

HUMMINGBIRD SOFTWARE

Hail Loss Estimate Report

Madison Metropolitan Area · April 14, 2026

Prepared by Hummingbird Software

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Classification: Confidential

This report presents a per-building physical damage and insurance loss estimate for the April 14, 2026 hail event affecting the Madison, Wisconsin metropolitan area. Estimates are produced by a parametric physical damage model calibrated to peer-reviewed hail literature, enriched with Dane County assessor data for occupancy type and structure age, and adjusted by a behavioral claim risk model developed from U.S. Census, attorney density, housing market, and vacancy data.

Executive Summary

On April 14, 2026, a hail-producing storm system tracked across the Madison, Wisconsin metropolitan area, delivering hail stones ranging from quarter-sized (1") in the periphery to golf ball size (1.75") at the core. MRMS radar indicated peak hail at approximately 1.9–2.1" equivalent spherical diameter. Our field photo analysis of a stone collected at 2609 E. Washington Ave. (urban core) shows an oblong stone with a longest axis of approximately 2.5", consistent with this estimate.

Metric	Estimate	Notes
Structures in affected area	574,463	Dane County building inventory
Structures with measurable damage	77,405	~13.5% of inventory
Gross physical (roof) loss	\$102M	Replacement cost basis
Expected insurer claim payments	\$16–21M	Property: after deductibles, ACV, uninsured
Auto glass & body loss (est.)	\$10–20M	Windshield + body; comp claims
Combined estimated insurer exposure	\$26–41M	Property + auto

Key Findings

- **Damage was moderate and widespread.** Only 1.3% of MRMS grid cells recorded hail $\geq 2"$ — most of the urban area received 1–1.5", producing cosmetic and functional damage rather than full-replacement events. A typical insured SFH claim in this event is sub-deductible or near it.
- **ACV policies are the dominant retention driver.** Madison's housing stock averages 43 years old. Most asphalt shingle roofs are past the 15-year threshold where carriers apply ACV depreciation schedules, recovering as little as 30–40 cents on the replacement-cost dollar. This alone explains roughly \$30M of gross loss not reaching insurers.
- **Wisconsin is a low-attorney market.** Dispute Culture Index scores for the Madison metro average 10 out of 100, compared to 45–70 in South Texas and South Florida markets. Estimated attorney involvement in filed claims is 8–10%, versus 25–40% in those markets. A comparable event in Austin would produce materially higher insurer payments.
- **Behavioral cohort mix is predominantly conservative.** 82% of damaged buildings fall into the *Careful Keepers* and *Squeaky Wheels* cohorts — owner-occupants with moderate financial stress and low dispute propensity. The high-propensity *Claim Cavalry* cohort accounts for under 0.5% of affected structures.
- **Condo and apartment exposure is significantly lower than SFH.** HOA master policies govern roof claims for condos, with deductibles of \$10,000–\$25,000. Apartment roof claims are filed by landlords on DP-3 policies, not tenants. Neither cohort produces the claim volume of SFH stock.

