Texas Windstorm Insurance Association

Estimated Aggregate Annual Losses
Based on Industry Accepted
Hurricane and Severe Thunderstorm Catastrophe Models
Based on Data as of November 30, 2020

Cautionary Language Regarding Catastrophe Model Loss Estimates

The following tables present hurricane and severe thunderstorm loss estimates prepared by the Association based on two leading industry models: AIR Touchstone and RMS RiskLink. Developing models to estimate losses resulting from catastrophes or other large-scale events is an inherently subjective and imprecise process, involving judgment about a variety of environmental, demographic and regulatory factors. Such factors are inherently uncertain and the Association does not model all the types of perils that may result in losses to the Association.

The assumptions and/or methodologies used in connection with the preparation of estimated losses derived by the Association may not constitute the exclusive set of reasonable assumptions, and the use of alternative assumptions and/or methodologies could yield results materially different from those generated or relied upon by the Association. Each model run is based on exposure information that will differ from the Association's actual exposure in the future based on future action the Association may take, including changes to existing policies and the writing of new business. Loss distribution models are not facts and should not be relied upon as such. Actual loss experience can materially differ from the modeled loss estimates used by the Association.

The Board of Directors considers the results of the models and other factors in connection with its decisions with respect to the purchase of reinsurance, including the amount of total limits sought. The Board also considers the results of the models in considering to its obligations under Chapter 2210.453 which require that the Association maintain total available loss funding in an amount not less than the probable maximum loss for the association for a catastrophe year with a probability of one in 100.

These models simulate thousands of hurricane and severe thunderstorm scenarios and applied the simulated hurricanes and severe thunderstorms to the Association's insured business to calculate the probability of losses of certain sizes, both for single occurrences and aggregate losses for the entire year. The results below were generated using Association exposures as of November 30, 2020 and November 30, 2019. The loss estimates are used by the Association in the course of its business operations. The data and analysis provided by TWIA herein are provided "as is", without warranty of any kind whether express or implied.

The loss estimates were prepared by the Association based on certain accepted industry models of Air Worldwide Corporation and Risk Management Solutions. The modeled estimates were prepared by the Association from model output prepared by Guy Carpenter & Company LLC in connection with their provision of reinsurance brokerage services and not in connection with the preparation of this information. The information contained herein reflects the professional judgment and analysis of the Association in respect to certain hurricane occurrence loss estimates derived from industry models. Neither Air Worldwide Corporation, Risk Management Solutions, Inc., nor Guy Carpenter & Company LLC have reviewed, commented on, or approved this report or the information contained herein.

Definitions

Aggregate Loss Estimate: The most basic output of a catastrophe model is the estimate of losses for every simulated event. Losses presented on an aggregate basis include estimated total losses from ALL events in any given year. In contrast, an "occurrence basis" reflects the losses from the largest single event in any given year. The aggregate loss estimates do not include a provision for loss adjustment expenses. TWIA staff would recommend adding an amount equal to 15% of the estimated aggregate losses to represent the estimated loss adjustment expenses. Loss adjustment expenses represent costs associated with investigating and settling claims.

Aggregate Exceedance Probability: Aggregate Exceedance Probability represents the probability of the total losses from ALL events in any given year meeting or exceeding a given threshold.

Average Annual Loss (AAL): The AAL is the expected value of losses to be experienced in any given year. It is equal to the sum of all simulated event losses multiplied by the probability of each of those events. Average annual losses are also calculated by dividing the total losses for all simulated storms by the number of simulated years in the computer simulation.

Demand Surge: Demand surge estimates the degree to which losses are escalated by a combination of economic, social and operational conditions that follow after a given event. Demand Surge accounts for three separate mechanisms of escalation arising from (1) increase in the costs of building materials and labor costs as demand exceeds supply, (2) cost inflation due to the difficulties in fully adjusting claims following a catastrophic event, and (3) under certain extreme scenarios, coverage and loss expansion due to a complex collection of factors such as containment failures, evacuation effects, and systemic economic downturns in selected urban areas.

Gross Basis: Gross basis refers to the total losses before any recoveries from reinsurance or other funding mechanisms.

Near Term vs. Long Term (Historical) Event Set: Hurricanes in the Atlantic basin are known to follow multidecadal periods of heightened or diminished activity in terms of frequency of events, intensity and landfall frequency. To account for these frequency changes, catastrophe model vendors provide alternative event catalogs or rates set alongside the long-term mean. Near-Term or Medium-Term Rates represent the five-year, medium-term outlook of North Atlantic hurricane activity. Long-Term Rates represent the event rates that are consistent with the long-term historical average.

