

A Snowstorm Puzzle: The Relationship Between Federal Declarations of Impact and Storm Tracks for Extreme Midwestern Blizzards

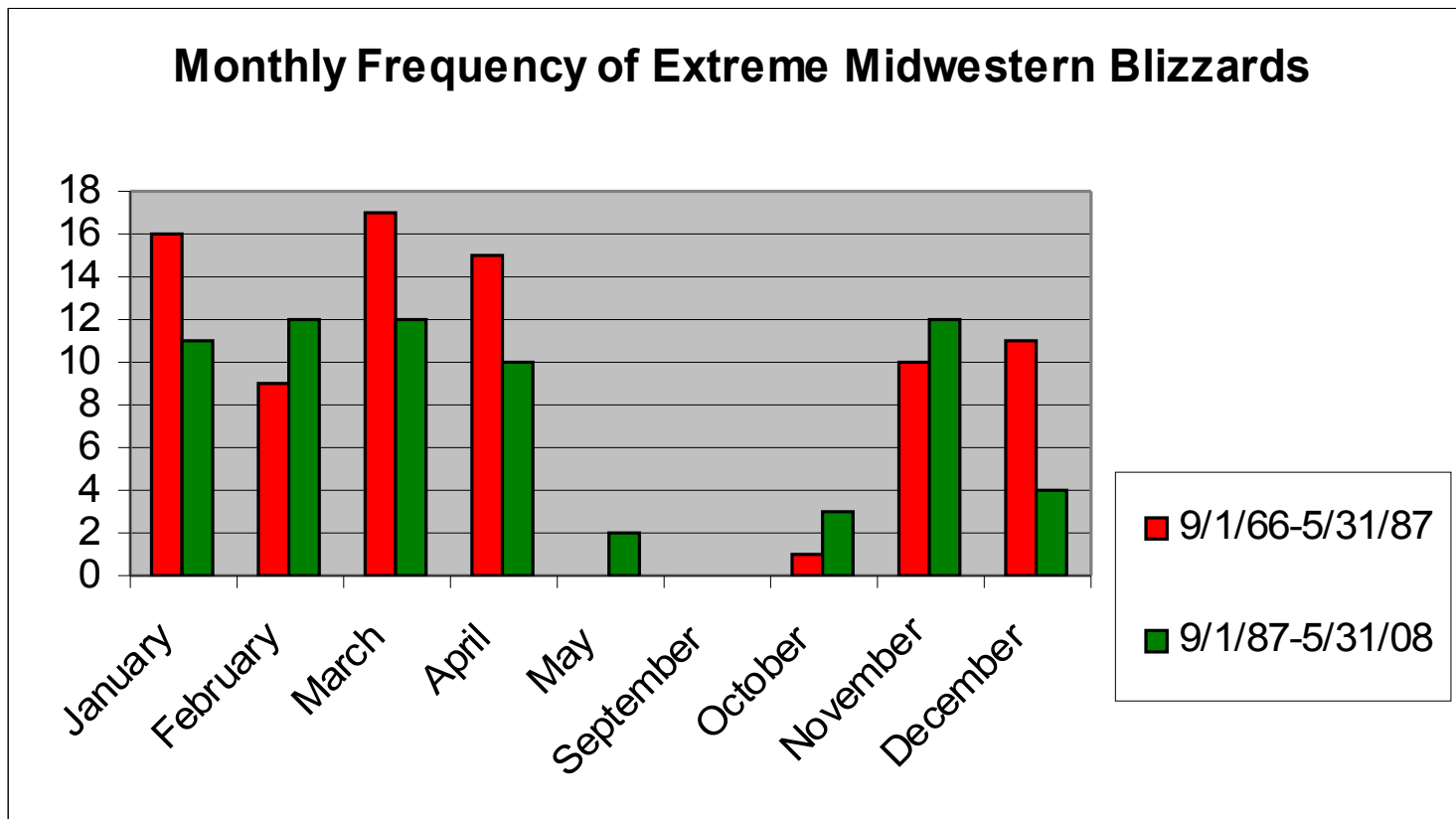


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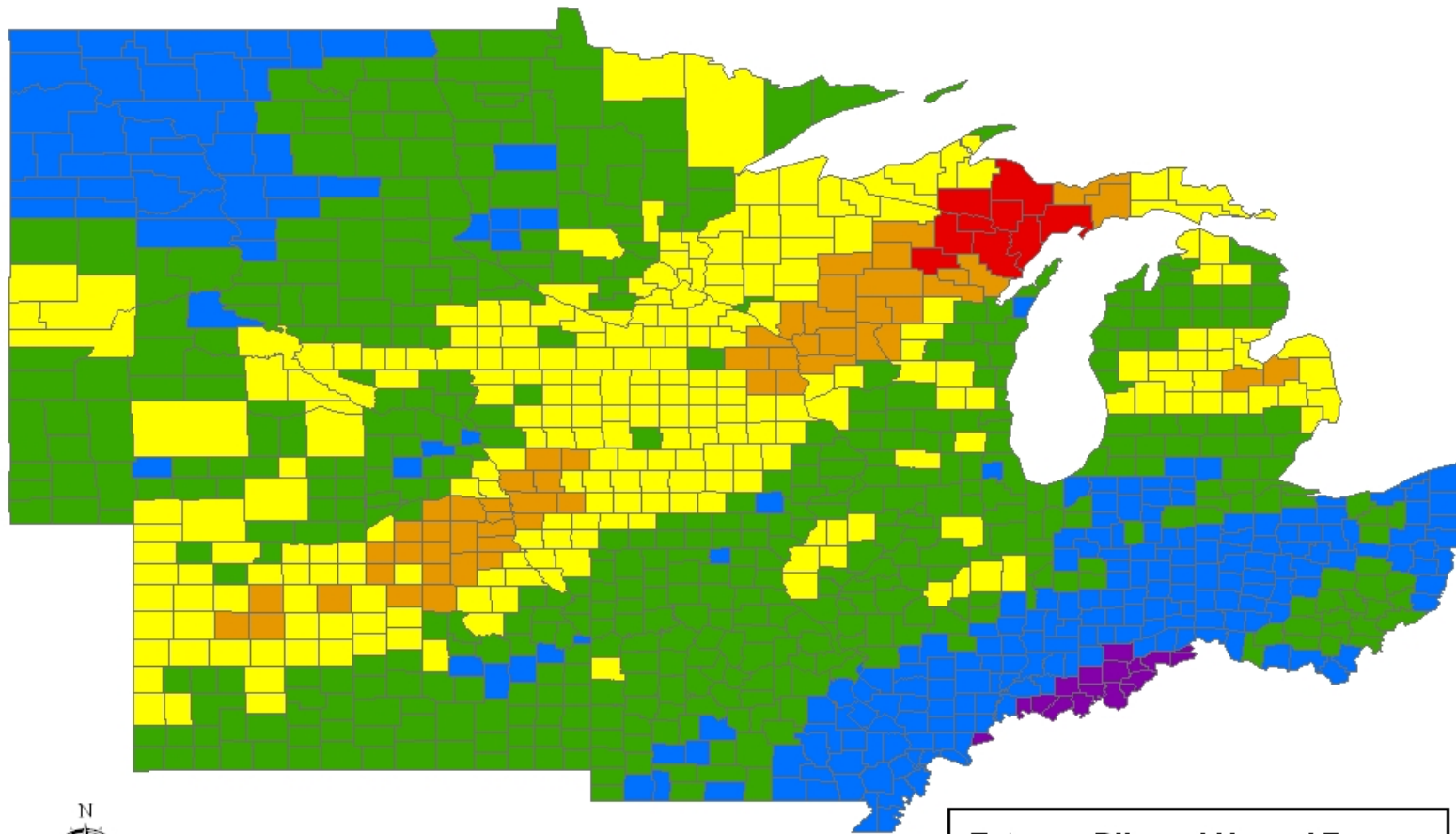
1st Period: 79 Storms

