The AIR Hurricane Model: AIR Atlantic Tropical Cyclone Model V15.0.1 as Implemented in Touchstone® V3.0.0

Submitted in Compliance with the 2013 Standards of the Florida Commission on Hurricane Loss Projection Methodology

May 2015

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Model Submission Checklist

Please indicate by checking below that the following has been included in your submission documentation to the Florida Commission on Hurricane Loss Projection Methodology.

Yes	No	Item
✓		*1. Letter to the Commission*
✓		*a. Refers to the certification forms and states that professionals having credentials and/or experience in the areas of meteorology, statistics, engineering, actuarial science, and computer science have reviewed the model for compliance with the standards*
✓		*b. States model is ready to be reviewed by the Professional Team*
✓		*2. Summary statement of compliance with each individual standard and the data and analyses required in the disclosures and forms*
✓		*3. General description of any trade secret information the modeling organization intends to present to the Professional Team*
✓		*4. Model Identification*
✓		*5. Seven (7) Bound Copies (duplexed)*
✓		*6. Link containing:*
✓		*a. Submission text in PDF format*
✓		*b. PDF file supports highlighting and hyperlinking, and is bookmarked by standard, form, and section*
✓		*c. Data file names include abbreviated name of modeling organization, standards year, and form name (when applicable)*
	✓	*d. Form S-6 (Hypothetical Events for Sensitivity and Uncertainty Analysis), if required, in ASCII and PDF format*
✓		*e. Forms M-1 (Annual Occurrence Rates), M-3 (Radius of Maximum Winds and Radii Of Standard Wind Thresholds), V-2 (Mitigation Measures – Range of Changes in Damage), A-1 (Zero Deductible Personal Residential Loss Costs by ZIP Code), A-2 (Base Hurricane Storm Set Statewide Losses), A-3A (2004 Hurricane Season Losses, 2007 FHCF Exposure Data), A-3B (2004 Hurricane Season Losses, 2012 FHCF Exposure Data), A-4A (Output Ranges, 2007 FHCF Exposure Data), A-4B (Output Ranges, 2012 FHCF Exposure Data), A-5 (Percentage Change in Output Ranges, 2007 FHCF Exposure Data), A-7 (Percentage Change in Logical Relationship to Risk), and A-8 (Probable Maximum Loss for Florida) in Excel format*
✓		*7. All hyperlinks to the locations of forms are functional*
✓		*8. Table of Contents*
✓		*9. Materials consecutively numbered from beginning to end starting with the first page (including cover) using a single numbering system, including date and time*
✓		*10.All tables, graphs, and other non-text items consecutively numbered using whole numbers*
✓		*11. All tables, graphs, and other non-text items specifically listed in Table of Contents*
✓		*12. All tables, graphs, and other non-text items clearly labeled with abbreviations defined*
✓		*13. All column headings shown and repeated at the top of every subsequent page for forms and tables*
✓		*14.Standards, disclosures, and forms in italics, modeling organization responses in non-*

Yes	No	Item
		italics
✓		*15. All graphs and maps conform to guidelines in* ***II. Notification Requirements A.5.e.***
✓		*16. All units of measurement clearly identified with appropriate units used*
✓		*17. All forms included in submission document as Appendices except Forms V-3 (Mitigation Measures – Mean Damage Ratios and Loss Costs, Trade Secret item), A-6 (Logical Relationship to Risk, Trade Secret item), and S-6 (Hypothetical Events for Sensitivity and Uncertainty Analysis)*
✓		*18. Hard copy documentation identical to electronic version*
✓		*19. Signed Expert Certification Forms G-1 to G-7*

Explanation of "No" responses indicated above. (Attach additional pages if needed.)

Form S-6 was submitted as a requirement under the 2009 Standards. The results are unchanged.

AIR Atlantic Tropical Cyclone Model V15.0.1 as Implemented in Touchstone® V3.0.0

May 20, 2015

Model Name *Modeler Signature* *Date*

Florida Commission on
Hurricane Loss Projection Methodology

Model Identification

Name of Model:	AIR Atlantic Tropical Cyclone
Model Version Identification:	V15.0.1
Software Program Version Identification:	Touchstone® V3.0.0
Interim Software Program Version Update Identification:	
Software Platform Name and Identifications:	Touchstone V3.0.0
Interim Data Update Designation:	
Name of Modeling Organization:	AIR Worldwide Corporation
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Date:	May 20, 2015

Trade Secret Information to be Presented to the Professional Team in Connection with the Acceptability Process

The list of trade secret items that will be provided to the Professional Team during the on-site review includes:

- Form V-3 (Mitigation Measures–Mean Damage Ratios and Loss Costs)
- Form A-6(Logical Relationship to Risk)

Any other materials will be dependent upon requests or suggestions from the Professional Team

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2013 General Standards

G-1 Scope of the Computer Model and Its Implementation

(Significant Revision)

Relevant Form: G-1, General Standards Expert Certification

A. The computer model shall project loss costs and probable maximum loss levels for residential property insured damage from hurricane events.

The AIR Hurricane Model projects loss costs and probable maximum loss levels for residential property insured damage from hurricane events.

B. The modeling organization shall maintain a documented process to assure continual agreement and correct correspondence of databases, data files, and computer source code to slides, technical papers, and modeling organization documents.

AIR has maintained a documented process to assure continual agreement and correct correspondence of various modeling organization documents used in or generated through model update efforts, submission preparation and preparation for all related meetings with the Commission. Coordination across research, software development, quality assurance and consulting, combined with adherence to documentation standards, ensure that changes are supported throughout the workflow. Preparation for Commission meetings, including slides to be shown to the Commission and work papers to be shown to the Professional Team, will draw upon the central repositories of data and documentation.

Disclosures

1. *Specify the model version identification and software program version identification. If the model submitted for review is implemented on more than one software platform, specify each model software platform. Specify which software platform is the primary software platform and verify how any other software platforms produce the same model output results or are otherwise functionally equivalent as provided for in the "Process for Determining the Acceptability of a Computer Simulation Model" in VI. Review by the Commission, I. Review and Acceptance Criteria for Functionally Equivalent Model Software Platforms.*

The current AIR hurricane model being submitted to the Commission for approval is the AIR Atlantic Tropical Cyclone Model V 15.0.1; Program: Touchstone® V3.0.0.

2. *Provide a comprehensive summary of the model. This summary shall include a technical description of the model including each major component of the model used to produce residential loss costs and probable maximum loss levels in the State of Florida. Describe the theoretical basis of the model and include a description of the methodology, particularly the wind components, the vulnerability components, and the insured loss components used in the model. The description shall be complete and shall not reference unpublished work.*

Introduction

Standard actuarial techniques rely on data on past losses to project future losses. The scarcity of historical loss data resulting from the infrequency of these events makes standard actuarial techniques of loss estimation inappropriate for catastrophe losses. Furthermore, the usefulness of the loss data that does exist is limited because of the constantly changing landscape of insured properties. Property values change, along with the costs of repair and replacement. Building materials and designs change, and new structures may be more or less vulnerable to catastrophe events than were the old ones. New properties continue to be built in areas of high hazard. Therefore, the limited loss information that is available is not suitable for directly estimating future losses.

AIR Worldwide Corporation (AIR) was the first company to develop probabilistic catastrophe modeling as an alternative to the standard actuarial or "rule of thumb" approaches on which insurance companies had to rely for the estimation of potential catastrophe losses. In 1987, AIR introduced to the insurance industry a modeling methodology based on simulation techniques and mathematical approaches long-accepted in a wide variety of scientific disciplines. Since the inception of this new approach, the AIR Atlantic Tropical Cyclone Model (the U.S. Hurricane Model) has undergone a continual and comprehensive process of refinement, enhancement, validation and review.

Figure 1 illustrates the component parts of the U.S. Hurricane Model (dashed boxes). Each component represents both the ongoing efforts of the research scientists and engineers responsible for its design and the computer processes that occur as the simulations are run.

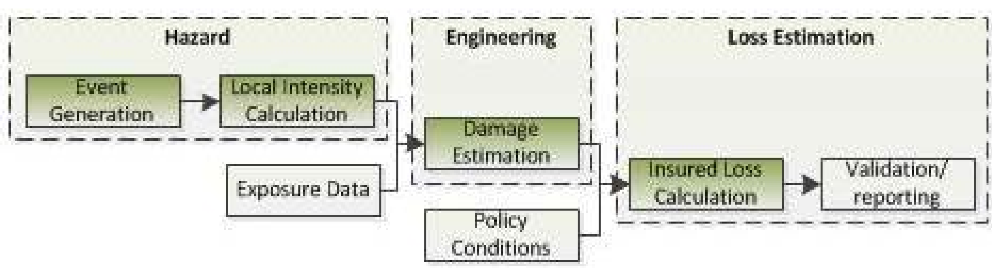

Figure 1. AIR Tropical Cyclone Model Components

Methodology

The AIR research team collects the available scientific data pertaining to the meteorological variables critical to the characterization of hurricanes and therefore to the simulation process. These primary model variables include landfall location, central pressure, radius of maximum winds, forward speed and storm heading. Data sources used in the development of the U.S. Hurricane Model include the most complete databases available from various agencies of the National Weather Service, including the National Hurricane Center. All data is cross-verified. If data from different sources conflict, a detailed analysis and the use of expert judgment are applied to prepare the data for modeling purposes.

After the rigorous data analysis, AIR researchers develop probability distributions for each of the variables, testing them for goodness-of-fit and robustness. The selection and subsequent refinement of these distributions are based on the expert application of statistical techniques, on well-established scientific principles and on an understanding of how hurricanes behave.

By sampling from the various probability distributions the model generates a large catalog of simulated "years" of event activity. A simulated year in this context represents a hypothetical year of hurricane experience that could happen in the current year. The AIR model allows for the possibility of multiple events occurring within a single year. That is, each simulated year may have no, one or multiple hurricanes, just as might be observed in an actual year.

Many thousands of these scenario years are generated to produce the complete and stable range of potential annual experience of tropical cyclone activity. The pattern and distribution of the simulated years approximate the pattern of historical and future years because their derivation is based on a scientific extrapolation of actual historical data.

Each simulated storm is propagated along its track once values for each of the important meteorological characteristics have been stochastically assigned. A complete time profile is estimated for each geographical location affected by the storm. Based on the wind profile, damages are estimated at each location for different types of structures. Finally, policy conditions are applied to estimate the insured losses resulting from each event.

As opposed to purely deterministic simulation models, probabilistic simulation models enable the estimation of the complete probability distribution of losses from hurricanes. Once this probability distribution is estimated, hurricane loss costs by county, five digit ZIP Code or location can be derived.

Event Generation Component

This first module of the AIR tropical cyclone model is used to create the stochastic storm catalog. More than one hundred years of historical data on the frequency of hurricanes and their meteorological characteristics were used to fit statistical distributions for each parameter. By stochastically drawing from these distributions, the fundamental characteristics of each simulated storm are generated. The result is a large, representative catalog of potential events.

Landfall Location: There are 62 potential landfall segments in the AIR model, each representing approximately 50 nautical miles of smoothed coastline from Texas to Maine. There is an additional segment for the Florida Keys. To estimate the probability of a hurricane occurring on each of these segments, a cumulative distribution of landfall locations is developed as described below. Once a segment is chosen, the landfall location is picked uniformly along the segment.

The coastline is first smoothed for irregularities such as inlets and bays. The actual number of hurricane occurrences is then tabulated for smoothed 50-nautical-mile segments. The actual number of occurrences for each segment is then smoothed by setting it equal to the weighted average of a set of successive data points centered on that segment.

This smoothing technique was selected because it has been used in other climatological studies and because it maintains areas of high and low frequency and also accounts for the lack of historical landfalls in certain portions of the coastline.

Bypassing Storms: The AIR model generates bypassing as well as landfalling storms through a track generation procedure that follows each simulated hurricane from the time of its inception until it dissipates. A bypassing hurricane is one that does not make landfall in Florida as a hurricane but does cause damaging winds over land.

Meteorological Standards: The simulated frequency of hurricanes is consistent with the frequency observed historically over the period 1900-2012.

Meteorological Characteristics: Probability distributions are estimated for central pressure and forward speed for 31 one-hundred-nautical-mile segments of coastline. Separate distributions are estimated for each of these segments because the likely range and probabilities of values within each range for these variables depend upon geographic location and, in particular, latitude. For example, intense hurricanes are more likely to occur in southern latitudes where the water is warmer. Storms affecting the coast in northern latitudes tend to be larger and faster moving on average. Radius of maximum winds is represented using a regression model that relates the mean radius to central pressure and latitude.