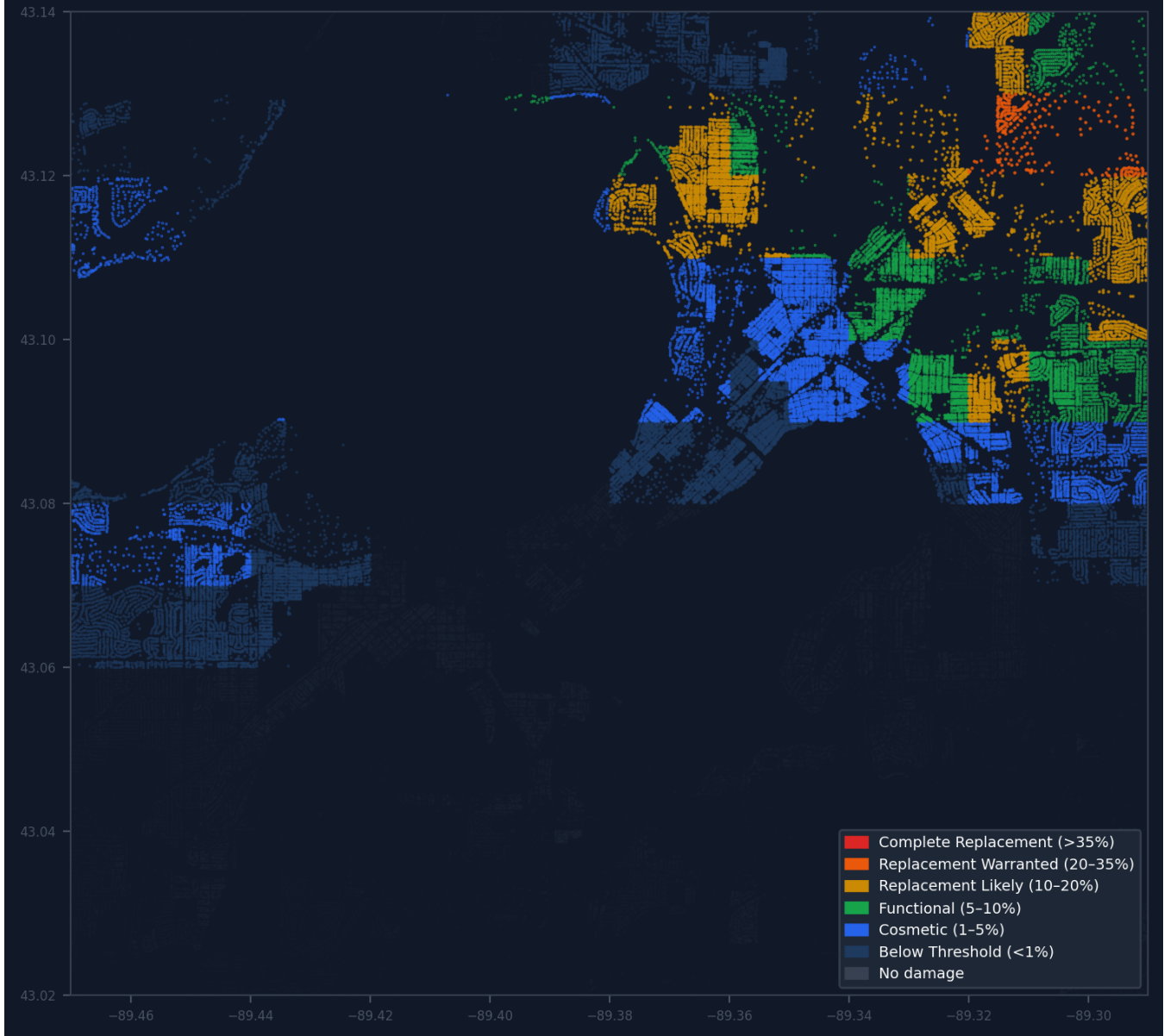
Model Visualizations

The maps below are generated directly from per-building model output and census tract behavioral scores. They are included for visual reference only.

Hail Damage by Building - Madison Urban Core

Below Threshold	< 1% DR	No visible damage; sub-threshold MESH exposure
Cosmetic	1–5% DR	Granule loss; functional life not reduced; low claim probability
Functional	5–10% DR	Impact marks; reduced roof lifespan; potential claim filed
Replacement Likely	10–20% DR	Field adjuster typically confirms partial replacement
Replacement Warranted	20–35% DR	Full roof replacement estimate generated
Complete Replacement	> 35% DR	Total loss of roof assembly; structural inspection recommended

