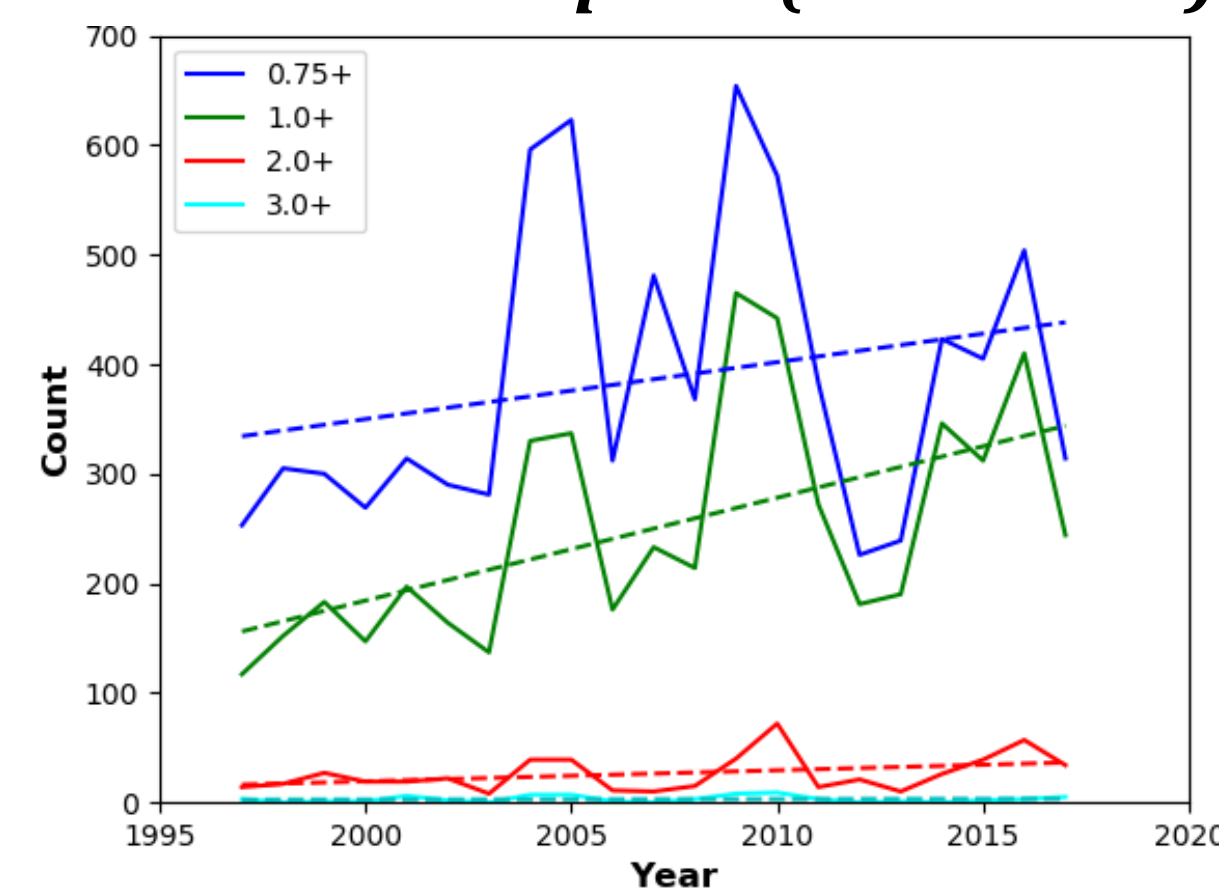
The Anomalously Large 2018 Hail Season of Eastern Colorado: A Local Perspective on a National Trend

Samuel J. Childs and Russ S. Schumacher

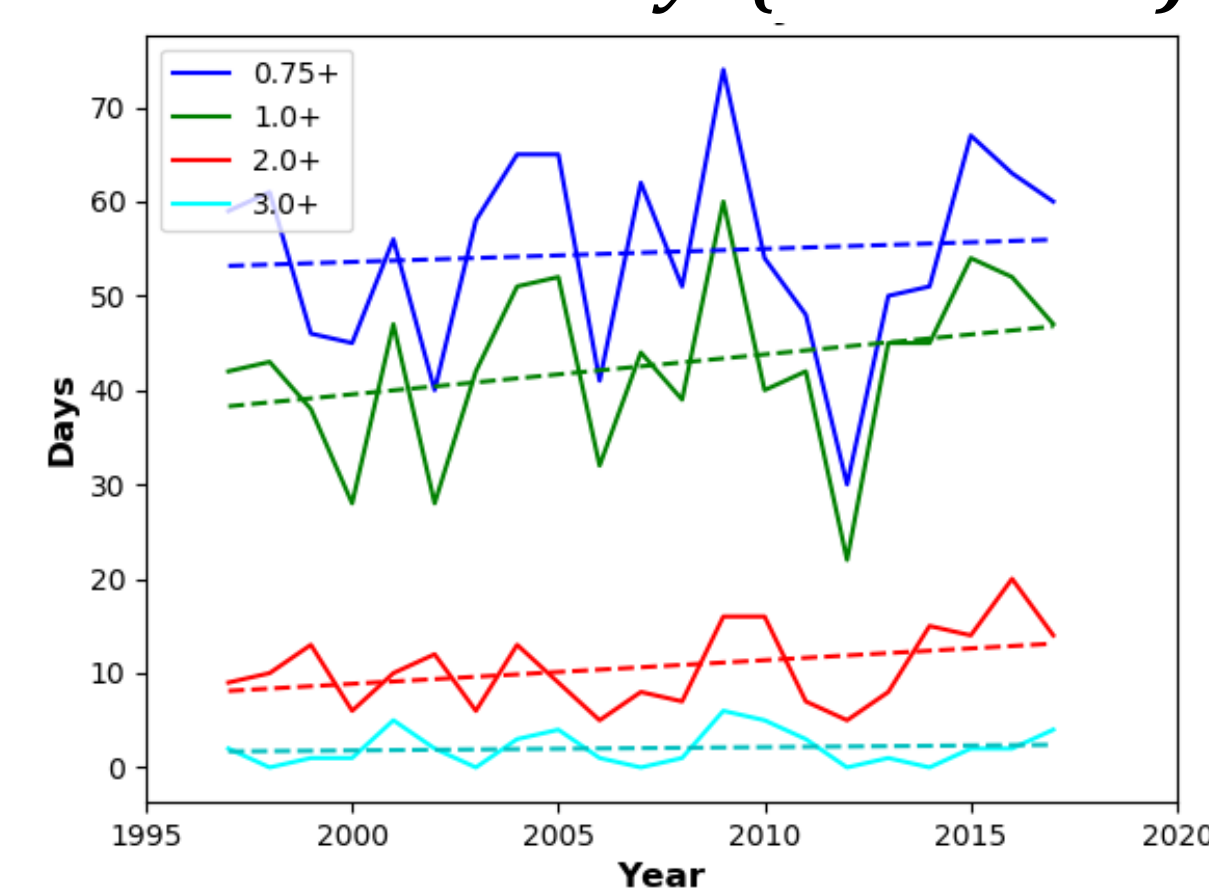
Department of Atmospheric Science, Colorado State University, Fort Collins, CO