2nd Period: 66 Storms

NOAA, HPC, GISS, and *Storm Data*



Blizzard Impact Zonation for Time Period I



0 105 210 420 630 840 Kilometers

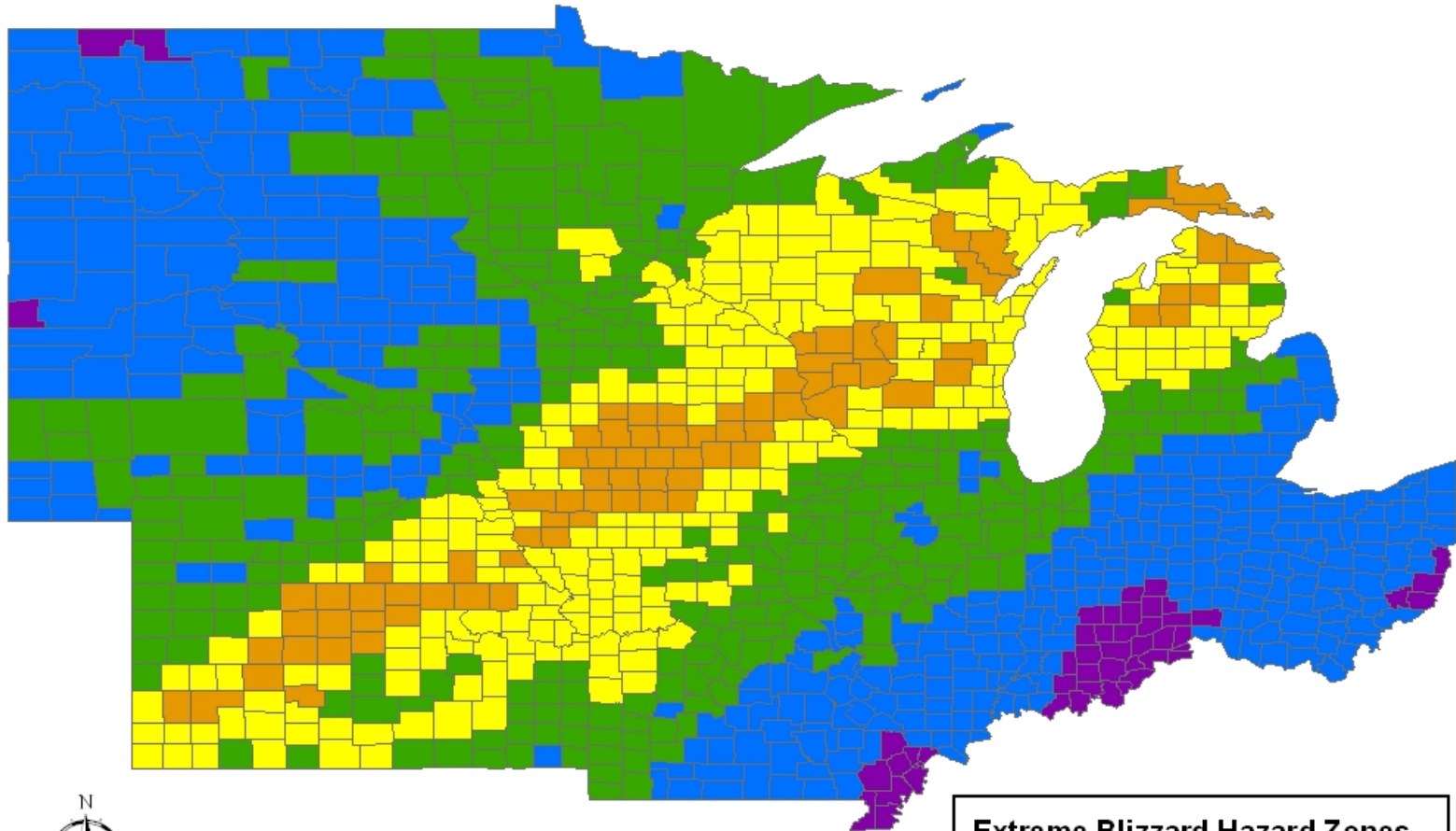
Extreme Blizzard Hazard Zones

- | | |
|---|---|
|  Hazard Zone 1 |  Hazard Zone 4 |
|  Hazard Zone 2 |  Hazard Zone 5 |
|  Hazard Zone 3 |  Low Hazard Risk |

Sources: ESRI; NOAA, HPC Daily Weather Maps: 2003-2009;
GISS, Atlas of Extratropical Storm Tracks: 1961-1998