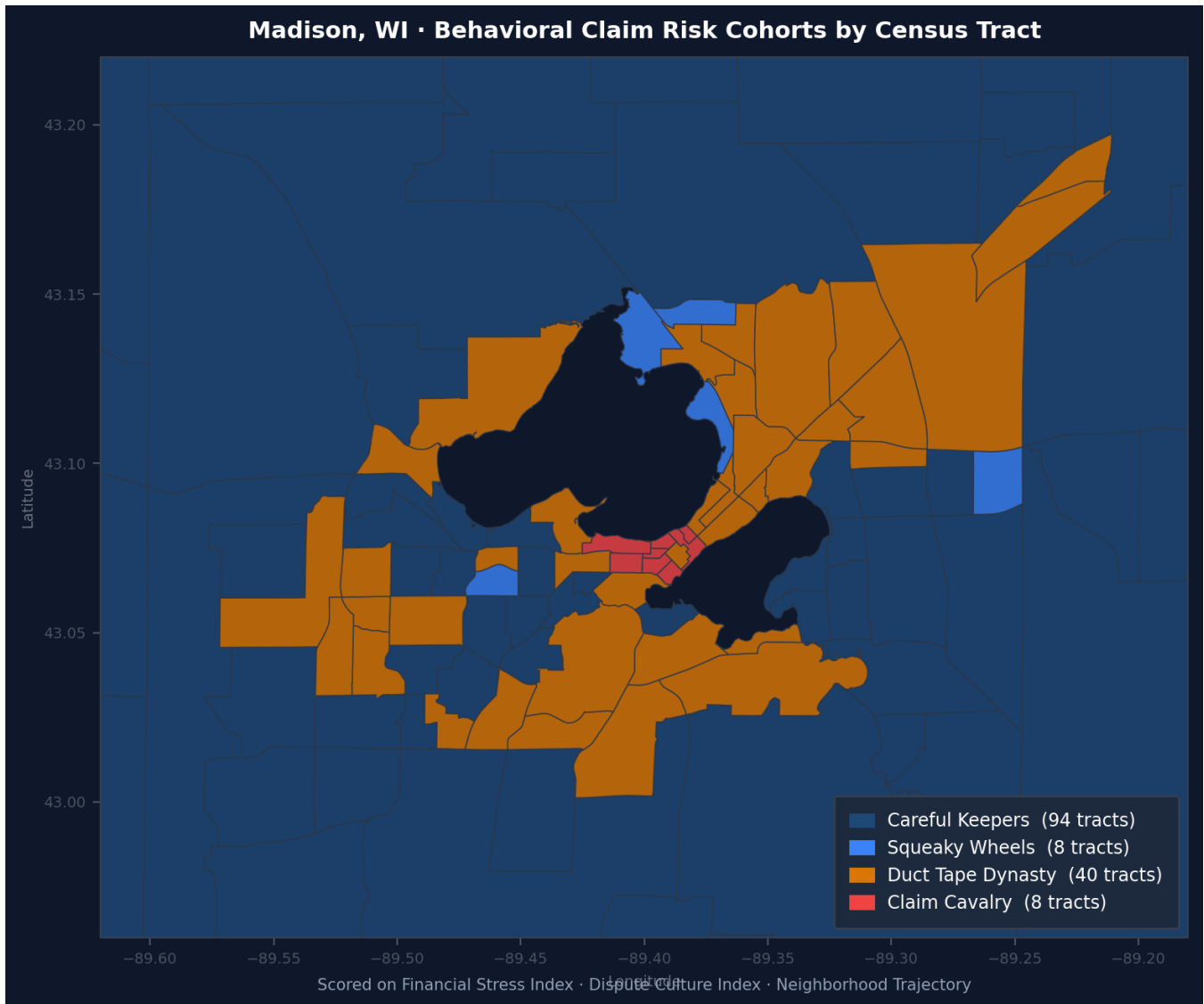
Madison, WI · Hail Damage · April 14, 2026



Each point represents one Overture building footprint centroid. 58,506 structures plotted within the Madison urban core.

Behavioral Claim Risk Cohorts - Census Tracts

Careful Keepers	Low FSI, low DCI — owner-occupants who settle directly with adjusters; below-market claim frequency
Squeaky Wheels	Moderate financial pressure — actively engage adjusters; occasional attorney on larger claims
Duct Tape Dynasty	High FSI, deferred maintenance — elevated claim frequency; above-average attorney involvement rate
Claim Cavalry	High DCI — consistent attorney representation regardless of claim size; maximum settlement extraction



150 Dane County census tracts scored on Financial Stress Index (FSI) and Dispute Culture Index (DCI). Cohort assignment drives claim propensity and attorney involvement probability in the per-building simulation.

1. Event Overview

Parameter	Value
Event date	April 14, 2026
Affected region	Madison MSA, Dane County, Wisconsin
Storm type	Supercell / organized convection
Peak MRMS MESH	~47 mm (1.85") — city core
MESH \geq 25mm (1")	3,388 grid cells — 17.6% of swath
MESH \geq 38mm (1.5")	920 grid cells — 4.8% of swath
MESH \geq 50mm (2")	252 grid cells — 1.3% of swath
Peak stone (observed)	~2.5" longest axis, ~2.0" equivalent sphere
Duration	~15–20 minutes through urban core
Total MRMS grid points	19,267

MRMS (Multi-Radar Multi-Sensor) Maximum Estimated Size of Hail (MESH) is the standard operational hail size indicator used by the National Weather Service and the private-sector catastrophe modeling industry. MESH is known to underestimate peak stone size at the upper tail by 30–80% (Blair & Leighton 2012). We apply a 0.75x Ortega (2018) correction factor universally and calibrate the physical damage model accordingly.