COLORADO HAIL CLIMATOLOGY

Severe Hail Reports (1997-2017)

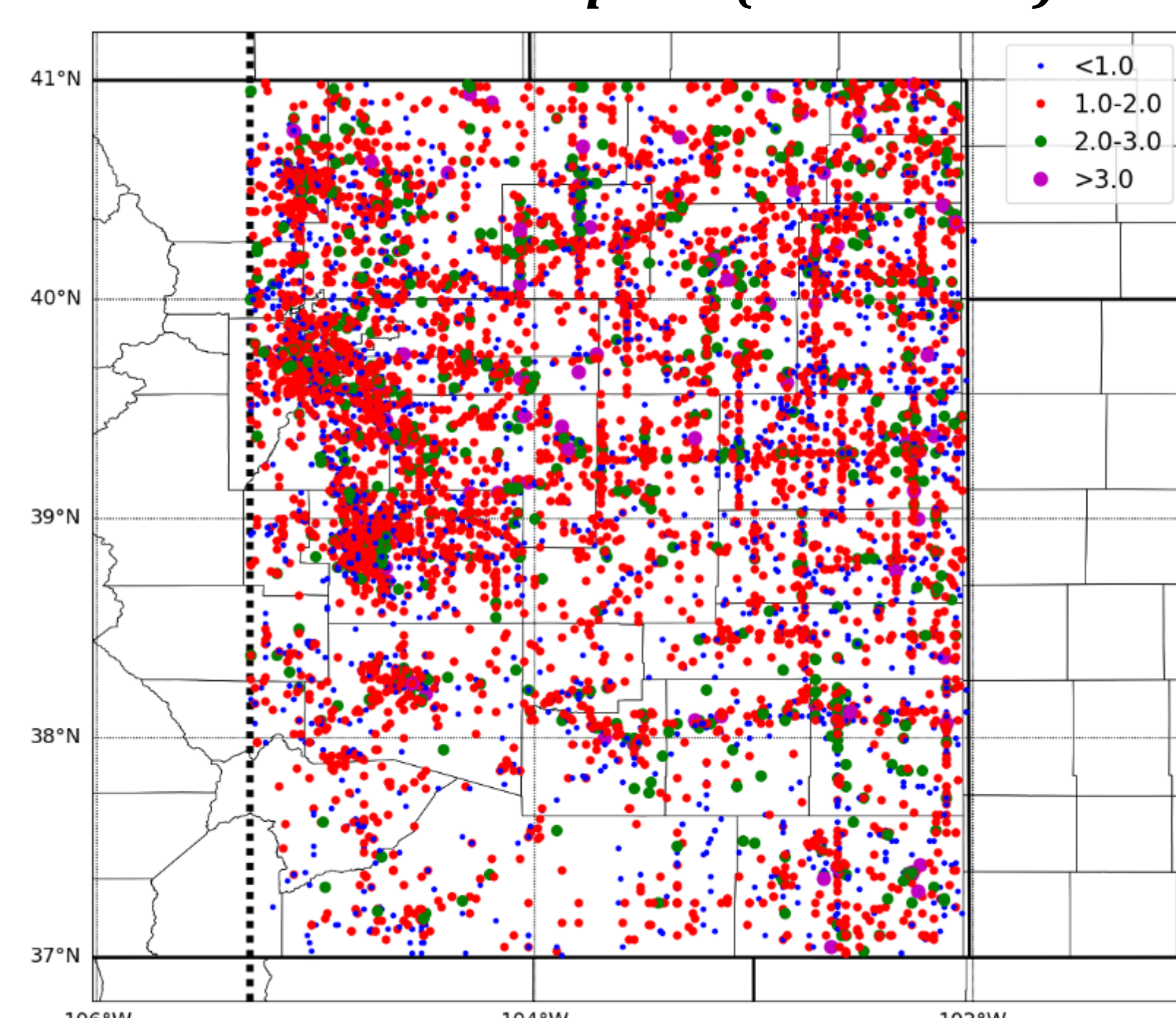


Severe Hail Days (1997-2017)



Domain: 102-105.3°W, 37-41°N

Severe Hail Reports (1955-2017)