Map by: Christopher Atkinson

Blizzard Impact Zonation for Time Period II



0 105 210 420 630 840 Kilometers

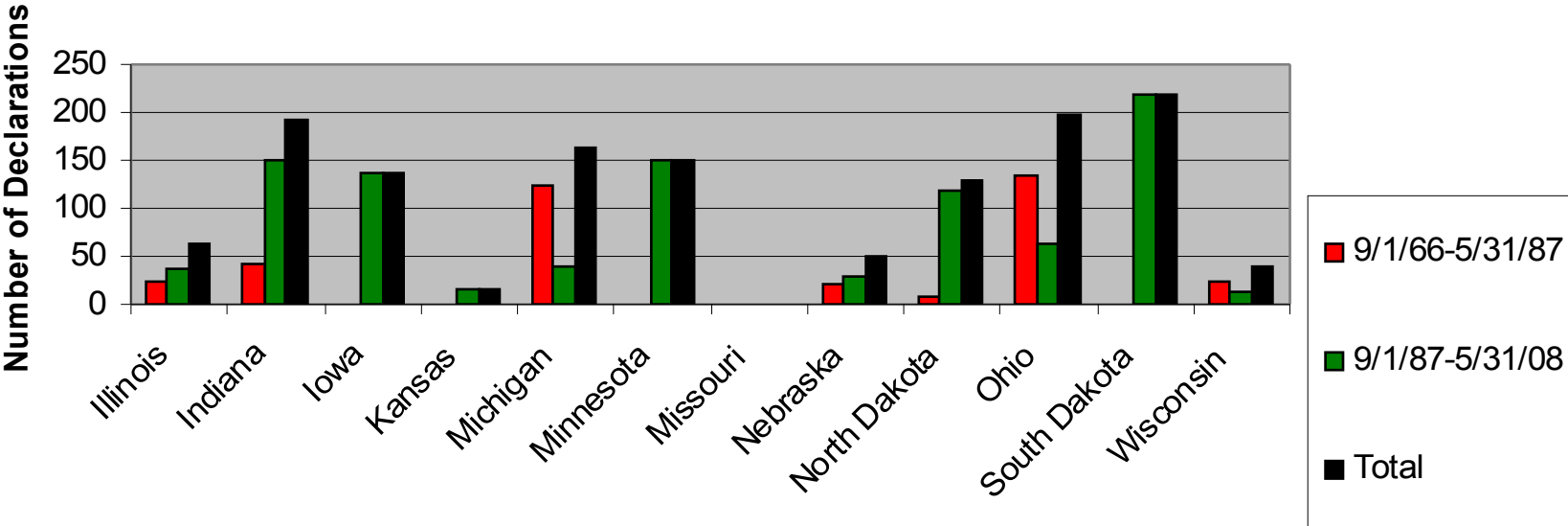
Extreme Blizzard Hazard Zones

- | | |
|---|---|
|  Hazard Zone 1 |  Hazard Zone 4 |
|  Hazard Zone 2 |  Low Hazard Risk |
|  Hazard Zone 3 | |