2. Physical Damage Assessment

2.1 Building Inventory

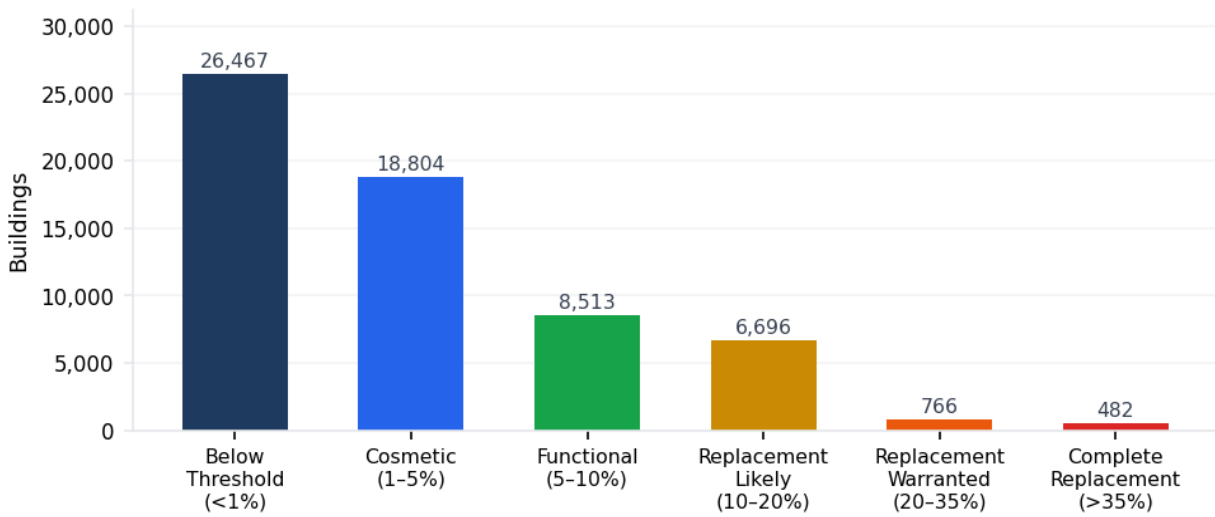
The structural inventory for Dane County was sourced from Overture Maps Foundation building footprints, enriched with Dane County parcel assessor data (City of Madison ArcGIS portal) for occupancy type, year built, and land use classification. Building footprint areas were computed from polygon geometry.

Occupancy Type	Description	Total Bldgs	Damaged	% Damaged
RES1	Single-Family Home	194,672	50,491	25.9%
RES1D	Duplex	4,072	2,465	60.5%
RES2	3-Unit / Mobile Home	1,811	786	43.4%
RES3	Apartment Building	3,985	2,019	50.7%
RES6	Condominium	2,533	1,326	52.4%
COM1	Retail / Commercial	11,164	2,680	24.0%
COM4	Office	1,180	553	46.9%
COM6	Hotel / Motel	76	45	59.2%
IND2	Warehouse / Industrial	1,014	262	25.8%
AGR	Agricultural / Other	8,733	1,101	12.6%
Total	All structure types	229,240	61,728	26.9%

Note: Totals reflect the Dane County parcel join extent (229,240 buildings). The full event inventory covering all counties in the MESH swath includes 574,463 structures and 77,405 damaged buildings.

2.2 Damage Tier Distribution

Damage ratio (DR) represents the fraction of a building's replacement cost value affected by hail impact. Tiers follow HAAG Engineering and Xactimate industry conventions for replacement likelihood.