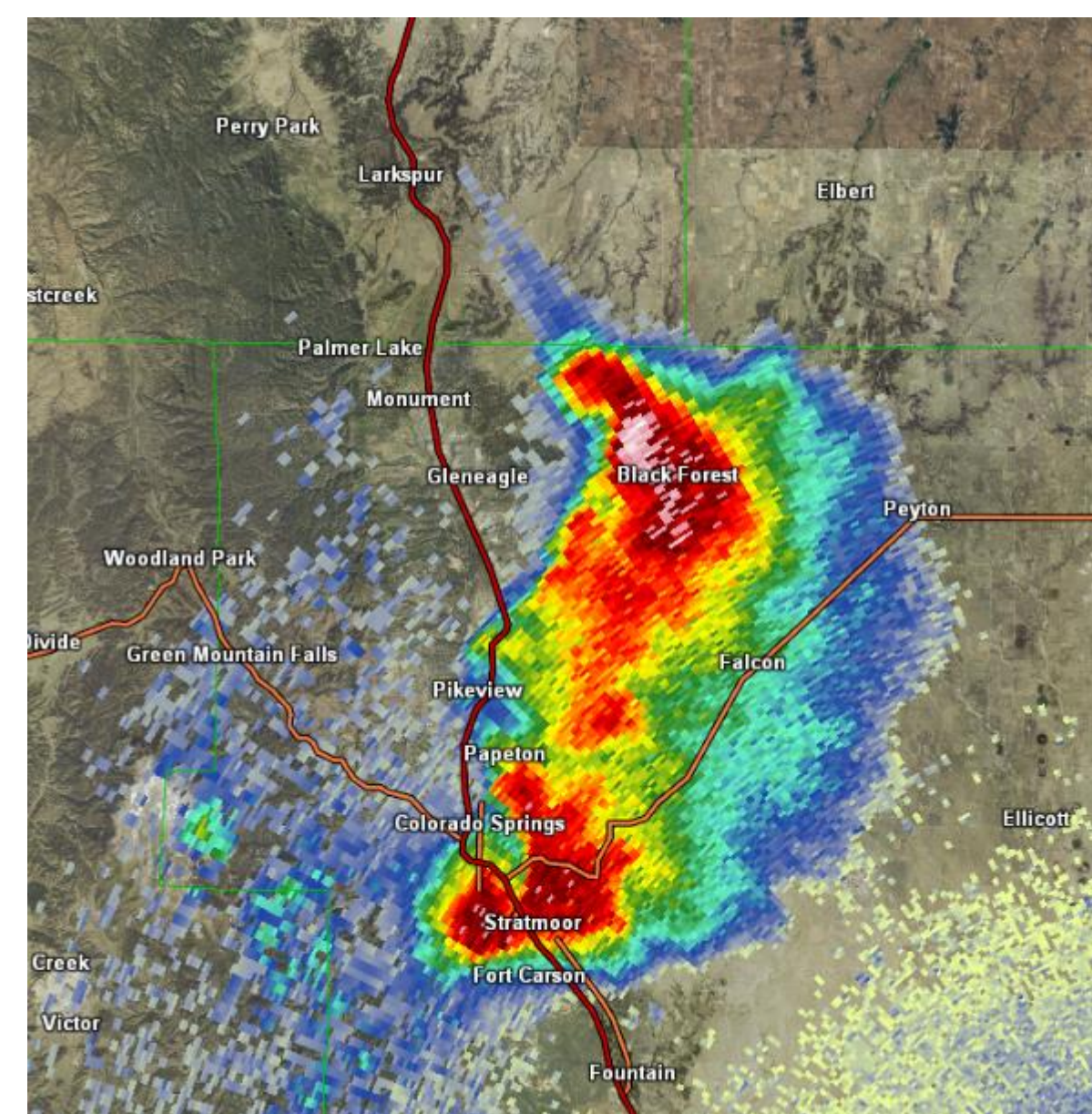


- Severe Hail Reports and Severe Hail Days increasing at all size thresholds
- Severe Hail Reports highly correlated to population centers and roadways

NOTABLE EVENTS

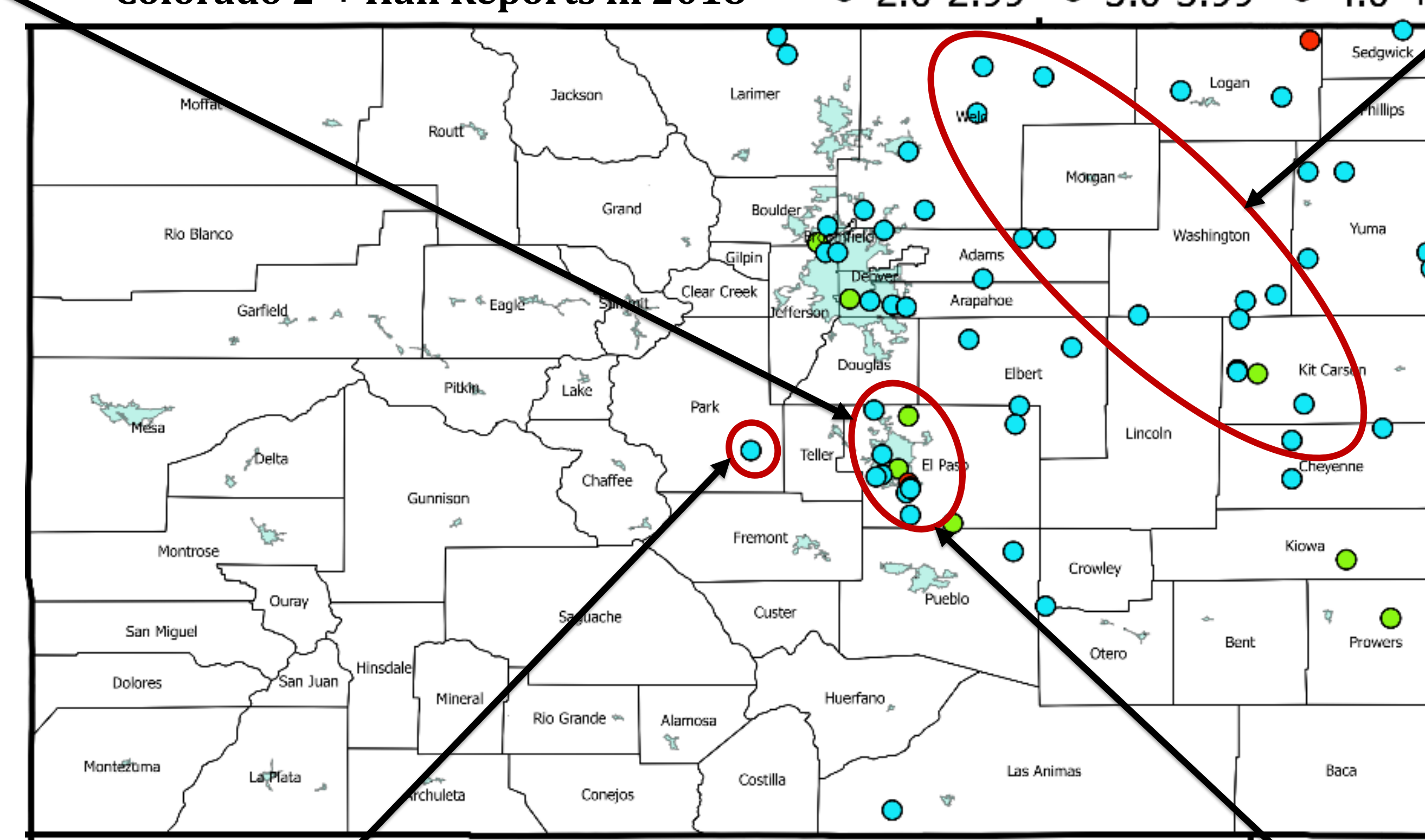
June 13 Colorado Springs Overnight Event