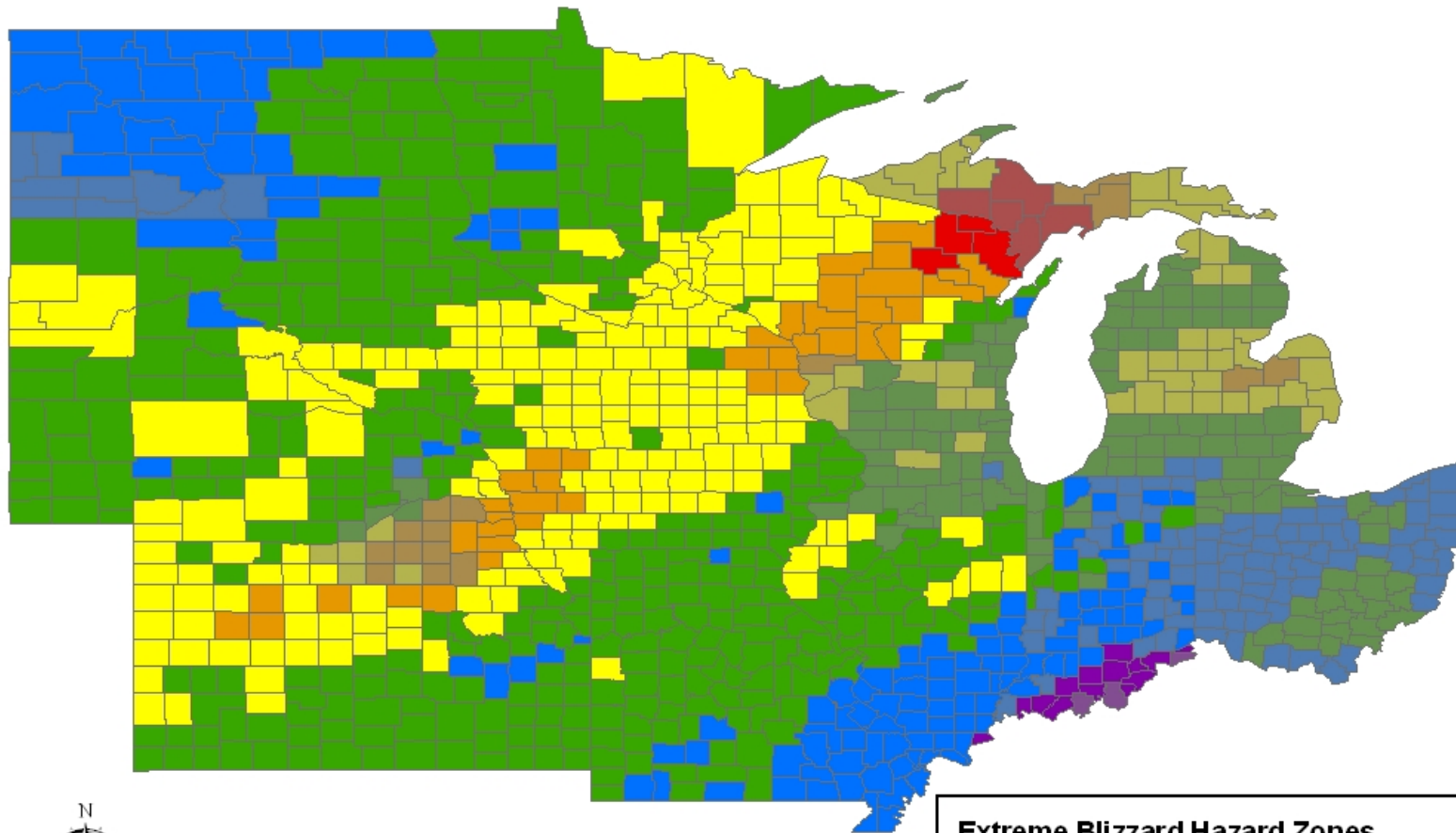
Sources: ESRI; NOAA, HPC Daily Weather Maps: 2003-2009;
GISS, Atlas of Extratropical Storm Tracks: 1961-1998

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Frequency of Federal County Declarations Due to Extreme Midwestern Blizzards