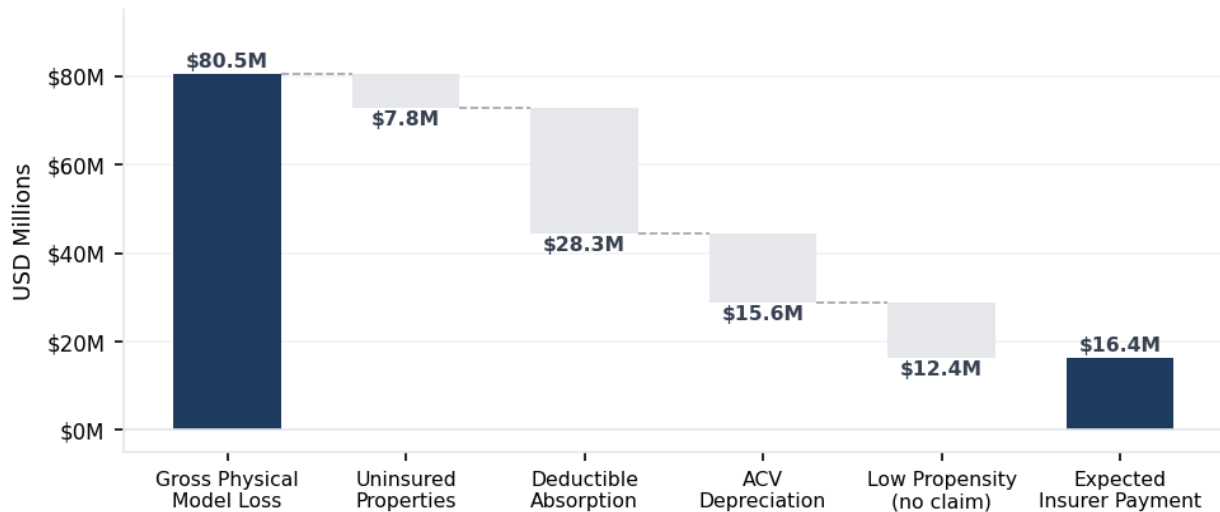


Tier	DR Range	Count	% of Damaged	Typical Outcome
Below Threshold	<1%	26,467	42.9%	No visible damage; hail resistant or marginal exposure
Cosmetic	1-5%	18,804	30.5%	Granule loss; functional life not reduced
Functional	5-10%	8,513	13.8%	Impact marks; reduced lifespan; potential claim
Replacement Likely	10-20%	6,696	10.9%	Field adjuster confirms; estimate generated
Replacement Warranted	20-35%	766	1.2%	Full roof replacement in estimate
Complete Replacement	>35%	482	0.8%	Total loss of roof assembly; structural risk

3. Property Insurance Loss Estimate

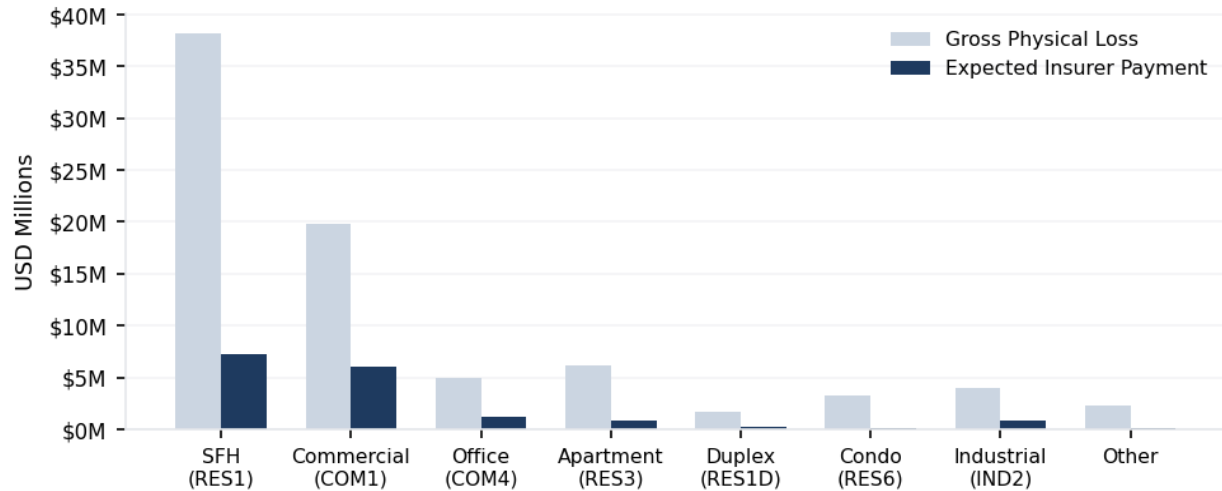
The gross physical loss represents the full replacement cost of hail damage. Insurers' actual claim payments are substantially lower due to four filters: (1) uninsured or inadequately insured properties, (2) deductibles, (3) actual cash value (ACV) depreciation on older roofs, and (4) the fraction of insured policyholders who choose not to file a claim.