Storm Heading at Landfall: Landfall angle is measured clockwise (+) or counterclockwise (-) with 0 representing due North. Separate distributions for storm heading at landfall are estimated for each 50-nautical-mile segment of coastline. Storm heading is modeled as combined Normal distributions, and bounded based on the historical record, geographical constraints, and meteorological expertise. Diagnostic tests performed show a reasonable agreement between historical and modeled values.

Storm Track: The methodology used to generate storm tracks is based on the information available in the National Hurricane Center HURDAT database for the period 1900-2007. This database provides track information for more than 1,000 North Atlantic storms at six-hour time intervals. Time series techniques have been used to determine the dependence structure present in key model variables from one time period to the next. Time series models that describe the dependence in the historical data are used in the generation of simulated tracks. For example, a first-order Markov model with transition probabilities estimated from the historical data is used to generate changes in track direction of simulated storms. An illustration of the procedure is given in Figure 2. The storm tracks generated using this approach are realistic and resemble storm tracks that have been observed for historical storms.

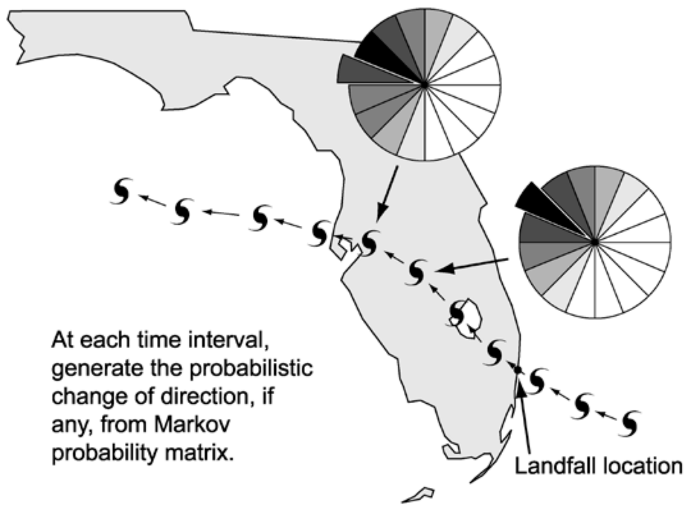

Figure 2. Storm Track Generation

AIR uses the event generation component of the model to simulate 50,000 years of potential hurricane activity.

Wind Field Generation Component

Once the model probabilistically generates the hurricane's meteorological characteristics, it simulates the storm's movement along its track. A complete time profile of wind speeds is developed for each location affected by the storm, thus capturing the effect of duration of wind on structures as well as peak wind speed. Calculations of local intensity take into account the effects of the asymmetric nature of the hurricane windfield, storm filling over land and radial variation of wind speeds from the radius of maximum winds. The model also uses surface roughness information to account for boundary layer modification of the winds by the local land surface.

Gradient Wind Reduction Factor (GWRF): The model uses a stochastic GWRF, which varies from storm to storm. The mean value, the distribution about the mean and the radial profile of the GWRF have been developed based on analyses of dropsonde (GPS dropsonde data are provided courtesy of the NOAA/AOML/Hurricane Research Division in Miami, Florida), as well as results from published literature (Franklin et al., 2003, Powell et al., 2009). The GWRF is adjusted based on the Peak Weighting Factor (see below) and the distance from the eye. Both parameters (GWRF and PWF) are generated jointly using a bounded Bivariate Normal Distribution (based on Casella and Berger, 1990).

Peak Weighting Factor (PWF): The PWF is a stochastic parameter used to reflect the vertical slant in the hurricane eye (Powell et al., 2009). As mentioned above, the PWF and GWRF are generated jointly using a bounded Bivariate Normal Distribution.

Damage Calculation Component

AIR scientists and engineers have developed damage functions that describe the interaction between buildings, both their structural/nonstructural components and their contents, and the local intensity to which they are exposed. These functions relate the mean damage level as well as the variability of damage to the measure of intensity at each location.

The damage functions vary according to construction class and occupancy because different structural types will experience different degrees of damage. For example, a home of masonry construction generally performs better in a hurricane than does a home of wood frame construction, all things being equal. The AIR model estimates a complete distribution around the mean level of damage for each local intensity and each structural type. Losses are calculated by applying the appropriate damage function to the replacement value of the insured property.

The AIR damageability relationships incorporate the results of well-documented engineering studies, damage surveys and analyses of available loss data. AIR engineers have surveyed all significant loss causing events since Hugo in 1989 as part of the ongoing process of refinement and validation of these functions. In addition, actual claims data from recent hurricanes, supplied to AIR by client companies, have been extensively analyzed.

Insured Loss Calculation Component

In this last component of the AIR model, insured losses are calculated by applying the policy conditions to the total damage estimates. Policy conditions may include deductibles by coverage, site-specific or blanket deductibles, coverage limits and sublimits, loss triggers, coinsurance, attachment points and limits for single or multiple location policies, and risk-specific reinsurance terms.

3. *Provide a flow diagram that illustrates interactions among major model components.*
    1. *Provide a flow diagram that illustrates interactions among major model components.*

The interactions among major model components are illustrated in Figure 3.

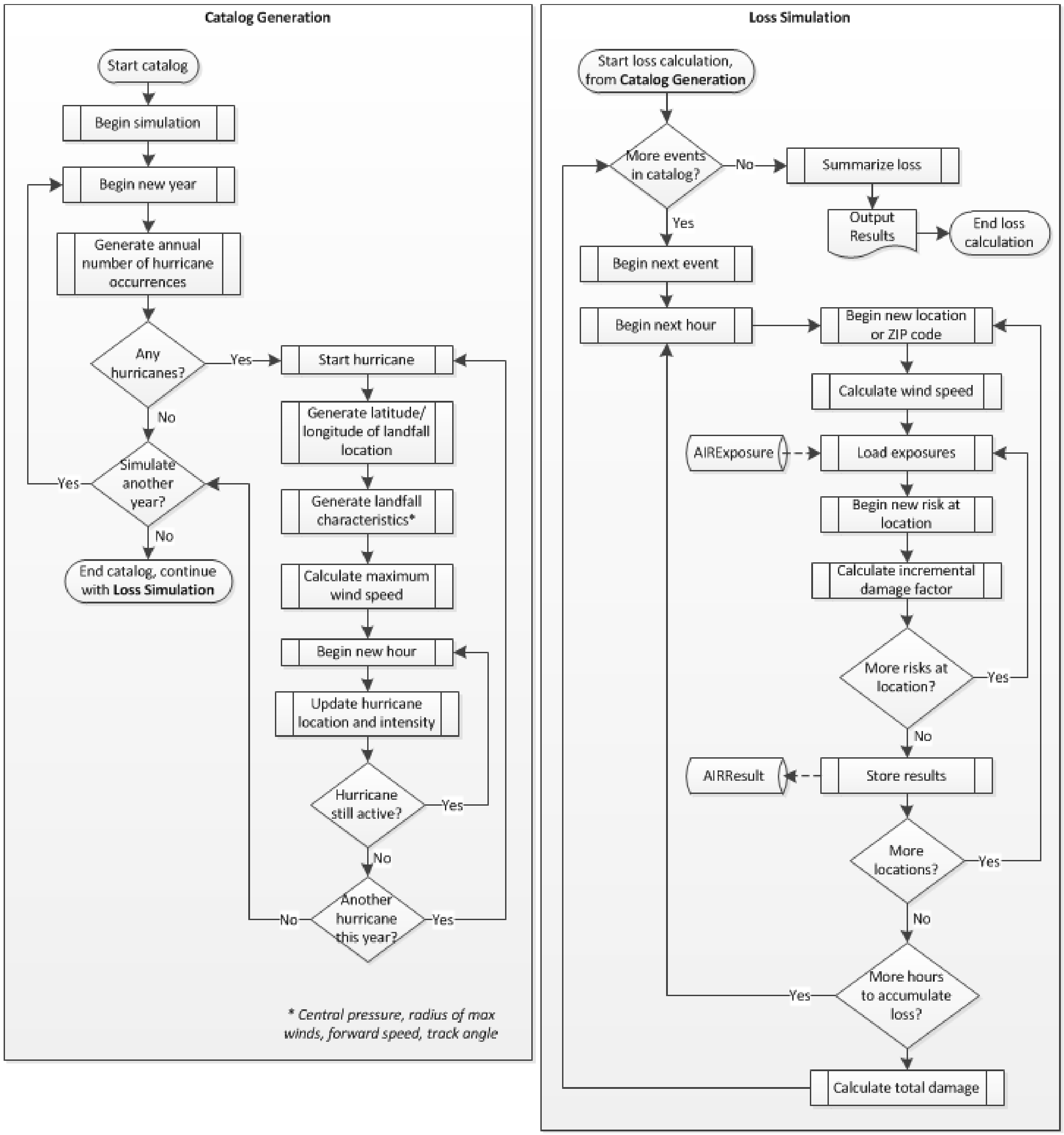

Figure 3. Flowchart of the AIR Model

4. *Provide a comprehensive list of complete references pertinent to the submission by standard grouping, according to professional citation standards.*

The AIR hurricane simulation model is based on well-founded, widely accepted, and state-of-the-art meteorological knowledge and structural engineering expertise.

The following reference materials have been reviewed by AIR researchers and used in the development and refinement of the AIR model.

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5. *Provide the following information related to changes in the model from the previously accepted submission to the initial submission this year.*
   A. *Model changes:*
      1. *A summary description of changes that affect the personal or commercial residential loss costs or probable maximum loss levels,*
      2. *A list of all other changes, and*
      3. *The rationale for each change.*

AIR continually reviews model assumptions in light of new meteorological and other information and periodically modifies the U.S. Hurricane Model.

The 2014 updates to the U.S. Hurricane Model focus on the event generation component, (which includes updates to the historical and stochastic catalogs), hazard module, building vulnerability, the ZIP Code database and the industry exposure database (affecting the average physical properties). A summary description of changes that affect the personal or commercial residential loss costs or probable maximum loss levels is provided below.

Event Generation Component (i.e. Catalog): For this model release, AIR's historical storm set has been updated, incorporating track information from the August 2013 version of HURDAT2. The probability distributions used for annual landfall frequency and landfall location in the stochastic catalog have been updated accordingly and an updated stochastic catalog has been generated.

Hazard Component: The hazard component of the model, comprising both the wind and the storm surge hazard models, of the U.S. Hurricane Model has been updated since the release of the previously accepted model. The changes since the previously accepted model include:

a) The hazard module has been updated with new land use land cover data. The model uses the latest United States Geological Survey (USGS) National Land Cover Database 2011 data as published in 2014.
b) The methodology for assigning average physical properties to a ZIP Code has been updated from a ZIP Code area average to a fixed distance averaging.
c) The formulation for storm surge hazard has been updated. Storm surge is turned off in the preparation of the loss costs and probable maximum loss levels shown in the submission.

Building Vulnerability Component: The building vulnerability component, comprising both the wind and the storm surge vulnerability models, of the U.S. Hurricane Model has been updated since the release of the previously accepted model. The changes since the previously accepted model include:

a) The wind vulnerability model for mobile homes has been enhanced to capture regional vulnerability impacts and variations in vulnerability based on the year of construction, in relation to the use of Housing and Urban Development (HUD) codes. Existing and newly available detailed claims data were used to update the vulnerability functions.
b) Adjustments to the structural wind vulnerability based upon the size (i.e. square footage) of a residential structure have been incorporated, developed through computational simulations and validation against company loss data.
c) The surge vulnerability model, which is independent of the wind vulnerability model, has been updated and enhanced in conjunction with development of the new storm surge hazard modeling. This vulnerability model was developed at a component level, covering the occupancy and construction classes already in use by the wind vulnerability model and the current storm surge vulnerability model. Additionally, secondary characteristics (e.g. foundation type, basement condition, etc.) have been developed for use by the storm surge vulnerability model to refine the loss estimates.
d) The "No attached wall structures" option within the secondary characteristic group encompassing "Wall Attached Structures", as detailed in Appendix 9, has been adjusted to maintain consistency between the other options within this grouping.
e) Vulnerability adjustments that account for structural aging and building technology changes have been updated to be relevant through 2014. Accordingly, adjustments to the modeled year built categories for Florida have been incorporated. The year built categories have been updated to: pre-1995, 1995-2001, 2002-2008 and Post-2008, to the list of vulnerability updates
f) The pre-computed factors which adjust the base wind structural vulnerability accordingly when the user provides no year built information, as opposed to a known year built, have been updated to be relevant through 2014. This includes adjusting the underlying year built weighting assumptions to use the latest census and tax assessor data regarding building stock age.