Splitting supercell leads to the first instance in state history of two 3"+ hail reports between midnight and 9am local time on the same day, and only the third and fourth times overall that hail this large has fallen between those hours (last time was in 1982)



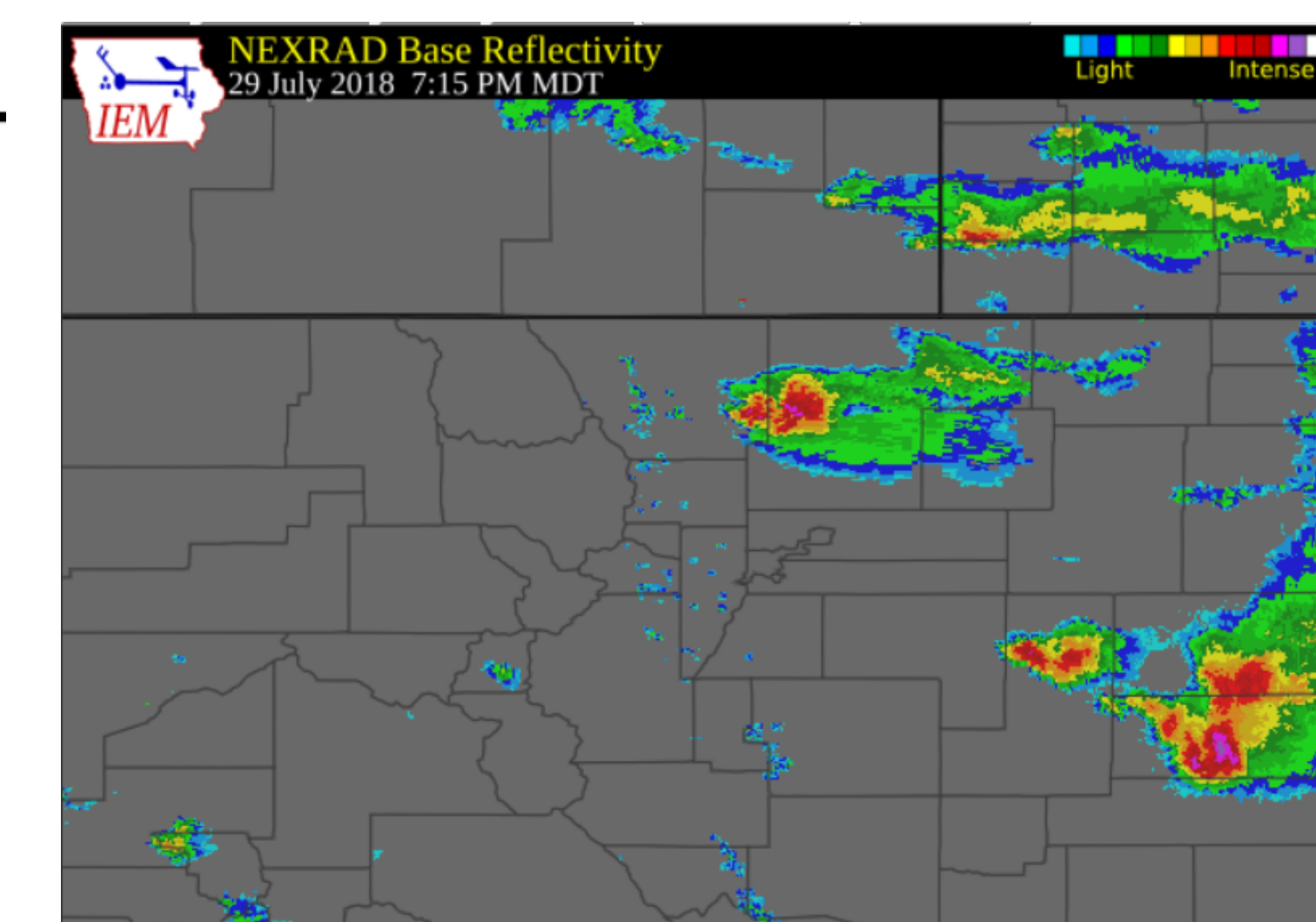
https://gazette.com/weather/areas-near-colorado-springs-see-worst-overnight-hail-storm-in/article_6442b5f7-51bc-57b3-b1cc-3b07eb704e3.html