Return Period: The return period is simply the inverse of the exceedance probability. For example, a 1% exceedance probability is equal to a 100-year return period. The return-period term can be misleading by implying a period of time that would be expected to pass between events of that magnitude, when in reality they are representative of the probability of meeting or exceeding that level of loss in any given year.

Risk count: Risk Count refers to the number of individual structures insured. Some policies may cover more than one structure.

Storm Surge: Storm surge refers to the damage caused by rising ocean water levels along coastlines affected by a hurricane that can cause widespread flooding.

Texas Windstorm Insurance Association
Catastrophe Modeling Results on Exposure of 11/30/2019

Catastrophe Model Results

Occurrence Loss Estimates

RMS RiskLink

Exceedence Probability[3]	Return Period	11/30/2019 Exposures RMS v18.1
10.00%	10	$334,340,996
5.00%	20	$758,679,674
4.00%	25	$939,607,918
2.00%	50	$1,698,126,177
1.00%	**100**	**$2,784,380,587**
0.40%	250	$4,634,040,082
0.20%	500	$6,779,936,162
0.10%	1000	$9,297,529,033
	TIV	$61,298,338,492
	Values	$66,715,956,466
	Risk Count	201,719

AIR Touchstone

Exceedence Probability[3]	Return Period	11/30/19 Exposures AIR v7
10.00%	10	$369,997,743
5.00%	20	$947,468,109
4.00%	25	$1,199,829,025
2.00%	50	$2,370,195,132
1.00%	**100**	**$4,296,818,590**
0.40%	250	$6,431,284,211
0.20%	500	$9,248,110,739
0.10%	1000	$10,751,067,684
	TIV	$61,298,338,492
	Values	$66,715,956,466
	Risk Count	201,719

Average of RMS and AIR Models

Exceedence Probability[3]	Return Period	11/30/19 Exposures Average of RMS and AIR
10.00%	10	$352,169,370
5.00%	20	$853,073,892
4.00%	25	$1,069,718,471
2.00%	50	$2,034,160,654
1.00%	**100**	**$3,540,599,588**
0.40%	250	$5,532,662,147
0.20%	500	$8,014,023,451
0.10%	1000	$10,024,298,358
	TIV	$61,298,338,492
	Values	$66,715,956,466
	Risk Count	201,719

Aggregate Loss Estimates

RMS RiskLink

Exceedence Probability[3]	Return Period	9/30/2019 Exposures RMS v18.1
10.00%	10	$365,087,444
5.00%	20	$810,967,796
4.00%	25	$1,000,043,185
2.00%	50	$1,785,048,135
1.00%	**100**	**$2,890,027,171**
0.40%	250	$4,778,706,427
0.20%	500	$6,934,944,335
0.10%	1000	$9,460,278,167
	TIV	$61,298,338,492
	Values	$66,715,956,466
	Risk Count	201,719

AIR Touchstone

Exceedence Probability[3]	Return Period	11/30/19 Exposures AIR v7
10.00%	10	$413,849,507
5.00%	20	$1,055,868,335
4.00%	25	$1,310,463,031
2.00%	50	$2,518,026,227
1.00%	**100**	**$4,376,080,717**
0.40%	250	$6,755,920,518
0.20%	500	$9,405,374,844
0.10%	1000	$10,751,242,908
	TIV	$61,298,338,492
	Values	$66,715,956,466
	Risk Count	201,719

Average of RMS and AIR Models

Exceedence Probability[3]	Return Period	Aggregate Loss Estimate - Gross[1,2] 11/30/19 Exposures Average of RMS and AIR
10.00%	10	$389,468,476
5.00%	20	$933,418,066
4.00%	25	$1,155,253,108
2.00%	50	$2,151,537,181
1.00%	**100**	**$3,633,053,944**
0.40%	250	$5,767,313,473
0.20%	500	$8,170,159,589
0.10%	1000	$10,105,760,538
	TIV	$61,298,338,492
	Values	$66,715,956,466
	Risk Count	201,719

Footnotes:

(1) Loss estimates are presented on a gross basis, including hurricane and severe convection storm ("SCS") losses, excluding loss adjustment expenses. Hurricane losses include demand surge and exclude storm surge. Hurricane losses are based on the near-term (Warm Sea
(2) For Severe Thunderstorm, the Standard catalog was used which includes the lower severity/higher frequency events.
(3) Exceedance probability represents the probability that losses exceed a certain amount from either single or multiple occurrences.