Geographical or Other Updates: The ZIP Code and Industry Exposure databases are updated each year. For each new ZIP Code centroid, the following data needs to be re-estimated: distance from coastline, elevation and surface roughness. AIR's Industry Exposure Database for the U.S. has been updated as of

12/31/2013. The Industry Exposure Database update affects estimated industry losses and resulting demand surge factors. This is a technical update.

Other changes have been made to continually improve AIR's models and software for the benefit of our clients and the industry, including:

- Introduction of the AIR Inland Flood Model for the United States
- Update of the AIR Severe Thunderstorm Model for the United States
- Update of the AIR Earthquake Model for the United States
- Update to the AIR Earthquake Model for Canada
- Update to the AIR Severe Thunderstorm Model for Canada
- Update to the AIR Hurricane Model for Offshore Assets
- Update to the AIR Typhoon Model for China
- Introduction of Loss Modification functionality
- Introduction of Underwriting Workflow module
- Introduction of Non-Catastrophe loss analysis capabilities
- Enhancements to import, export and geocoding functionality, exposure management features
- Enhancements to geospatial functionality, data quality and hazard analytics
- Introduction of Loss Analysis Templates

B. Percentage difference in average annual zero deductible statewide loss costs based on the 2007 Florida Hurricane Catastrophe Fund's aggregate personal and commercial residential exposure data found in the file named "hlpm2007c.exe" for:

1. All changes combined, and

The overall change in the statewide average annual zero deductible industry statewide residential average loss cost is +5.4%.

2. Each individual model component change.

Event Generation Component: These updates have resulted in a 0.7% decrease in losses.

Hazard Component: These updates have resulted in a 0.8% increase in losses.

Building Vulnerability Component: These updates have resulted in a 5.2% increase in losses.

Geographical or Other Data Update: These updates have resulted in a 0.2% increase in losses

C. *Color-coded maps by county reflecting the percentage difference in average annual zero deductible statewide loss costs based on the 2007 Florida Hurricane Catastrophe Fund's aggregate personal and commercial residential exposure data found in the file named "hlpm2007c.exe" for each model component change*

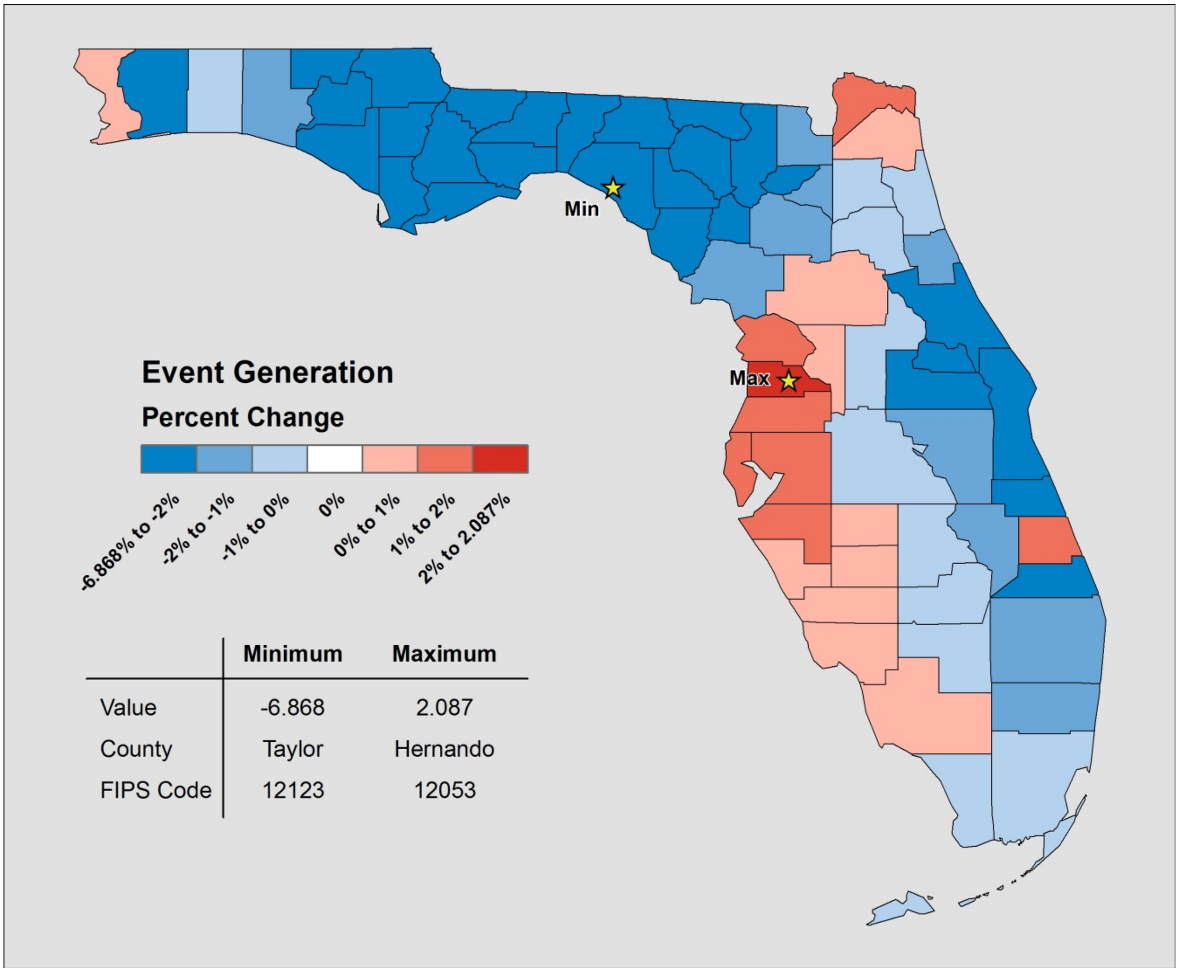


Figure 4. Event Generation Percentage Impact on Average Annual Zero Deductible Statewide Loss Costs

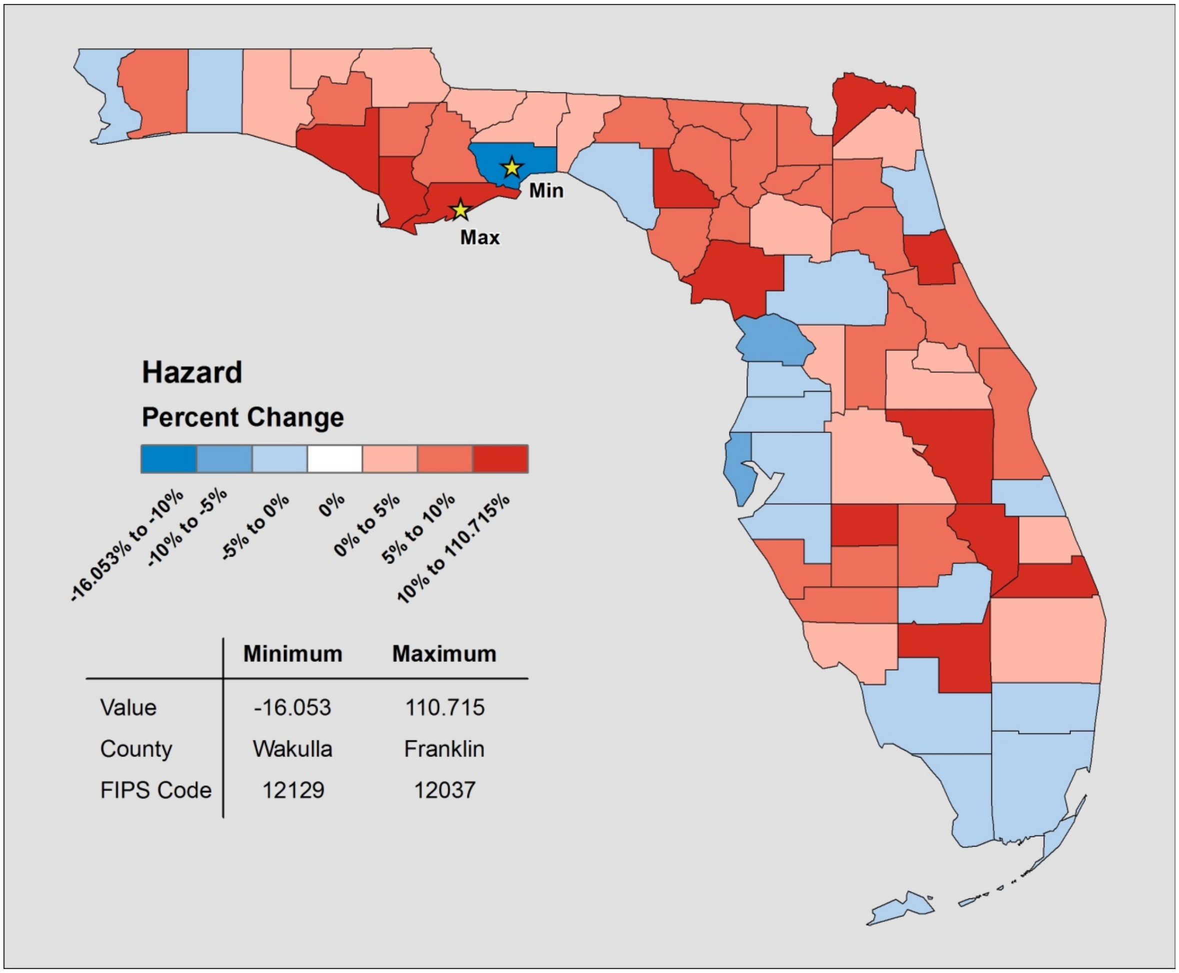
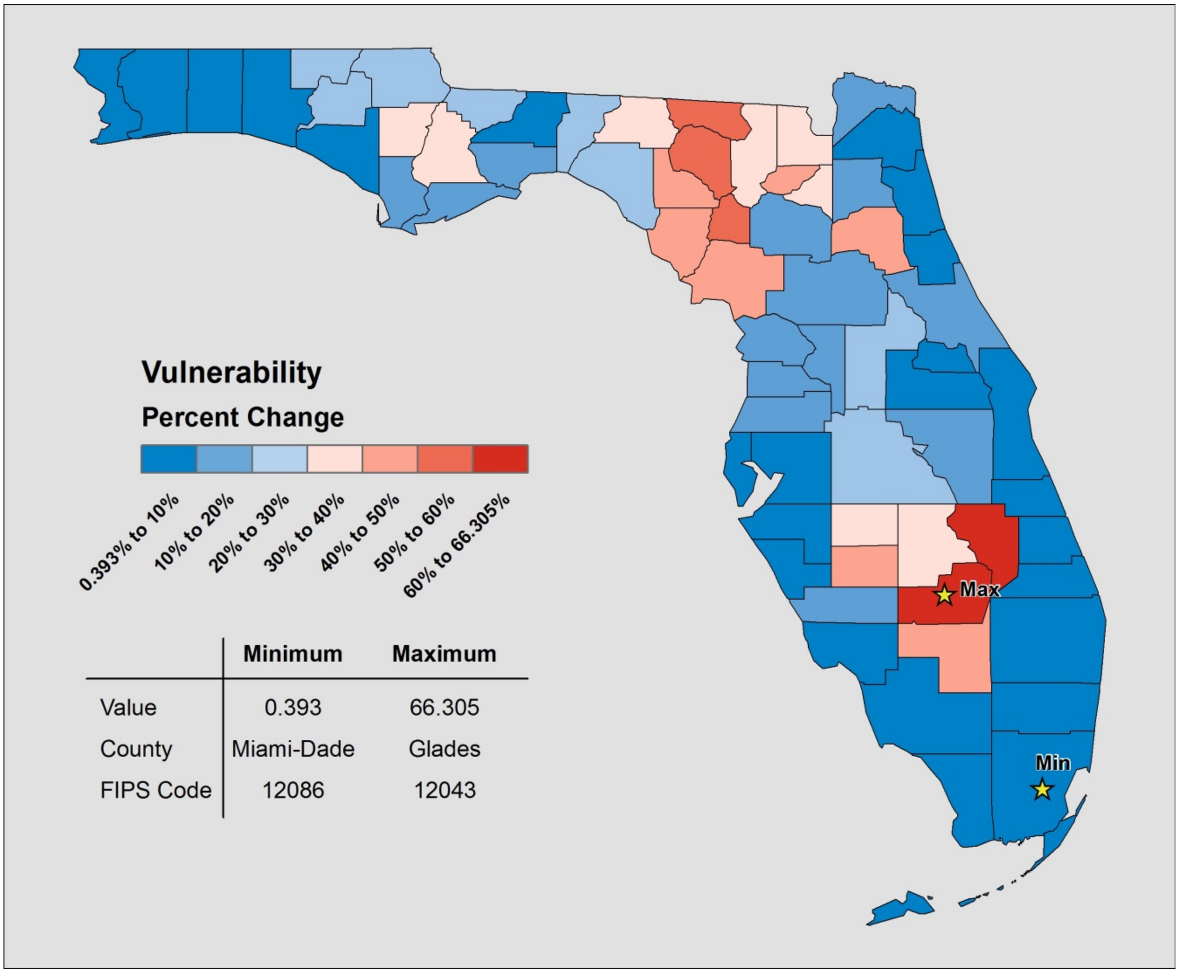