Colorado 2"+ Hail Reports in 2018



July 29 Large Hail Outbreak

Series of training supercells lead to seventeen 2"+ reports across NE Colorado, tying the state record for most 2"+ reports on one day

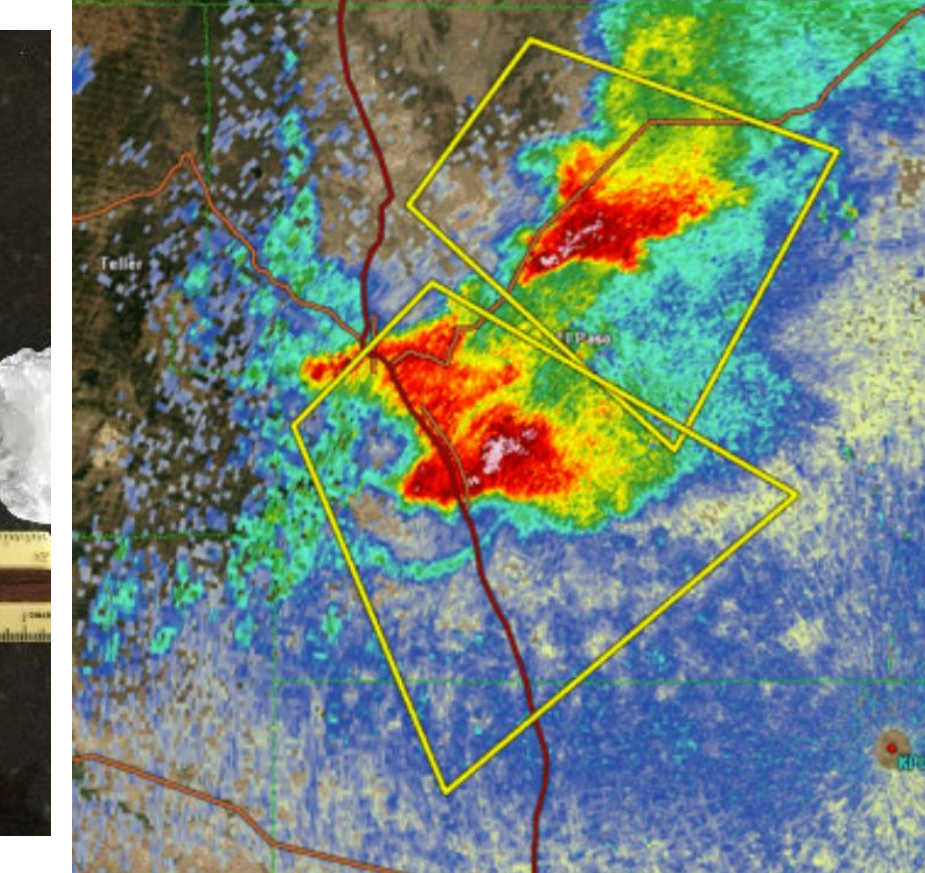


August 6 Cheyenne Mountain Zoo Destruction

At least ten human injuries, five animal fatalities, and hundreds of vehicles destroyed; unofficial report of 4.5" hail stone would tie state record



NWS Pueblo, Photo by Jennifer Stark



NWS Pueblo



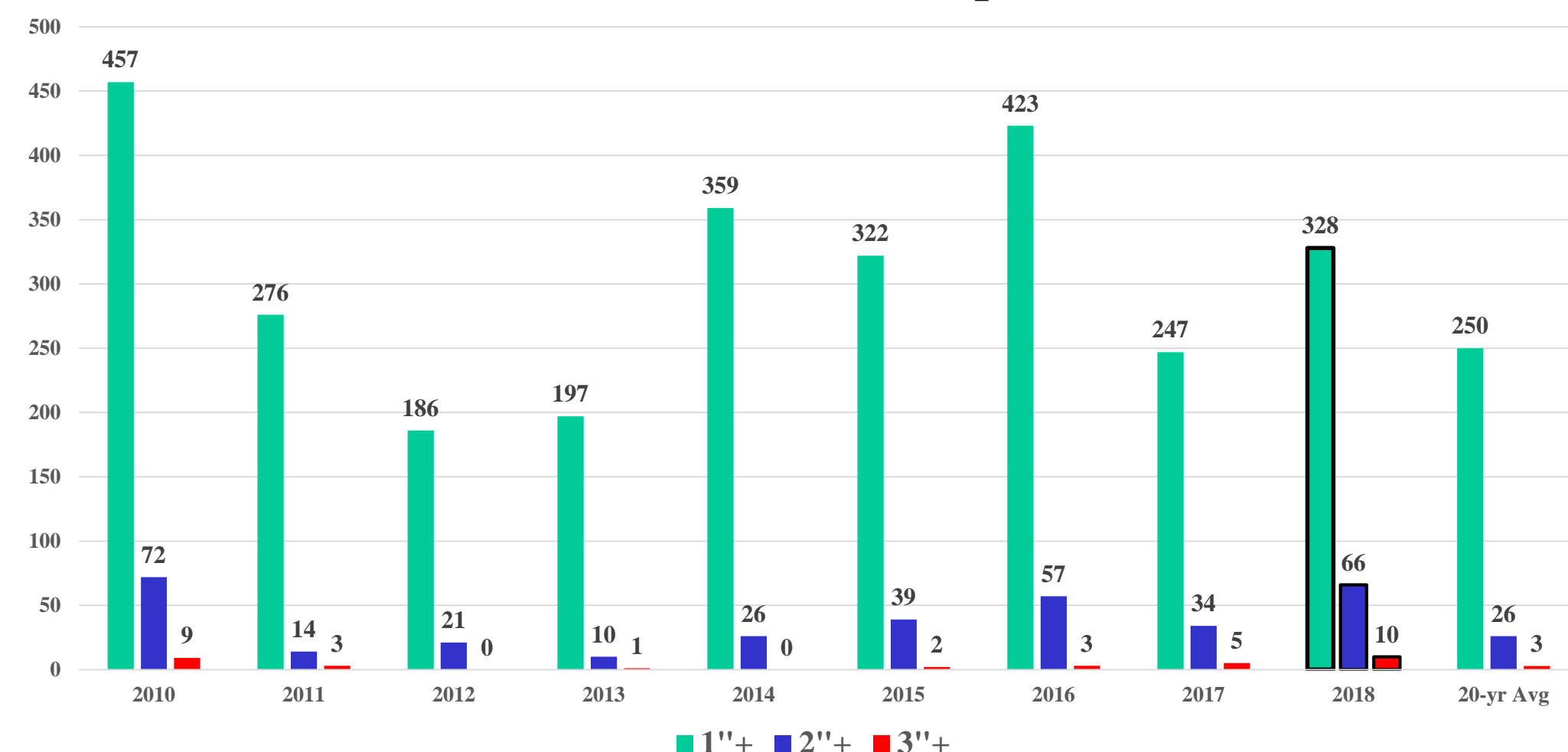
<https://www.wfla.com/national/colorado-zoo-closed-after-hail-storm-injuries-5-kills-birds/1351765379>