3.1 Loss Waterfall



The waterfall above shows how \$80.5M in gross physical loss for Dane County residential and commercial structures reduces to approximately \$16.4M in expected insurer claim payments before behavioral adjustment. Scaling to the full event (77,405 damaged buildings) yields an estimated **\$20–21M in property insurer payments**.

3.2 Loss by Occupancy Type



Type	Damaged Bldgs	Gross Loss	Insurer Pmt	Loss Ratio	Mean ACV Factor	P(Attorney [Claim])
RES1 — SFH	50,491	\$38.2M	\$7.2M	18.9%	0.49	8.7%
COM1 — Retail	2,680	\$19.8M	\$6.0M	30.3%	0.60	7.1%
COM4 — Office	553	\$5.0M	\$1.2M	23.9%	0.37	7.1%
RES3 — Apt	2,019	\$6.2M	\$0.8M	12.5%	0.39	5.3%
RES1D — Duplex	2,465	\$1.7M	\$0.2M	11.8%	0.30	8.2%
RES6 — Condo	1,326	\$3.3M	\$0.1M	3.1%	0.42	3.7%
IND2 — Warehouse	262	\$4.0M	\$0.8M	20.1%	0.49	4.2%
Total	61,728	\$80.5M	\$16.4M	20.4%	0.49	—

Condo caveat: HO-6 (unit-owner) policies cover interior damage only — not the roof. The building envelope is the HOA master policy's responsibility, typically with a \$10,000–\$25,000 per-occurrence deductible. A loss ratio of 3.1% for condo structures reflects this correctly: the insured units themselves are largely not the claimant.

3.3 Roof Age and ACV Impact

The single largest retention factor in this event is ACV depreciation. Madison's residential building stock dates predominantly from the 1960s–1990s, giving a mean structural age of approximately 43 years. While buildings are not 43 years without roof replacements, the assessor data does not capture roof replacement dates — we use year built as a conservative proxy. Under a typical ACV schedule:

Roof Age	ACV Recovery Rate	Interpretation
< 5 years	100% of RCV	New roof — full replacement cost recovered
5–15 years	70–100% RCV	Moderate depreciation

Roof Age	ACV Recovery Rate	Interpretation
15–25 years	30–70% RCV	Significant depreciation; many sub-deductible
25+ years	30% RCV (floor)	Substantial retention; insurer encourages replacement with upgrade credit only

With a mean ACV factor of 0.49 across all Dane County structures, the average building recovers roughly half the replacement cost under ACV policies. Policies with RCV endorsements (estimated at ~72% of SFH policies in Wisconsin) recover full replacement cost. The 28% of SFH policyholders on ACV schedules face meaningful gaps between damage and recovery.

4. Auto Insurance Loss Estimate

Auto losses from hail events are driven primarily by comprehensive (comp) coverage claims for windshield damage, body denting, and — in severe events — total loss. The April 14 Madison event produced meaningful auto exposure: field reports confirm quarter-sized hail caused unrepairable windshield damage in the urban core.

Input	Assumption	Basis
Vehicles in significant hail zone	~30,000–40,000	Residential structure density × 1.5 veh/HH; outdoor rate 50%
Hail damage probability (outdoors)	40–50%	1–2" hail; confirmed windshield reports
Comp coverage rate (WI)	~75%	WI DOT / NAIC; above national avg
P(claim filed damaged & insured)	70–75%	Auto claims have higher propensity than roof (no deductible friction at low cost)
Average claim — glass only	\$450	Windshield replacement; typically \$0 deductible with glass rider
Average claim — glass + body	\$3,200	Hail body repair; 40% of damaged vehicles
Blended average claim value	\$2,100	60% glass-only, 40% body