Figure 5. Hazard Percentage Impact on Average Annual Zero Deductible Statewide Loss Costs



	Minimum	Maximum
Value	0.393	66.305
County	Miami-Dade	Glades
FIPS Code	12086	12043

Figure 6. Vulnerability Percentage Impact on Average Annual Zero Deductible Statewide Loss Costs

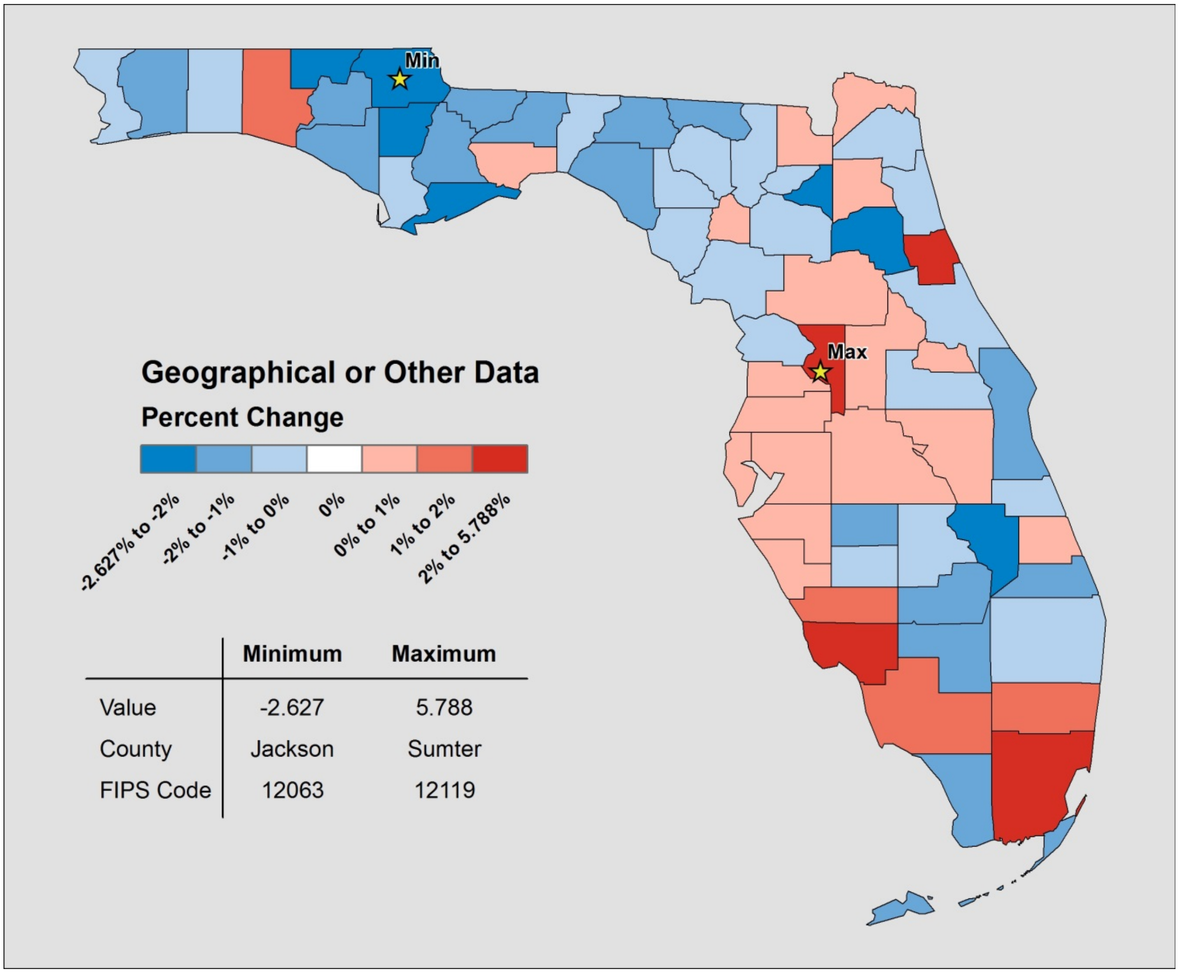
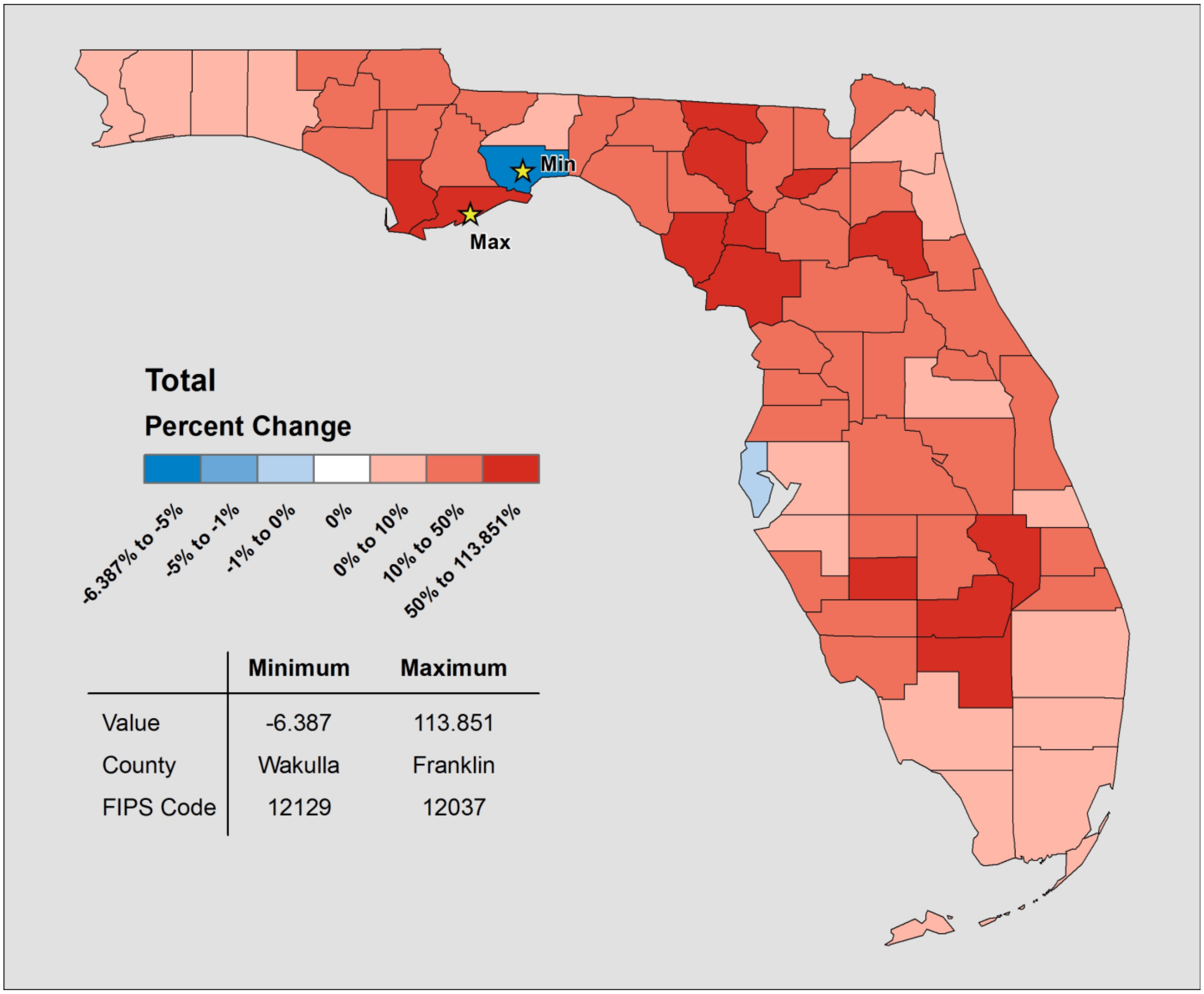


Figure 7. Geographic or Other Data Impact on Average Annual Zero Deductible Statewide Loss Costs

D. *Color-coded map by county reflecting the percentage difference in average annual zero deductible statewide loss costs based on the 2007 Florida Hurricane Catastrophe Fund's aggregate personal and commercial residential exposure data found in the file named "hlpm2007c.exe" for all model components changed.*



	Minimum	Maximum
Value	-6.387	113.851
County	Wakulla	Franklin
FIPS Code	12129	12037

Figure 8. Total Percentage Impact on Average Annual Zero Deductible Statewide Loss Costs

6. *Provide a list and description of any potential interim updates to underlying data relied upon by the model. State whether the time interval for the update has a possibility of occurring during the period of time the model could be found acceptable by the Commission under the review cycle in this Report of Activities.*

The following updates to underlying data relied upon by the model may be made during 2015 and during the review cycle in this Report of Activities.

1. The ZIP Code database may be updated—for each new ZIP Code centroid, the following data needs to be re-estimated: distance from coastline, elevation and surface roughness.
2. The Industry Exposure database may be updated—the Industry Exposure Database update affects estimated industry losses and resulting demand surge factors.

G-2 Qualifications of Modeling Organization Personnel and Consultants

Relevant Forms: G-1, General Standards Expert Certification
G-2, Meteorological Standards Expert Certification
G-3, Statistical Standards Expert Certification
G-4, Vulnerability Standards Expert Certification
G-5, Actuarial Standards Expert Certification
G-6, Computer Standards Expert Certification

A. Model construction, testing, and evaluation shall be performed by modeling organization personnel or consultants who possess the necessary skills, formal education, and experience to develop the relevant components for hurricane loss projection methodologies.

AIR employs a large, full-time professional staff in actuarial science, computer science, insurance and reinsurance, mathematics, meteorology and other physical sciences, software engineering, statistics and structural engineering. Most have advanced degrees and more than 80 hold Ph.D. credentials. These are the academic disciplines required to properly develop, test, and evaluate hurricane loss projection methodologies.

B. The model and model submission documentation shall be reviewed by either modeling organization personnel or consultants in the following professional disciplines: structural/wind engineering (licensed Professional Engineer), statistics (advanced degree), actuarial science (Associate or Fellow of Casualty Actuarial Society), meteorology (advanced degree), and computer/information science (advanced degree). These individuals shall certify Forms G-1 through G-6 as applicable.

All modifications to AIR's currently accepted model have been reviewed by modeler personnel or independent experts as indicated in Table 1.

All AIR staff and independent experts abide by the standards of professional conduct adopted for their respective professions.

Table 1. AIR Modeler Personnel and Independent Experts

Name	Professional Discipline	Years of Professional Experience	Education Level	Qualification
Doggett, Arthur	Atmospheric Science	16	Ph.D., Texas Tech University	Advanced degree
Huang, Suilou	Statistics	21	M.S., University of Rhode Island (Ph.D. Oceanography, University of Rhode Island)	Advanced degree
Friedland, Carol*	Civil Engineering	7	Ph.D., Louisiana State University	Advanced degree, licensed P.E.
Wang, Heidi	Actuarial Science	10	M.S., Actuarial Science	FCAS
Yingqun Wang	Software Development	15	M. S. in computer science, California State University	Advanced degree

*Independent expert Dr. Carol Friedland, Ph.D., P.E., consulting engineer and professor at the Louisiana State University, reviewed the vulnerability components of the U.S. Hurricane Model.

Disclosures

1. *Organization Background*
   A. *Describe the ownership structure of the modeling organization. Describe affiliations with other companies and the nature of the relationship, if any. Indicate if your organization has changed its name and explain the circumstances.*

AIR Worldwide Corporation is a second-tier subsidiary of Verisk Analytics, Inc., a publicly held company. AIR has subsidiaries or offices in San Francisco, London, Munich, Hyderabad, Beijing, Tokyo, and Singapore. AIR is directly or indirectly the owner of AIR Worldwide Limited in London, Verisk Analytics India Private Limited in India, Verisk Analytics GmbH in Germany, and Verisk Analytics Japan LLC in Japan.