June 19 Park County Mountainous Hail Storm

2.75" hail reported at 11-Mile Canyon Reservoir at 8,500 feet elevation is only the third time that 2.75" hail or larger has been recorded that far west in the state

2018 IN PERSPECTIVE

Colorado Annual Severe Hail Reports: 2010-2018

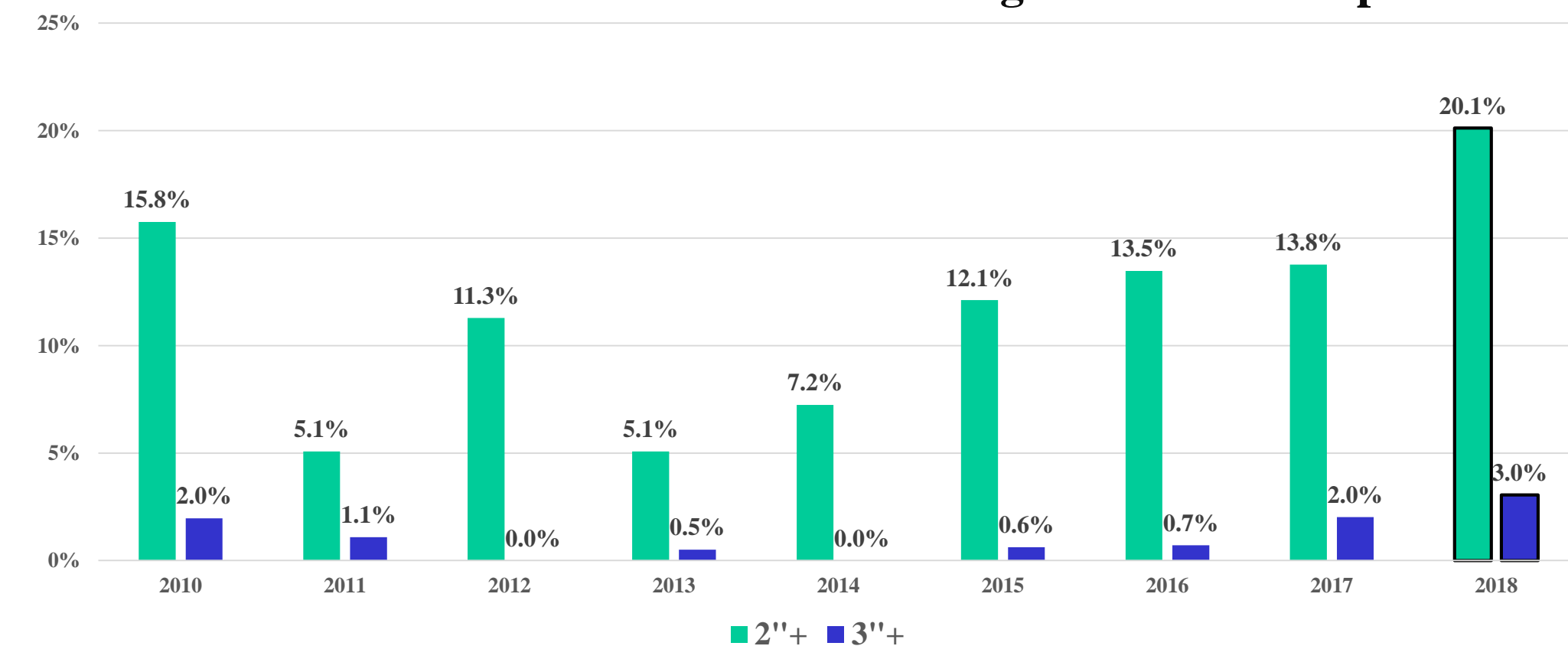


2018 TOTALS

- 1"+ Reports: 328
- 2"+ Reports: 66
- 3"+ Reports: 10**

**state record

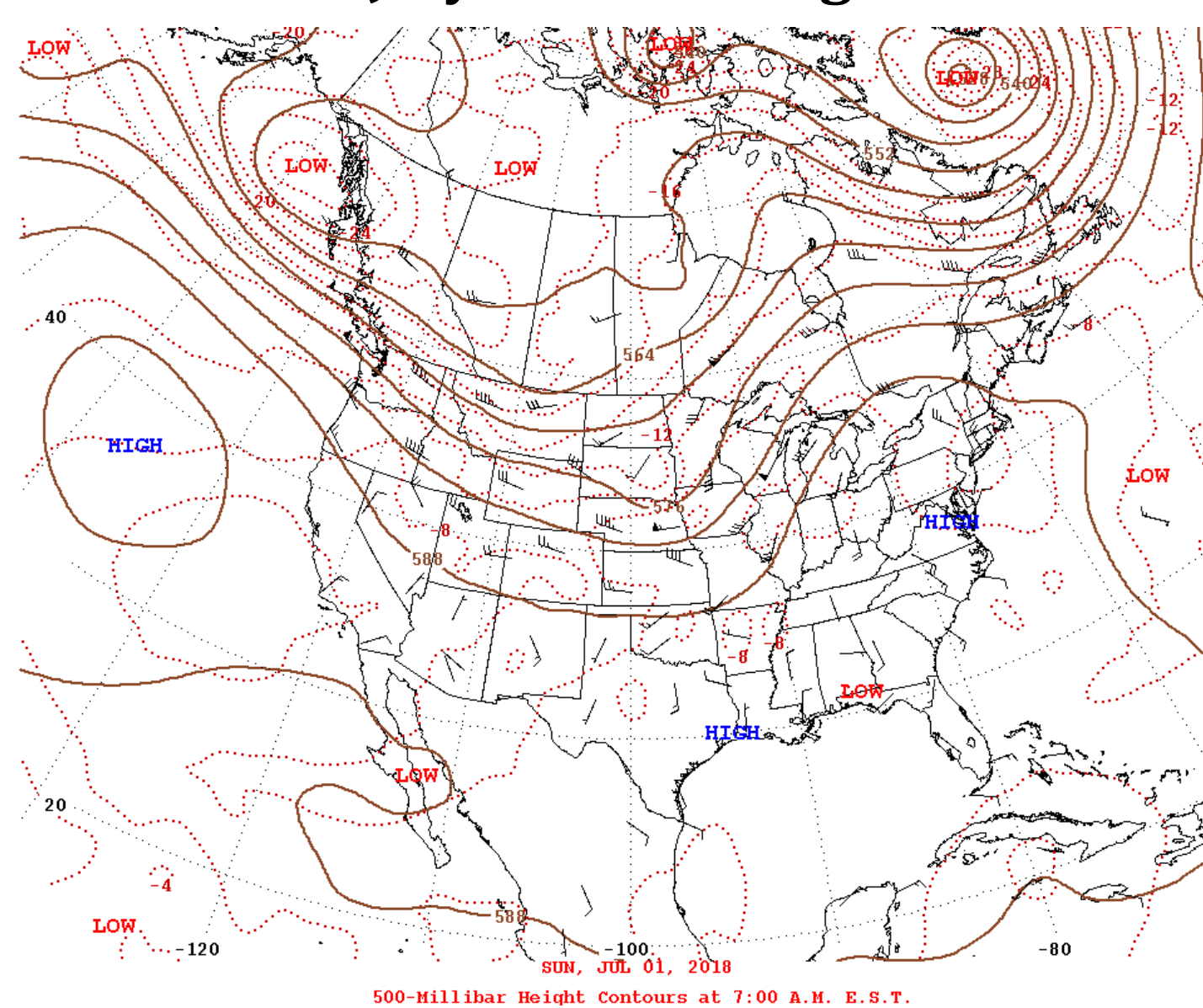
Percent Contribution of Colorado Significant Hail Reports