Blizzard Impact Zonation for Time Period I



0 105 210 420 630 840 Kilometers

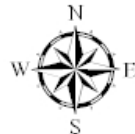
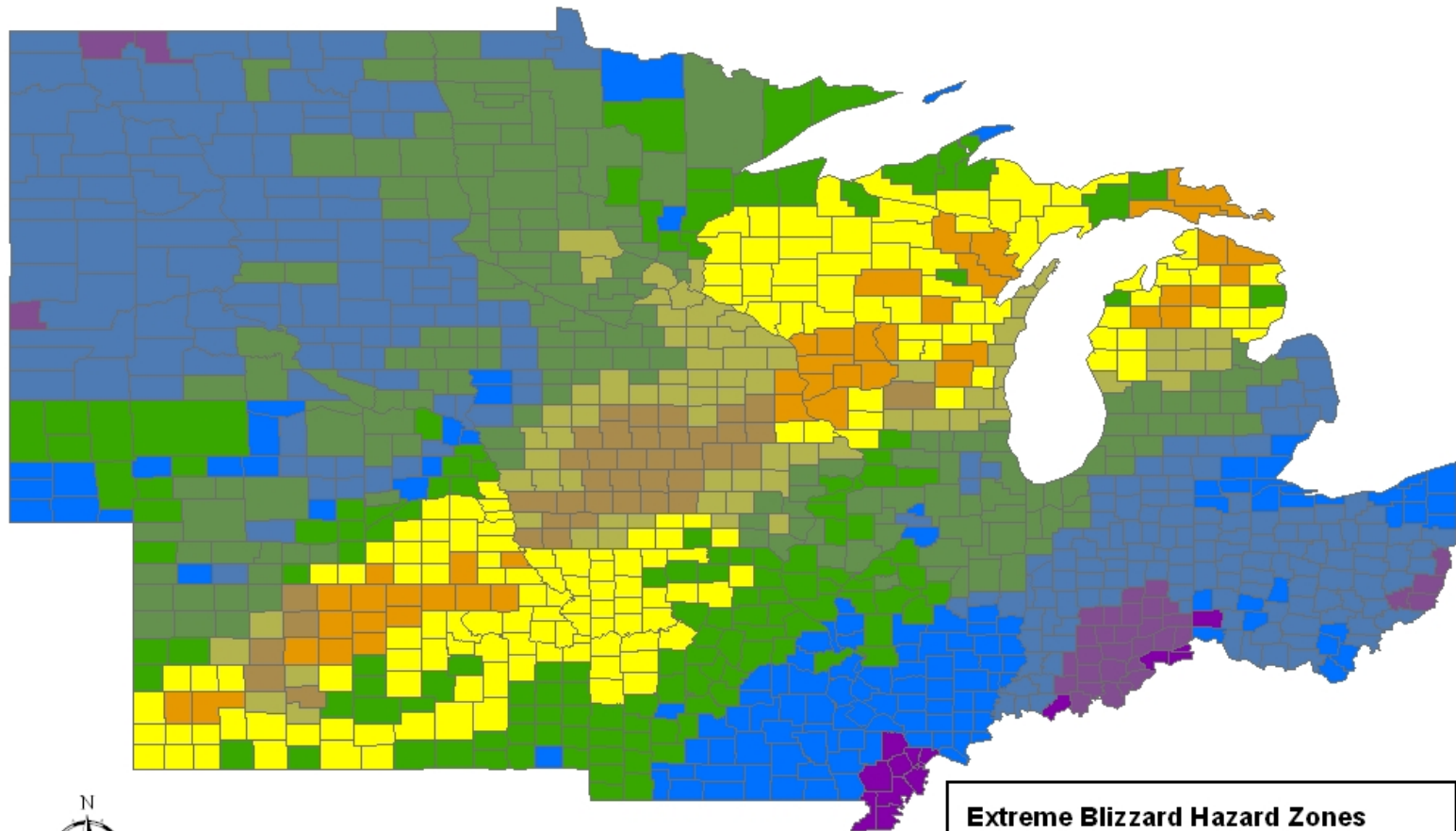
Extreme Blizzard Hazard Zones

- | | |
|----------------------|-----------------|
| Declaration Counties | Hazard Zone 4 |
| Hazard Zone 1 | Hazard Zone 5 |
| Hazard Zone 2 | Low Hazard Risk |
| Hazard Zone 3 | |

Sources: ESRI; NOAA, HPC Daily Weather Maps: 2003-2009;
GISS, Atlas of Extratropical Storm Tracks: 1961-1998

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Blizzard Impact Zonation for Time Period II



0 105 210 420 630 840 Kilometers

Extreme Blizzard Hazard Zones

- | | |
|----------------------|-----------------|
| Declaration Counties | Hazard Zone 4 |
| Hazard Zone 1 | Low Hazard Risk |
| Hazard Zone 2 | |
| Hazard Zone 3 | |

Map by: Christopher Atkinson

Sources: ESRI; NOAA, HPC Daily Weather Maps: 2003-2009;
GISS, Atlas of Extratropical Storm Tracks: 1961-1998

Conclusions: Period 2 vs. Period 1

- **Blizzard Frequency**
 - ~ 16% decrease
 - ($\alpha = 0.01$; $t = 7.91$; $7.91 > 2.845$)
- **Blizzards and Federal Declarations**
 - ~ 183% increase in blizzards with declarations
 - Avg. Minimum Central Pressure: 988 mb vs. 981 mb
- **Total Number of Federal Declarations**
 - ~ 158% increase in total county declarations
 - ~ 96% increase in number of counties with at least 1 declaration (564 vs. 288)
 - Shift in spatial locations of impact