   B. *If the model is developed by an entity other than a modeling company, describe its organizational structure and indicate how proprietary rights and control over the model and its critical components is exercised. If more than one entity is involved in the development of the model, describe all involved.*

The U.S. Hurricane Model is developed, maintained and enhanced by full-time professional staff employed by AIR.

   C. *If the model is developed by an entity other than a modeling company, describe the funding source for the model.*

The U.S. Hurricane Model is developed exclusively by full-time professional staff employed by AIR.

   D. *Describe the modeling organization's services.*

AIR provides catastrophe risk assessment and management products and services to primary insurance companies, reinsurers, intermediaries, involuntary markets, state funds and other insurance industry organizations such as ISO and the NCCI. We also provide services to investment banks, investors in catastrophe bonds and corporate and government risk managers.

AIR's Touchstone software product is designed to help clients estimate their potential losses from hurricanes, extratropical cyclones, tornadoes, hailstorms, straight-line windstorms, earthquakes, fire-following earthquakes, terrorism, flood and wildfire. Designed to analyze risks at the location (i.e., geocode) level, Touchstone takes full advantage of risk-specific structural details; occupancy, age and height locational characteristics such as site-specific geographical and geological information; and insurance policy and reinsurance treaty terms. Our clients use these loss estimates in the areas of ratemaking, underwriting, risk mitigation strategies, risk-transfer decision-making and overall portfolio management. Our primary company clients account for over 50 percent of the total property market in the U.S.

AIR provides hurricane loss estimation services for involuntary markets, including the Florida Hurricane Catastrophe Fund (FHCF) and Citizens Property Insurance Corporation. AIR also provides loss estimation services to the investment community in conjunction with various catastrophe bond offerings. Finally, AIR services an increasing number of corporate and government clients, helping risk managers understand their exposure to extreme event risk from both natural and man-made catastrophes.

AIR's CATRADER® software enables a reinsurer to estimate potential catastrophe losses from reinsurance treaties covering insurance companies worldwide. It covers the perils of hurricane, tornado, hailstorm, straight-line windstorm, extratropical cyclone, earthquake and fire-following earthquake in more than 90 countries throughout North and South America, the Caribbean, Europe and the Asia-Pacific region. This system is used in pricing treaties, for risk selection and for overall portfolio management. CATRADER provides detailed output that allows analysis of risk transfer options, other than reinsurance, thus making it an appropriate tool for primary insurance companies as well as reinsurers.

   E. *Indicate if the modeling organization has ever been involved directly in litigation or challenged by a statutory authority where the credibility of one of its U.S. Hurricane Model versions for projection of* *loss costs or probable maximum loss levels was disputed. Describe the nature of each case and its conclusion.*

AIR has never been involved in litigation or been challenged by a statutory authority with respect to the credibility of its Atlantic Tropical Cyclone Model.

2. *Professional Credentials*
   A. *Provide in a chart format (a) the highest degree obtained (discipline and university), (b) employment or consultant status and tenure in years, and (c) relevant experience and responsibilities of individuals currently involved in the acceptability process or in any of the following aspects of the model:*
      1. *Meteorology*
      2. *Statistics*
      3. *Vulnerability*
      4. *Actuarial Science*
      5. *Computer Science*

In total, the AIR technical staff consists of more than 500 professionals, more than 80 of whom hold Ph.D. credentials in their fields of expertise. While many of these professionals have been directly or indirectly involved with the U.S. Hurricane Model, we list below only those individuals who have contributed significantly to model development, enhancement, testing and/or validation.

Credentials are summarized in Table 2. Note that all of the individuals named are full-time employees of AIR.

Table 2. Professional Credentials

2.A.1. Meteorology		
(a) Name, Education	**(b) Years at AIR**	**(c) Relevant Experience**
Arthur Doggett Ph.D., Geosciences/ Atmospheric Science Texas Tech University	11	Dr. Doggett is an Assistant Vice President and Senior Principal Meteorologist with the weather and climate team at AIR. He is responsible for the development of the Mexico Tropical Cyclone model, as well as working with the U.S. Hurricane and Severe Thunderstorm models. Dr. Doggett has also worked closely with agricultural risk modeling team and supports the data needs of many AIR projects. Before joining AIR, Dr. Doggett was a professor of Atmospheric Science at Texas Tech University. At Texas Tech, he worked as a member of the Wind Science and Engineering Program developing mesoscale-observing networks, leading mobile field observation of hurricanes and producing state-of-the-art Doppler radar applications.
Mark Hope B.Sc. Marquette University	1	Mark joined AIR in 2013 as an Atmospheric Scientist in the Research Department. Most recently, he was a graduate student working in the Computational Hydraulics Laboratory at the University of Notre Dame where he worked on the implementation and development of the ADCIRC coastal circulation model. He also worked in conjunction with the United States Army Corps of Engineers to develop and test the Texas Gulf Coast computational grid as well as a parametric study of storm surge risk for the Hawaiian Islands. He has worked extensively with storm surge processes in Louisiana, Texas, Hawaii, and the New York City region. He earned a B.S. in Environmental Engineering from Marquette University, as is completing his Ph.D. in Civil Engineering at the University of Notre Dame. .

2.A.1. Meteorology		
(a) Name, Education	**(b) Years at AIR**	**(c) Relevant Experience**
Todd Keller B.Sc., Earth and Geological Science, University of Massachusetts	11	Mr. Keller is a Research Analyst in the Atmospheric Sciences Group within AIR's Research and Modeling Department. He has over 13 years of Geographic Information Systems (GIS) experience, 11 of which were gained at AIR. Mr. Keller works on developing and maintaining several atmospheric models produced by AIR. They include tropical cyclone models for the United States, Mexico and Central America; winter storm models for the United States and Canada; and the United States severe thunderstorm model. Mr. Keller also leverages his GIS experience in assisting in the production of presentation-quality maps and graphics, conducting various spatial analyses in support of model development, validation and calibration, as well as training fellow colleagues in the proper use and functions of GIS across different software platforms. Prior to joining AIR, Mr. Keller was a GIS Engineer for a civil engineering firm. He holds a B.S. in Earth and Geographic Sciences as well as a certificate in Geographic Information Technologies, both from the University of Massachusetts. He is currently working toward an M.S. in Atmospheric Sciences from Mississippi State University.
Sylvie Lorsolo Ph.D., Geosciences (Atmospheric Sciences), Texas Tech University	2	Dr. Lorsolo joined AIR in 2012 as an Atmospheric Scientist in the Research Department. Most recently, Sylvie worked as an Assistant Scientist for the NOAA/Hurricane Research Division at the University of Miami where she focused on observational studies of the hurricane boundary layer and developed expertise on collecting and analyzing airborne data for a better understanding of hurricane intensity change. Prior to that, Sylvie was a Research Assistant at Texas Tech University, where she studies hurricane structure at landfall and was responsible for field experiment design for land falling tropical cyclones. She also conducted damage surveys after hurricane landfall and tornado events. In addition, Dr. Lorsolo earned her Ph.D. in Geosciences from Texas Tech University.

While many outside experts have been consulted on various aspects of the vulnerability functions, the primary full-time employees currently involved in model development are:

2.A.2. Vulnerability		
(a) Name, Education	**(b) Years at AIR**	**(c) Relevant Experience**
Jayanta Guin Ph.D., Civil Engineering, State University of New York, Buffalo	17	Dr. Guin is executive vice president responsible for operational and strategic management of the AIR Research and Modeling team. Under his leadership the team has expanded the global coverage of natural catastrophe models and continues to enhance existing models. He has more than ten years of experience in probabilistic risk analysis for natural catastrophes worldwide. Dr. Guin has led the research effort on a number of capital markets transactions that involved transfer of risk due to earthquakes, cyclones and windstorms. Prior to his graduate studies, he worked as a structural engineer with a leading design consultant in India. Dr. Guin received his B.S. in Civil Engineering from Jadavpur University in India. He earned his M.S. and Ph.D. in Civil Engineering from the State University of New York, Buffalo, with a specialization in dynamic soil-structure interaction and computational mechanics. As a member of the

2.A.2. Vulnerability		
(a) Name, Education	**(b) Years at AIR**	**(c) Relevant Experience**
		Computational Mechanics Laboratory at SUNY, Buffalo, Dr. Guin gained extensive experience in finite-element and boundary-element analyses for a wide range of engineering problems.
Cagdas Kafali Ph.D., Civil and Environmental Engineering, Cornell University	7	Dr. Cagdas Kafali is an Assistant Vice President and a Senior Principal Engineer in AIR's Research and Modeling group, working primarily on wind vulnerability of civil engineering systems. He has been involved in the development of many of AIR's wind models, particularly the Asia-Pacific typhoon models and the European Extratropical Cyclone model, and more recently the U.S. and Canada wind storm models. Dr. Kafali holds an M.S. in Structural Engineering from Case Western Reserve University and a Ph.D. in Civil Engineering from Cornell University with a minor in Applied Mathematics. In his dissertation he developed a probabilistic methodology for assessing performance of structural/nonstructural systems in a multi-hazard environment.
Karthik Ramanathan Ph.D., Civil and Environmental Engineering, Georgia Institute of Technology	2	Dr. Ramanathan joined AIR in 2012 as an Engineer in our Research and Modeling Department. Prior to AIR, he worked as a Graduate Research Assistant with the School of Civil and Environmental Engineering at Georgia Institute of Technology where he earned both his Ph.D. and M.S. in Civil and Environmental Engineering with a special focus in Earthquake Engineering and Structural Reliability. Prior to joining Georgia Tech, Dr. Ramanathan obtained an M.S. from the University of Pittsburgh in Civil and Environmental Engineering with a special emphasis in Structural Engineering and Mechanics.

2.A.3. Actuarial		
(a) Name, Education	**(b) Years at AIR**	**(c) Relevant Experience**
Brandie Andrews B.S., Mathematics Statistics, Wheaton College	8	Ms. Andrews is an Assistant Vice President within AIR's Consulting and Client Services Group. She has been with AIR for eight years and in that time has acted as the primary modeler for a large number of insurance, reinsurance, and securitization projects. She is currently the leader of the Regulatory and Public Policy market segment. In this role Ms. Andrews ensures compliance with all regulatory requirements of catastrophe models and assists clients in dealing with regulators and rating agencies. She has taught classes on exposure data, interpretation of model results and the financial model at the AIR Institute. Prior to joining AIR, Ms. Andrews spent over ten years in the actuarial field in ratemaking and reserving. She earned a B.A. in Mathematics from Wheaton College and has passed five Casualty Actuarial Society Exams. Ms. Andrews has achieved the designation of Certified Catastrophe Modeler by completing the requirements of the AIR Institute Certification Program.
Warren Chanzit B.S., Chemical Engineering, Northwestern University	1	Mr. Chanzit joined AIR in 2013 as a Risk Analyst in the Consulting and Client Services Department. Most recently, he held a position as an Analyst at The Northbridge Group, where he modeled effects of proposed electricity transmission market rule changes to assist clients in evaluating the financial impact and formulating appropriate strategic response. Prior to this, Mr. Chanzit held a position as a Researcher at Northwestern University, where he was responsible for performing complex calculations that simulated molecular behavior using both FORTRAN and MATLAB.

		Mr. Chanzit earned a Bachelor of Science Degree in Chemical Engineering from Northwestern University as well as an Undergraduate Certificate in Managerial Analytics from the Kellogg School of Management.
Christy Shang M.S., Mathematics, University of Connecticut	3	Ms. Shang is a risk consultant in the Consulting and Client Services group at AIR. She works in the Regulatory and Public Policy market segment, where she ensures compliance with all regulatory requirements of catastrophe models and assists clients in dealing with regulators and rating agencies. Ms. Shang holds a B.A. in Economics from Boston University and an M.S. in Mathematics from the University of Connecticut.
Heidi Wang M.S., Actuarial Science, University of Illinois at Urbana Champaign	4	Ms. Wang is a senior manager in the Business Development group at AIR. She works on promoting and developing catastrophic related models for agriculture segment as well as supporting the actuarial work at AIR. Prior to joining AIR, Ms. Wang worked for different consulting companies and most recently worked as an Actuarial Manager at Liberty Mutual Insurance Company in which she managed premium analysis as well as reserve studies for different lines of business for Commercial Market. She has earned her M.S in Actuarial Science from the University of Illinois at Urbana Champaign.
Katie Ward B.S, Environmental Science, Northeastern University	2	Ms. Ward joined AIR in 2012 as a Risk Analyst in the Consulting and Client Services Department. Most recently, Katie was employed at Lexington Insurance Company (Chartis) as an RMS Catastrophe Modeling Analyst, where she analyzed data with natural disaster modeling software and made updates to quoted and booked accounts. Katie has earned her B.S in Environmental Science from Northeastern University.