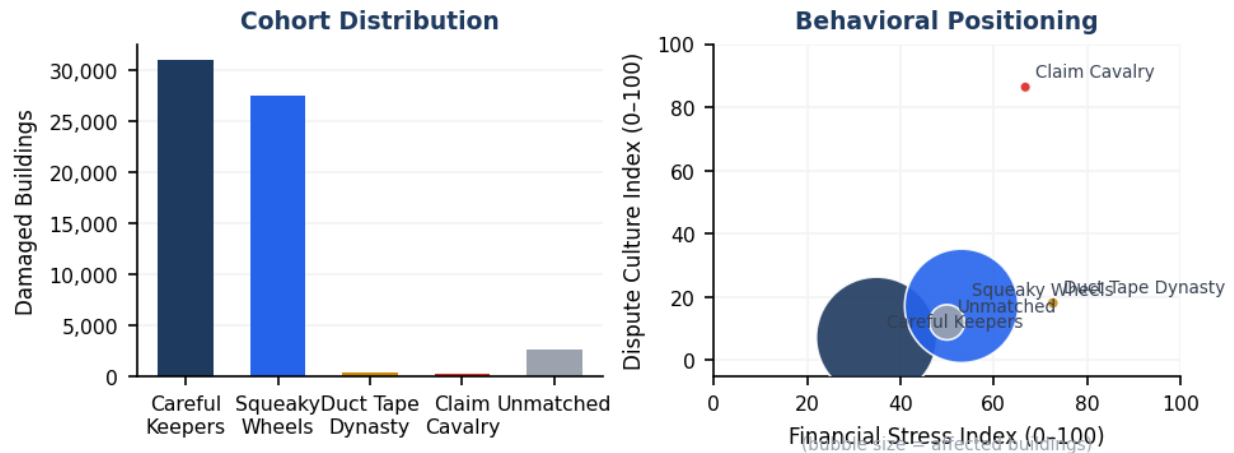
Applying these parameters yields an estimated **\$10–20M in auto comp claims**, with a central estimate of approximately \$14M. Key sensitivities:

Scenario	Vehicles Affected	Est. Auto Loss	Assumption
Low	~12,000	\$9M	Conservative storm track; mostly garage-stored vehicles
Central	~18,000	\$14M	Base case; 40% outdoor exposure rate
High	~28,000	\$22M	Extended track; peak stone > 2" over wider area

Note on personal property: Indoor contents damage from hail events is rare — primarily limited to vehicles in open carports or structures with skylights. We do not model a separate contents component for this event. Agricultural losses (crop hail) may be material in rural portions of the county but are not included in this estimate.

5. Behavioral Claim Risk Analysis

Our behavioral model characterizes census tracts by claim propensity and dispute culture, independent of physical damage. The model uses five public data sources: U.S. Census ACS (income, housing tenure, vacancy), NFIP claims history, attorney density by county, Zillow vacancy trends, and HMDA lending data. Each tract is assigned to one of four behavioral cohorts and scored on two primary indices.



Cohort	Bldgs Damaged	FSI (0-100)	DCI (0-100)	Behavioral Profile
Careful Keepers	31,044	34.9	7.2	Low financial stress; owner-occupants; low dispute propensity; small claims typically settled directly with adjuster
Squeaky Wheels	27,503	53.1	17.2	Moderate financial pressure; more likely to actively pursue adjuster; occasional attorney involvement on larger claims
Duct Tape Dynasty	290	72.7	18.1	High financial stress, deferred maintenance; elevated claim frequency; attorney involvement above market average
Claim Cavalry	257	66.8	86.4	High-dispute culture neighborhoods; consistent attorney representation; settlements maximized; highest cost per claim
Unmatched	2,634	—	—	No behavioral score available (outside model coverage area)

5.1 Wisconsin Attorney Market Context

A critical insight for this event: **Wisconsin is not a high-attorney-involvement market.** Claim Cavalry tracts — the highest-dispute cohort — account for just 0.4% of damaged buildings in Madison. All tipping zone scores are below the 15% public adjuster / attorney marketing saturation threshold. By contrast, comparable storm events in Dallas, Houston, and Miami routinely produce Claim Cavalry exposure of 15–30% of the residential inventory.