Highest ever proportions of 2"+ and 3"+ severe hail reports and 3"+ hail days

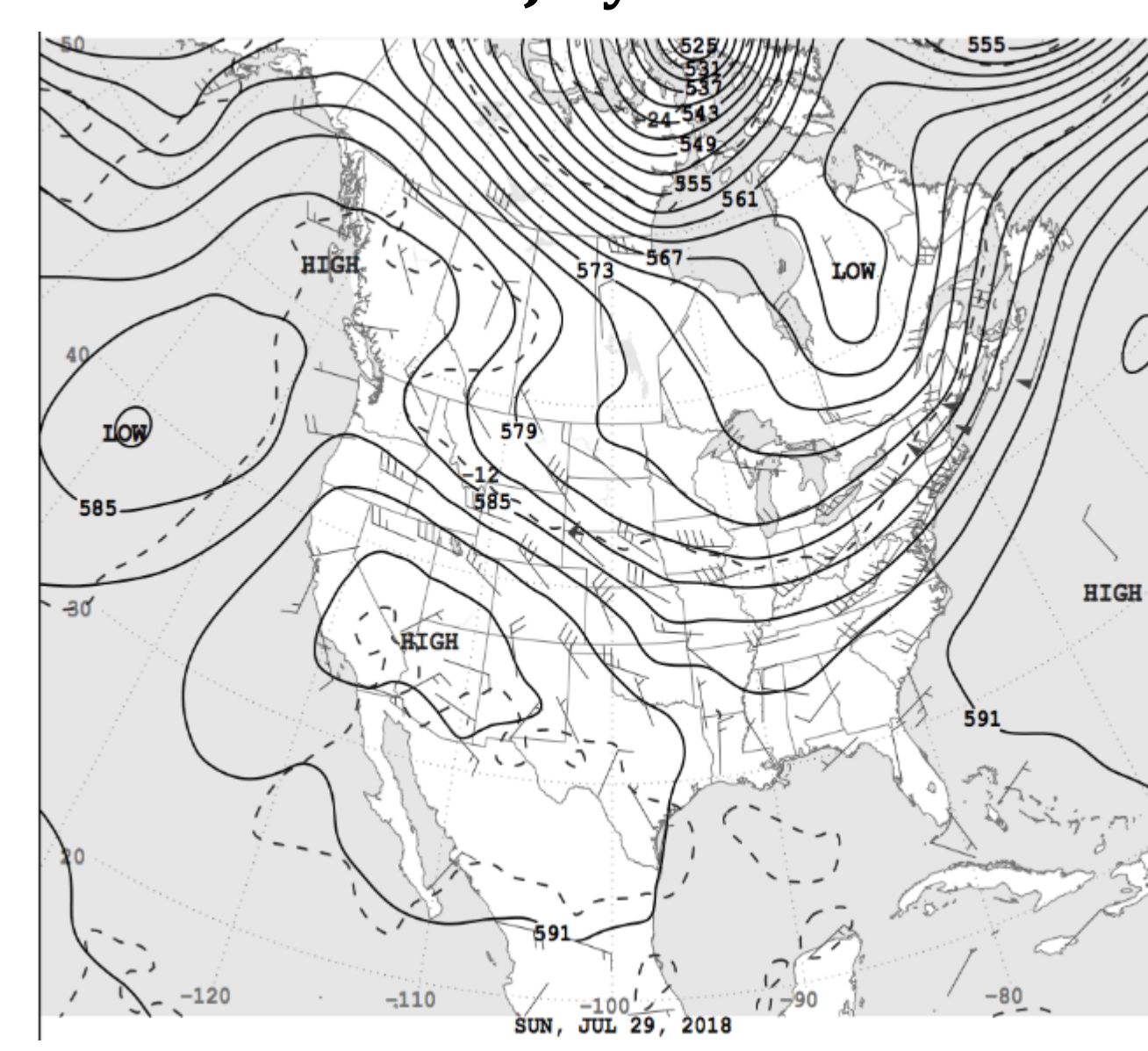
ATTRIBUTION

500-mb Heights & Winds
July 2018 Average



NCEI Synoptic Summary and WPC Weather Map Archive

500-mb Heights & Winds
29 July 2018

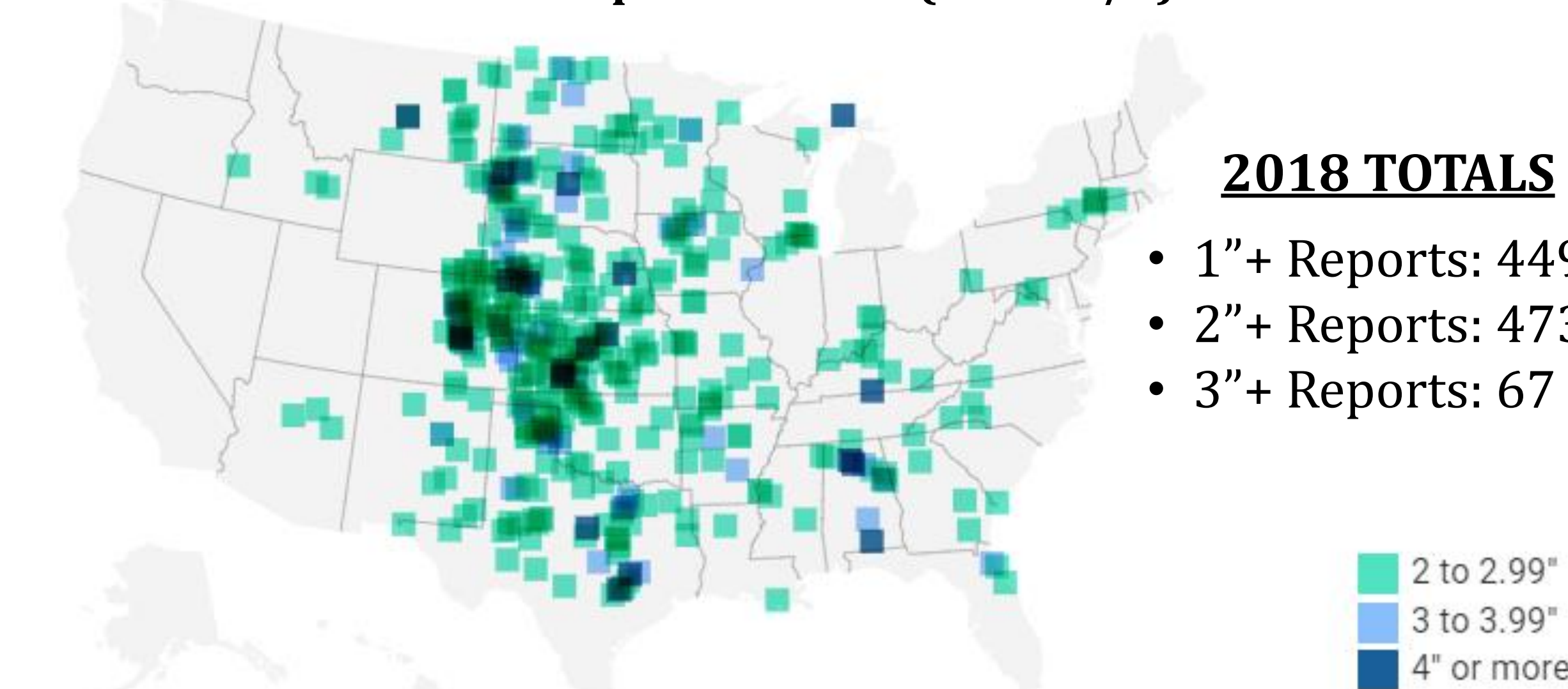


- Large ridge over the East Pacific puts the High Plains under strong mid-level northwesterly flow -> wind shear enhanced when flow is upslope
- Moisture increases as summer progresses due to Southwest Monsoon
- Many big hail days in CO characterized by High pressure southwest of state, promoting northwesterly flow and southeastward-moving supercells

NATIONAL ANALYSIS

** Figure taken from my article in *The Conversation*, 20 September 2018**
<https://theconversation.com/destructive-2018-hail-season-a-sign-of-things-to-come-102879>

U.S. 2"+ Hail Reports in 2018 (as of 10/1)



2018 TOTALS

- 1"+ Reports: 4493
- 2"+ Reports: 473
- 3"+ Reports: 67

Proportion of 2"+ Reports: 10.55%

Proportion of 3"+ Reports: 1.49%
new US record

ACKNOWLEDGMENTS

- Funding provided by NSF Graduate Research Fellowship Program Grant No. DGE-1321845 and NOAA grants NA15OAR4590233 and NA16OAR4590215

Contact E-mail: sjchilds@rams.colostate.edu