2.A.4. Statistics		
(a) Name, Education	**(a) Name, Educatio n**	**(a) Name, Education**
Tomas Girnius Ph.D., Applied Mathematics, California Institute of Technology	11	Dr. Girnius is a principal scientist at AIR Worldwide. During eleven years at AIR, Dr. Girnius has been model manager for both the AIR U.S. California Wildfire Model and the AIR Australia Bushfire Model; has been involved in several updates to AIR Severe Thunderstorm Models for U.S. and Canada; and has contributed to both the catalog and loss estimation modules of earlier releases of the U.S. Hurricane Model. Before joining AIR, Dr. Girnius worked as a researcher at two defense think tanks (Center for Naval Analyses and The Aerospace Corporation), as a software developer at the Smithsonian Astrophysical Observatory and, later, at Thomson Financial/Omgeo. Dr. Girnius received his Ph.D. from the California Institute of Technology (Thesis: Ray Tracing in Complex Three-Dimensional Earth Models), and his A.B. from Harvard University—both in Applied Mathematics.
Suilou Huang Ph.D., Oceanography, University of Rhode Island	2	Dr. Huang is a scientist in the Research Department, Statistics and Applied Mathematics group, at AIR. Since she joined AIR in 2013, she has been using her statistics expertise, data analysis, and computer programming skills in a variety of projects such as developing the Canada Tropical Cyclone catalog, U.S. Wildfire model, U.S. hurricane catalog update, providing support to the U.S. Hurricane Model submissions to the Louisiana State Hurricane Commission and FLHCM, and providing client support. In addition, she also gives statistical training courses to AIR employees. Prior to AIR, Dr. Huang's previous job duties in the United States include being an associate technical staff at MIT Lincoln Laboratory, a guest scientist at Woods Hole Oceanographic Institution, and a research scientist/adjunct faculty at New Mexico Institute of Mining and Technology.

		Dr. Huang holds a B.A. in Chemistry from Sun Yat-Sen University, China, M.S. in Statistics from University of Rhode Island, and a Ph.D. in Oceanography from the University of Rhode Island.
Adam Reichert Ph.D., Computer Science, University of Illinois, Urbana-Champaign	2	Dr. Reichert joined AIR in 2012 as a Scientist in our Research Department. Previously he worked as an Application Support Engineer for Math Works, where he assisted in the development of Bioinformatics Toolbox with the Engineering development group. Prior to that, he was a Research Assistant for the Department of Computer Science at the University of Illinois. In addition, Dr. Reichert has earned his Ph.D. in Computer Science from the University of Illinois and B.S in Physics from Stanford University.
Scott Stransky M.S., Atmospheric Science, Massachusetts Institute of Technology	7	Mr. Stransky is a Manager and Principal Scientist in AIR's research and modeling group, and manages the Statistics and Applied Mathematics Group. He leads the development of AIR's tropical cyclone stochastic catalogs. In addition, he is the model manager for the US & Canada severe thunderstorm models. He also manages the research and development of AIR's tropical cyclone models for the Caribbean and Hawaii. He participated in post-disaster damage surveys for the 2008 Super Tuesday Tornados in the Southeastern U.S., the 2008 Southern California wildfires, 2011's Hurricane Irene in the Bahamas, the Moore Tornado in 2013, and Hawaii's Tropical Storm Iselle in 2014. Mr. Stransky earned a B.S. in Mathematics with Computer Science from the Massachusetts Institute of Technology (MIT) and an M.S. in Atmospheric Science, also from MIT. His Masters research involved numerical modeling of rotating fluids in the laboratory setting and extrapolating the results to real-world weather models. His thesis was entitled: "Real-time state estimation of laboratory flows". His work has been published in academic journals such as Geophysical Research Abstracts and Lecture Notes in Computer Science, and was presented at IEEE's conference on Computer Vision and Pattern Recognition.
Susan Tolwinski-Ward Ph.D., Applied Mathematics, University of Arizona	1	Dr. Tolwinski-Ward is a statistical climatologist with expertise in data-model fusion and uncertainty quantification, and has been working on modeling tropical cyclones as a scientist with AIR since 2013. She holds a Ph.D. in Applied Mathematics from the University of Arizona with a minor concentration in Atmospheric Sciences. Prior to beginning work at AIR, she was a National Science Foundation Mathematical Sciences Postdoctoral Research Fellow at the Institute for Mathematics Applied to Geosciences at the National Center for Atmospheric Research.

2.A.5. Computer Science		
(a) Name, Education	**(b) Years at AIR**	**(c) Relevant Experience**
Prashant Annabattuni M.S., (Computer Science), University of North West	9	Mr. Annabattuni joined AIR Hyderabad in March 2005 and is the Director of the QA Group. He manages the QA group and testing activities of Touchstone and CLASIC/2. He also plays an important role in Client Services to the clients in Asia pacific region. He holds a M.S (Computer Science) degree from the University of North West. Prior to joining AIR, he was a QA Team Lead at Applabs Technologies Pvt. Ltd., testing security based products with features like Firewalls, Antivirus and Internet controls.
James Bachand B.S., Computer Science Wentworth Institute of Technology	4	Mr. Bachand joined AIR in 2010 through the cooperative education program and is now the Touchstone release engineer. He earned a Bachelor's of Science in Computer Science from Wentworth Institute of Technology and also holds an associate degree in Computer Information Security and Assurance. He also owns and operates an independent contracting business called Mass Webgineering, which specializes in Web

		Development on LAMP environments, and mobile platform application development.
Laxmi Balcha M.S., Software Engineering Brandeis University	8	Ms. Balcha is a Director in software development group providing direction and leadership to the engineering team, both in the U.S. and remote teams for Touchstone catastrophe modeling work stream and re-platform Touchstone onto big data technologies. She joined AIR in 2006 to oversee AIR Products data platform architecture and she played a pivotal role in the success of Touchstone release. She previously worked at EMC Corporation and has 16 years of Software Industry experience in US and Overseas. She holds a B.S. in Electronics & Communications Engineering from Osmania University, and a M.S. in Software Engineering from Brandeis University. She is also a Certified Public Accountant (Institute of Chartered Accountants of India), Certified in Statistical Methods & Applications (Gold Medalist) from Indian Statistical Institute, a Certified Catastrophe Modeler and a Certified Ham Radio Operator from NIAR.
Tanya Bedore B.S., Scientific and Technical Communication, Michigan Technological University	8	Ms. Bedore is a principal technical writer within the Software Development group. She is responsible for the development and maintenance of internal technical documentation client-facing technical and model-specific external documentation, as well as the Computer Standards documentation for the FCHLPM process She has more than 14 years of experience in technical writing. Before joining AIR, Ms. Bedore worked as a technical writer for HighJump Software, a 3M company, where she was responsible for documenting software applications designed to manage supply chain executions.
Johnny Cheng B.S., Computer Information Systems New England Institute of Technology	1	Mr. Cheng joined AIR in 2013 as a Tech Support Engineer in our Technical Support Department. Previously he worked as a Technical Support Analyst for Retail Decisions, Inc., where he provided second tier ad hoc client and internal support. Prior to that, Johnny worked for MEDfx Corporation as a Technical Support Engineer where he worked with data migrations and exports, provided application testing, and managed the level 1 & 2 support team. In addition, Johnny has earned a Bachelor's Degree in Computer Information Systems from The New England Institute of Technology.
Suryanarayana Datla M.E., Structural Dynamics, IIT, Roorkee, India	13	Mr. Datla joined AIR Hyderabad in February 2001 and is currently Assistant Vice President and Director for the Model group at Hyderabad. Mr. Datla has more than 16 years' experience in developing catastrophe loss estimation models. His current responsibilities include implementation of various catastrophic risk assessment models developed for various regions and perils worldwide into AIR products. He is also involved in development of catastrophe models for few regions/perils and manages the GIS and Flood Research teams in Hyderabad. Mr. Datla holds a M.E. (Masters in Engineering) in Structural Dynamics from IIT Roorkee, India. Prior to joining AIR, he was a senior engineer at RMS India Office at Delhi for three years where he played a crucial role in the development of earthquake, tornado, and hurricane models. Besides this, he also conducted post-disaster surveys for Gujarat (1998) and Orissa (1999) cyclones.
Phaninath Dheram M.Phil, Computer Science Jawaharlal Nehru University, New Delhi	2	Mr. Dheram joined AIR in 2012 as Manager of the Model implementation Group in Hyderabad. For three years prior to coming to AIR Mr. Dheram was an independent software development consultant. For nearly 11 years before that he worked for Mentor Graphics India Pvt Ltd. in Hyderabad developing software tools for electronic circuits design.
Baldvin Einarsson Ph.D., Mathematics, University of Iceland	<1	Dr. Einarsson joined AIR in 2014 as a Core QA Associate in the Product Management department. Most recently, he held a postdoc at the Center for Complex and Nonlinear Science at UC Santa Barbara and was a Specialist at the Marine Research Institute (MRI) of Iceland. There, Dr. Einarsson conducted mathematical research and joined a project to make

		the MRI's data available online. Prior to this, he was a Researcher at Universidad Complutense de Madrid, Spain, where he designed and programmed a cellular automata model for biofilm growth. Dr. Einarsson actively presented his research in conferences and published in academic journals. He has a teaching diploma and extensive teaching experience in Iceland, UC Santa Barbara and most recently at Bridgewater State University. Dr. Einarsson earned a Bachelor of Science Degree in Mathematics and a Ph.D. in Mathematics, both from the University of Iceland.
Jonathan Holden M.S., Hydrology, University of New Hampshire	8	Mr. Holden is a Vice President and leads AIR's Product Management group. He joined AIR in 2006 as a senior program manager. He previously worked for EMC Microsoft Practice (formerly Internosis, Inc.) as a senior project manager. Mr. Holden holds a B.A. in Geoscience from Franklin and Marshall College in addition to his M.S. in Hydrology from the University of New Hampshire.
Aditya Jinna M.S., Electrical and Computer Engineering, Wayne State University	14	Mr. Jinna is a Senior Software Engineer in the Software Development group at AIR. He works on the Touchstone platform with emphasis on Model integration in the application. He also works on various other components of the application namely, Security, Licensing, Authorization, Administration etc.Mr. Jinna also worked on numerous other AIR products such as TruExposure for CLASIC2, HomeValue, CATStation, and ALERT. Prior to joining AIR, Mr. Jinna worked as a WebDeveloper Intern for the Center for Urban Studies at Wayne State University. Mr. Jinna holds a B.S in Electronics and Instrumentation Engineering from Osmania University, India and an M.S in Computer Engineering from Wayne State University, Detroit.
Manoj Medarametla M.S., Software Systems Birla Institute of Technology & Science, Pilani	6	Mr. Medarametla joined AIR Hyderabad as a Software Engineer in Software Development group in June 2008. He is a Certified Catastrophe Modeler and his experience with AIR products includes Clasic/2, CATRader, and CATStation (CATools). He has earned an M.S. in Software Systems from Birla Institute of Technology & Science, Pilani.
Ram Nagulpally M.S., Mechanical Engineering, University of Arizona	2	Mr. Nagulpally joined AIR in 2012 as Director of QA in the Product Management department. Most recently, he was employed at Reveal Data Corporation as a Consulting Director of QA and Support, where he successfully managed delivery of the first Unicode compliant localization product and built a structured team to support the rapid growth of early stage start up. Prior to that, Mr. Nagulpally was Director of Operations for Geomagic, Inc. where delivered localization versions of software simultaneously in 6 different languages and operating systems. He earned his M.S in Mechanical Engineering from the University of Arizona.
Gayatri Natarajan B.S., Electronics and Communications Engineering, Madras University, India	8	Ms. Natarajan is the product manager for Touchstone where she manages product releases and coordinates development activities and delivery of software products to completion. She is also the lead business analyst for implementation of key models and software enhancements into the product. Ms. Natarajan received her B.S. in Electronics and Communications Engineering from Madras University in India and was awarded the silver medal for top rank in her university.
Robert Newbold M.S., Information Systems, M.B.A Boston University	12	Mr. Newbold is Senior Vice President of Business Development and Client Services, Americas. He is responsible for the Americas business development team and for providing support and client service to AIR clients in the insurance, reinsurance, securitization, and intermediary markets in the Americas and Bermuda. Rob has been involved in a wide range of consulting engagements at AIR, including loss analyses, portfolio optimizations, economic impact analyses, and the management of over 100 catastrophe bonds. Mr. Newbold received his M.B.A. and M.S. in Information Systems from Boston University Graduate School of Management. He received a B.S. in