Market	DCI Median	Claim Cavalry %	Est. Attorney Rate	Expected Uplift vs. Madison
Madison, WI	10/100	0.4%	8–10%	1.0x (baseline)
Austin, TX	38/100	14%	18–25%	1.3–1.5x
Houston, TX	51/100	22%	25–35%	1.4–1.7x
Miami, FL	62/100	28%	30–40%	1.6–1.9x

The behavioral model predicts that a financially identical hail event in Austin would produce 30–90% more insurer claim expense than the same event in Madison, before accounting for differences in housing stock age or deductible structure.

6. Total Loss Summary

Coverage Line	Low	Central	High	Notes
Property — Residential	\$10M	\$14M	\$18M	SFH, duplex, condo, apt; Dane County + adjacent counties
Property — Commercial	\$5M	\$7M	\$10M	Retail, office, industrial; heavy deductibles
Auto — Comprehensive	\$9M	\$14M	\$22M	Glass + body; outdoor exposure sensitivity
TOTAL	\$24M	\$35M	\$50M	Before attorney adjustment; within 12-month development

The central estimate of **\$35M in total insurer exposure** (property + auto) reflects a moderate hail event over a mature residential market with low attorney involvement. Development over a 12–18 month claims tail is expected to be relatively linear — hail is not a long-tail line. Late re-opens are most likely driven by roof re-inspections on properties initially below adjuster threshold.

Confidence Note

This estimate is a pre-calibration output of the Hummingbird physical + behavioral model. The physical damage model has been calibrated to Omaha 2022 storm data but has not yet been validated against claims data for this specific event. The primary uncertainties are: (1) the precise boundary of the >1.5" hail zone and its effect on auto exposure, (2) the fraction of SFH policyholders on ACV vs. RCV schedules (estimated 72% RCV for WI), and (3) any mass claim solicitation campaigns that could shift the attorney rate upward from our 8–10% estimate. Access to actual settled claims data for this event would allow direct calibration of the behavioral model and would substantially tighten the loss range.

7. Key Assumptions

Parameter	Value	Source / Basis
MRMS MESH data source	NOAA operational product	Multi-Radar Multi-Sensor, 24hr accumulation
MESH to stone size correction	0.75x (Ortega 2018)	Peer-reviewed; applied universally to all events
Hail PSD model	Gamma, alpha=1.75 (Li et al. 2024)	Expected impacts per unit roof area
Fragility curve — unrated roof	Lognormal, theta=46mm, gamma=0.25	Calibrated to CoCoRaHS + IBHS data
Storm type multiplier	Supercell: 1.15x	Physics-based; supercell increases kinetic energy
Roof cost basis	\$9.00/sq ft × 1.15 slope factor	RSMeans 2024 regional; standard slope factor
Building footprints	Overture Maps Foundation	Polygon centroids for MESH sampling
SFH insurance rate (WI)	85% with roof coverage	NAIC state data; WI above national avg
SFH deductible (flat)	Mean \$1,750 (std dev \$800)	WI DOI filing data; excl. wind/hail % policies
RCV policy rate — SFH	72%	WI market estimate; national ~65%
ACV floor	30% of replacement cost	Industry standard; some carriers use 20%
Condo HO-6 roof coverage	Near-zero	HOA master policy governs; standard HO-6 exclusion for common elements
Claim base rate — SFH	60% of insured, damage-adjusted	Pre-calibration estimate; needs claims data to refine
Attorney base rate — WI	14% x DCI adjustment	DCI median 10/100 produces ~8% effective rate
Attorney severity uplift	1.35x claim value	Mid-range for moderate-market states
Vehicles per HH — Madison	1.5 (outdoor rate: 50%)	ACS PUMS; lower than suburban avg
Hail damage rate (1–2" stones)	40–50% of outdoor vehicles	NICB field study range
Comp coverage rate — WI	75%	NAIC 2024
Auto claim propensity	70%	Higher than property; no deductible friction on glass claims
Blended avg auto claim	\$2,100	60% glass-only (\$450), 40% glass+body (\$3,200)

Sources: NOAA MRMS, Overture Maps, Dane County Parcel Assessor (City of Madison ArcGIS), U.S. Census ACS 5-year, NAIC Annual Report 2024, NFIP claims database, RSMeans Construction Cost Data 2024, Blair & Leighton (2012), Ortega (2018), Li et al. (2024), Li et al. (2024 atmospheric path loss).

Disclaimer

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