		Systems Engineering from the University of Virginia
Sudhir Kumar Potharaju B.S., Electronics and Communications, Osmania University	13	Mr. Potharaju is a Vice President of the Software Development group. He joined AIR as a software engineer at AIR Hyderabad and moved two years later into a senior software engineer position within the Software Development group in Boston. Prior to working at AIR, Mr. Potharaju worked at the Electronics Corporation of India Ltd. (ECIL) and was involved in design, coding and testing of various projects. He completed his engineering degree in Electronics and Telecommunications at IETE, Osmania University Campus, in 1998.
Andrew Rahedi M.A., Physics, Wesleyan University	**6**	Mr. Rahedi is the Lead of Core Quality Assurance Team. He joined AIR in 2008 as a Core Quality Assurance Associate in the Product Management group. Previously he was with the Hartford Life Insurance Company where he worked as a Statistical Modeler. Andrew holds a M.A. in Physics from Wesleyan University.
Praveen Sandri Ph.D., Civil Engineering, Texas Tech University	13	Dr. Sandri is managing director and senior vice president of India operations. He has over seventeen years of experience in probabilistic risk analysis for natural and man-made catastrophes and has been instrumental in the development of various catastrophe models worldwide. Hi is responsible for the strategic management of the Indian Operations which provides services in the areas of software development, model implementation, GIS, model and product testing, analytics & data services along with providing client services and business development initiatives in India, Asia-Pacific and the middle east regions. Prior to joining AIR, Dr. Sandri was a research associate at the Wind Engineering Research Center of Texas Tech University where he worked in the area of wind engineering and was the Manager of the Wind Engineering Research Field Laboratory (WERFL). He applied expert systems and artificial neural networks to wind engineering applications. He was the project leader for the development of WIND-RITE™, a knowledge-based expert system for the Insurance Institute for Property Loss Reduction, and he developed the “Expert System as an Alternate Code Compliance Methodology” for the Florida Housing Finance Agency. Dr. Sandri earned his B.S. in Civil Engineering at Osmania University in India, M.S. and Ph.D. in Civil Engineering at Texas Tech University, with a specialization in application of expert systems and artificial neural networks in Wind Engineering.
Barik Subhashis B.E Chem. Engineering, NIT Rourkela MBA, ICFAI Hyderabad	11	Mr. Subhashis joined AIR Hyderabad in January 2003 as data analyst and is currently Sr. Manager in the Model Quality group. The group takes care of quality assuring all models and related features in Touchstone. He holds a Bachelor’s degree in Chemical Engineering from National Institute of Technology, Rourkela and a Masters in Business Administration from ICFAI University, Hyderabad. Prior to joining AIR, he was an Assistant manager at HBLNife Power Systems for 2 years, implementing Japanese manufacturing concepts in the factory. He also has 5 years of experience in Chemical Unit of Indian Rare Earths, Orissa under Department of Atomic Energy.
Pasupulati Swarna Latha M.S., Computer Applications Osmania University, Hyderabad	5	Ms. Swarna Latha is an Assistant Manager for Software Development group in Hyderabad. She joined AIR, Hyderabad Office in October 2009 as Senior Software Engineer in the Software group. Prior to joining AIR, Hyderabad, she worked in the statistical and educational domains for Cranes Software International Ltd., Bangalore and NISAI Technologies, Hyderabad. She has more than eleven years of experience in the field of software development.
Anush Mani Subramanian MBA, Finance, Great Lakes Institute of	2	Mr. Subramanian joined AIR in 2012 as a Product Consultant in the Product Management department. Most recently, he worked as a Business Analyst for State Street Corporation, where he performed Data Analysis activities for the financial

Management, India		data repository team. Prior to that, Mr. Subramanian was a Lead Business Analyst for the Electronic Medical Records Department at eClinicalWorks, where he trained the users of the product to achieve better efficiency in operational workflows. He earned his MBA in Finance from Great Lakes Institute of Management, India.
Yingqun Wang M.S., Computer Science, California State University	7	Ms. Wang joined AIR in 2007 as a Software Engineer in the Software Development group. She now is a team lead within the Touchstone Software Development group. She previously worked as a Programmer Analyst at the University of California. Ms. Wang holds an M.S. in Computer Science from California State University in San Bernardino, CA.
David Wilson M.B.A., Wallace E. Carroll Graduate School of Management, Boston College	11	Mr. Wilson is a Sr. Product Manager in the Product Management group at AIR. He manages the Data Products Group, which includes responsibility for updating the spatial mapping layers, postal and boundary data, US address service/geocoding, and property-specific databases at AIR. Prior to joining AIR, Mr. Wilson worked as a Product Manager at Vality Technology (which was acquired by Ascential Software, and later IBM) as a Product Manager for data quality and geocoding product offerings.
Alex Wong B.S., Computer Science Northeastern University	7	Mr. Wong joined AIR in 2007 as a Software Engineer in the Software Development group. Before coming to AIR he was a Web Application Developer for Ziggs Inc. Mr. Wong graduated from Northeastern University with a B.S. in Computer Science.
Yili Yao M.S., Computer Science, State University of New York at Stony Brook	10	Ms. Yao has been with AIR since 2004 and is a Principal Database Engineer in the Software Development group. She primarily works on Touchstone platform and developed multiple databases in Oracle and SQL Server that provide US address service with geocoding, property building characteristics, data quality scoring and benchmarking for AIR's risk modeling software. She also works on various other aspects of the application, including exposure data conversion, loss analysis, data import and export. Prior to joining AIR, Ms. Yao worked at Level (3) Communications (Genuity/GTE Internetworking/BBN) as a Software Development/Sustaining Engineer. She has a B.A. from Clark University and an M.S. in Computer Science from State University of New York at Stony Brook

2.A.6. Data Management and Exposures		
(a) Name, Education	**(b) Years at AIR**	**(c) Relevant Experience**
Anthony Hanson M.A., Economics, Boston College	8	Mr. Hanson is a senior principal analyst in the Exposures Group. He joined AIR in 2005 as database engineer and focused on software performance improvements by changing the way the analytical engine accessed the database to increase scalability from 8 engines to a minimum of 40 engines. In 2008 he moved to the research department as a senior analyst where he has continued to automate and streamline database operations. Mr. Hanson has more than 14 years' experience designing database systems for commercial software; two products from the ground up. His last employer, the Hampden County Corrections Department, is still using the electronic medical record he designed to provide cost effective health care to a high risk population.
Cheryl Hayes M.A., Environmental Studies, Boston University	14	Ms. Hayes is an assistant vice president and manager of the Exposures team in the Research and Modeling Group. She has led the team in the development of comprehensive, high resolution industry exposure databases for more than 90 countries worldwide. During her tenure at AIR, she has been instrumental in streamlining the

2.A.6. Data Management and Exposures		
(a) Name, Education	**(b) Years at AIR**	**(c) Relevant Experience**
		development process for the industry exposure databases. She has also been involved in setting up and administering the source control database for the research department used for archiving source code, providing support for postings of real time loss estimates on AIR's ALERT website for major catastrophic events worldwide as well as assisting with special projects including catastrophe bonds. Ms. Hayes holds her B.A. in Political Science from Mount Holyoke College and her M.A. in Environmental Studies from Boston University.
John Rowe M.S., Structural Engineering, City University London and Technical University of Denmark, Copenhagen	18	Mr. Rowe is Vice President, director of research operations. Before being promoted, he was manager of AIR's Exposures Group. Previously, he worked on the catalogs and wind damage function development for numerous countries. He also worked on the development of the AIR storm surge flood model for the U.K. Mr. Rowe holds his M.S. in Structural Engineering from City University London and the Technical University of Denmark, Copenhagen. He specialized in numerically modeling the behavior of structures.
Andrew Shatz M.A., Geographic Information Sciences, Clark University.	1	Mr. Shatz joined the Research Team at AIR Worldwide in 2013 working as an Analyst in the Data Management Group (DMG). For the previous four years, he has held numerous research assistant and project manager positions, most notably at the Human Environment Regional Observatory, an NSF-REU site at Clark University. His research specialties include Remote Sensing, Species Distribution Modeling, invasive species biology, and GIS tool and application development. Mr.Shatz received both his B.A. in Geography/Music Composition and an M.A. in Geographic Information Sciences at Clark University.
Ben Spaulding Ph.D., Geography, University of Connecticut.	4	Dr. Spaulding joined AIR in 2010 as a Manager in the Data Management Group in our Research Department. Prior to AIR, he worked as a Project Manager with Progeos Inc. in Tolland, Connecticut. Dr. Spaulding earned both an M.A., and Ph.D. in Geography from The University of Connecticut.

2.A.7. Editorial		
(a) Name, Education	**(b) Years at AIR**	**(c) Relevant Editorial Experience**
Jonathan Kinghorn B.A., Combined Arts, University of Leicester	2	Mr. Kinghorn is a writer/editor with the Marketing and Communications and Consulting Client Services Groups. He is a published author and certified museum curator. Before joining AIR Mr. Kinghorn served in Corporate Communications at Abt Associates. Prior to that he was with the *New England Antiques Journal,* the IBM Institute for Knowledge Management, and the Beacon Press.

B. Identify any new employees or consultants (since the previous submission) working on the model or the acceptability process.

The following new employees have worked on the model or acceptability process since the previous submission. (Note that a "new" employee is new to the model development, to the acceptability process, or to both):

- James Bachand, see Disclosure 2.A.5. above
- Laxmi Balcha, see Disclosure 2.A.5. above
- Warren Chanzit, see Disclosure 2.A.3. above
- Johnny Cheng, see Disclosure 2.A.5. above
- Phaninath Dheram, see Disclosure 2.A.5. above
- Baldvin Einarsson, see Disclosure 2.A.5. above
- Mark Hope, see Disclosure 2.A.1. above
- Suilou Huang, see Disclosure 2.A.4. above
- Aditya Jinna, see Disclosure 2.A.5. above
- Sylvie Lorsolo, see Disclosure 2.A.1. above
- Manoj Medarametla, see Disclosure 2.A.5. above
- Ram Nagulpally, see Disclosure 2.A.5. above
- Andrew Rahedi, see Disclosure 2.A.5. above
- Karthik Ramanathan, see Disclosure 2.A.1. above
- Adam Reichert, See Disclosure 2.A.4 above
- Andrew Shatz, see Disclosure 2.A.6. above
- Ben Spaulding, see Disclosure 2.A.6 above.
- Anush Mani Subramanian, see Disclosure 2.A.5. above
- Pasupulati Swarna Latha, see Disclosure 2.A.5. above
- Susan Tolwinski-Ward, see Disclosure 2.A.4. above
- Yingqun Wang, see Disclosure 2.A.5. above
- Katie Ward, see Disclosure 2.A.3. above
- David Wilson, see Disclosure 2.A.5. above
- Alex Wong, see Disclosure 2.A.5. above
- Yili Yao, see Disclosure 2.A.5. above

The consultant listed below has worked on the acceptability process:

- Dr. Carol Friedland, P.E.

C. Provide visual business workflow documentation connecting all personnel related to model design, testing, execution, maintenance, and decision-making.

The AIR Hurricane Model Workflow is illustrated in Figure 9.

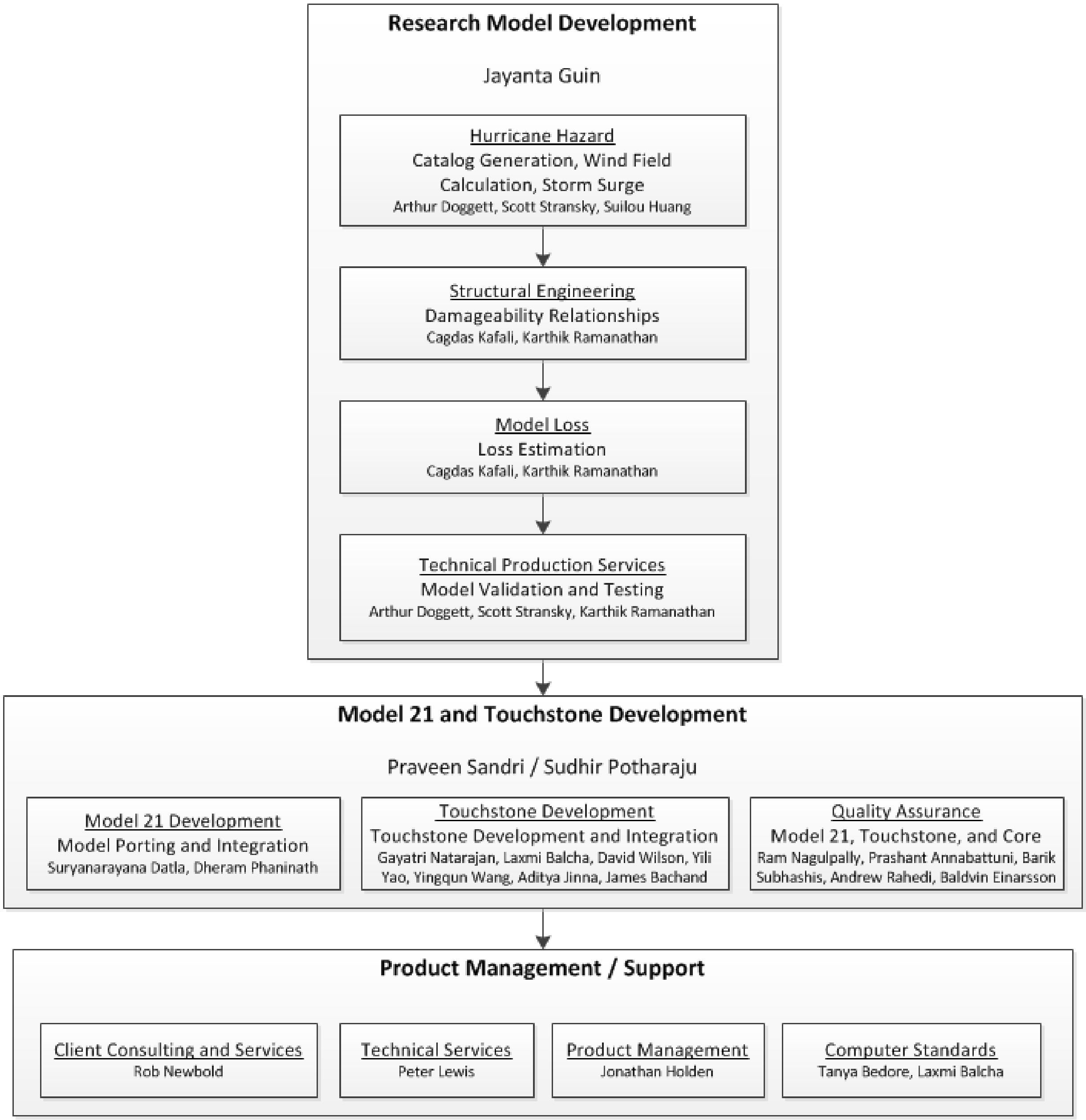


Figure 9. AIR Hurricane Model Workflow

D. *Indicate specifically whether individuals listed in A. and B. are associated with the insurance industry, a consumer advocacy group, or a government entity, as well as their involvement in consulting activities.*

All of the individuals listed are either full-time employees of AIR or are independent consultants.

3. *Independent Peer Review*
   - A. *Provide reviewer names and dates of external independent peer reviews that have been performed on the following components as currently functioning in the model:*
     1. *Meteorology*

Reviewed by Dr. Kerry Emanuel, Dr. Peter Black, and Dr. Robb Contreras in 2010.

2. *Statistics*

This component has not been reviewed by independent experts.

3. *Vulnerability*

Reviewed by Dr. Joseph Minor, PE in 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008 and 2009.

Reviewed by Dr. Carol Friedland and Dr. Marc Levitan in 2010.

Reviewed by Dr. Carol Friedland in 2012 and 2014.

4. *Actuarial Science*

Reviewed by John W. Rollins, FCAS, MAAA, in both 2010 and 2012.

5. *Computer Science*

Reviewed by Dr. Mark Wolfskehl in 2002.

Reviewed by Dr. John Kam in 2003, 2004 and 2005.

Reviewed by Ms. Narges Pourghasemi in 2006, 2007, 2008, 2010 and 2012.

B. *Provide documentation of independent peer reviews directly relevant to the modeling organization's responses to the current standards, disclosures, or forms. Identify any unresolved or outstanding issues as a result of these reviews.*

Dr. Friedland's CV is included in Appendix 7 on page 427.

Yingqun Wang's CV is included in Appendix 7 on page 440.

C. *Describe the nature of any on-going or functional relationship the organization has with any of the persons performing the independent peer reviews.*

AIR has no on-going functional relationship with any of the persons who performed independent reviews, nor with any of their employees or consultants, nor with any independent organization.

4. *Provide a completed Form G-1, General Standards Expert Certification. Provide a link to the location of the form here.*

A completed Form G-1 is provided on page 217.

5. *Provide a completed Form G-2, Meteorological Standards Expert Certification. Provide a link to the location of the form here.*

A completed Form G-2 is provided on page 218.

6. *Provide a completed Form G-3, Statistical Standards Expert Certification. Provide a link to the location of the form here.*

A completed Form G-3 is provided on page 219.

7. *Provide a completed Form G-4, Vulnerability Standards Expert Certification. Provide a link to the location of the form here.*

A completed Form G-4 is provided on page 220.

8. *Provide a completed Form G-5, Actuarial Standards Expert Certification. Provide a link to the location of the form here.*

A completed Form G-5 is provided on page 221.

9. *Provide a completed Form G-6, Computer Standards Expert Certification. Provide a link to the location of the form here.*

A completed Form G-6 is provided on page 222.

G-3 Risk Location

(Significant Revision)

Relevant Form: G-1, General Standards Expert Certification

A. ZIP Codes used in the model shall not differ from the United States Postal Service publication date by more than 24 months at the date of submission of the model. ZIP Code information shall originate from the United States Postal Service.

ZIP Codes used in the model are updated annually with information provided by the United States Postal Service (USPS). The USPS issue date of the information currently used in the model is June 2014.

B. ZIP Code centroids, when used in the model, shall be based on population data.

The AIR model uses population-weighted ZIP Code centroids.

C. ZIP Code information purchased by the modeling organization shall be verified by the modeling organization for accuracy and appropriateness.

The methodology employed by AIR's vendor for computing population centroids is identical to the computational methods promulgated by the U.S. Census Bureau.

Additional quality control measures are performed by AIR to verify the positional accuracy of the population centroid in relation to the ZIP Code boundaries and ensure their appropriateness. These measures comprise a set of procedures that overlay the population-weighted centroids with the ZIP Code boundaries.

D. If any hazard or any model vulnerability components are dependent on ZIP Code databases, the modeling organization shall maintain a logical process for ensuring these components are consistent with the recent ZIP Code database updates.

To ensure the accuracy of ZIP Code definitions across all ZIP Code dependent aspects of the model, the ZIP centroid and code definitions are accessed directly from the centralized ZIP Code database. Upon completion, the resulting data files and data files are crosschecked against the database values as a consistency and accuracy check.

E. Geocoding methodology shall be consistent and justifiable.

To perform loss analyses, Touchstone must first identify the latitude and longitude coordinates (geocode) for the exposure locations. Touchstone's Address Service is used to identify the geocode value for these exposures. Detailed information regarding the geocoding methodology shall be presented during the on-site presentation with the Professional Team.

Disclosures

1. *List the current ZIP Code databases used by the model and the components of the model to which they relate. Provide the effective (official United States Postal Service) date corresponding to the ZIP Code databases.*

The current ZIP Code database is referred to as, ZipAll2014_Output. The database was compiled from a host of data sets obtained from third party vendors. Data obtained from Nielsen included Tomtom's MultiNet product, which was developed using the following: United States Postal Service (USPS) ZIP+4 Data File, USPS City/State File, USPS Delivery Statistics File, USPS National 5-Digit ZIP and Post Office Directory, USPS Postal Bulletin, Local U.S. Post Offices, nationwide and USPS ZIP+4 State Directories.

For this update, data from the U.S. ZIP roster for the second quarter of 2014 was used as the most current ZIP list available prior to software finalization. This data was obtained in July 2014 from a third party vendor, ZIPInfo, with an effective date of June 2014. The product name is ZIPList5Max.

The ZIP Code database is used to locate an exposure for purposes of the Hazard and Vulnerability components of the model. It is also used to determine the valid ZIP Codes.

2. *Describe in detail how invalid ZIP Codes are handled.*

A ZIP Code is defined to be "invalid" if it does not match the list of currently valid ZIP Codes.

An invalid ZIP Code is first checked against AIR's master database of ZIP Codes for all years from 1990 through 2014. This database includes ZIP Codes that were valid in previous years but later became invalid. Any invalid ZIP Code matched to a ZIP Code in this master database is reassigned to the currently valid ZIP Code.

The model produces a list of ZIP Codes that do not appear in AIR's master database of valid ZIP Codes. Exposure in any remaining invalid ZIP Code is not modeled. The insurer may choose to allocate or map these exposures back into the exposure data set; this is not done within the model. If AIR makes assumptions regarding allocation or remapping at a client's request, such assumptions are included in the Project Information Assumption Form (PIAF), which is included in Appendix 6 of this submission.

3. *Describe the data, methods, and process used in the model to convert among street addresses, geocode locations (latitude-longitude), and ZIP Codes.*

To perform loss analyses, Touchstone must first identify the latitude and longitude coordinates (geocode) for the exposure locations. The address information provided by the client can vary in terms of its resolution (i.e., just a ZIP Code or very detailed street address information) and quality. Touchstone's Address Service is used to parse U.S. street address data, validate the address, and identify the geocode value for these exposures. Detailed information regarding these processes shall be presented during the on-site presentation with the Professional Team.

The data, methods and processes used in the model to convert among street addresses, geocode locations and ZIP Codes are discussed below.

Parse and Standardize the Address (U.S. Street-Level Data only)

Mailing address information—as distinct from physical street address information—is not needed for geocoding or location-based analyses. However, this mailing information is common in client portfolios. As a result, the Touchtone Address Service recognizes these address structures and separates them from the core physical street address components. In addition to providing a standard parsed output, the address processing also performs some basic standardization of expected values in some of the parsed output fields, according to USPS Publication 28 rules. The following fields will have expected values standardized: Street Pre-Directional, Street Type, Street Post-Directional, and State Codes.

Validate the Address (U.S. Street-Level Data only)

Once the address has been parsed and standardized, it is matched to a USPS-provided dataset in order to enhance the address and also append additional location attributes. By matching to the USPS data, the address components can be corrected, added (when omitted) or enhanced. For example, spelling errors can be corrected, pre- and/or post-directional(s) added, ZIP Code verified and ZIP+4 added to the address to improve the address content and quality. Also during this process, two city names can be returned (city or city alias).

To appropriately determine the match level for the input address, the Address Service assigns a match "score" value to each address component. The total of the score determines the best street match. The matched data source and/or subsequent geocoding methods determine the match level.

The street matching process is performed using cascade or waterfall match logic and is designed to provide for high-confidence matches even when some incorrect or incomplete input address information is provided. The cascade match logic will be available to the Professional Team.

Geocoding (Area-level, Street-Level, and Geocode data)

There are generally three levels of location data that a client can provide, and Touchstone has a different process for each. When the client provides non-street-level location data (country, CRESTA, area, subarea, and/or postal data), the Touchstone Address Service interprets this data and provides the geocode for the centroid, based on the resolution level location of the exposure data. Alternately, if the client provides street-level data and a corresponding street match is found, the Address Service produces the corresponding latitude/longitude combinations (when available). Lastly, clients can also provide the exposure's geocode (latitude/longitude pair) directly in the import data. This will be the case when the client has used a third party to geocode its exposure locations.

The Address Service generates two primary geocoding match levels. In Touchstone these codes are stored as the EnhancedGeocodeMatchLevel and the GeoMatchLevel (which is the same as the legacy CLASIC/2 match level). A match code is also generated to show how the street match was determined, which is referred to as the ValidatorMatchCode.

Geocoding Area-Level Address Data

Touchstone supports one or more location information schemes for supplying non-street-level location data (i.e. country, CRESTA, area, subarea, and/or postal) for exposures in each supported country. For all countries, the supported resolution levels for exposure data fall into one or more of the following categories defined in Table 3.

Table 3. Exposure Location Data Resolution Levels

Resolution Level	Geographic Resolution	Description	Examples
Highest resolution	Subarea 2	*A Sonpo, Locality, Postal Area Unit, or other name/code describing a very small, precise area*	• Not applicable in the United States • Mexico: Locality code 310020014 (Dzitiná, Acanceh, Yucatan) • New Zealand: Postal Area Unit 570100 (Wilford, Wellington)
⇑	Postal Area	*A Postal, Parish, District, LDU, Yubin, or other name/code describing a small area*	• U.S.: Postal code 02116 (Boston, MA) • Canada: LDU code V3W4G3 (Surrey, BC)
⇑	Subarea	A County, FSA, Municipio, District, Ward/KU, Province, or other name/code describing a larger area within a region of a country	• U.S.: County name Suffolk • Canada: FSA code K2T (Kanata, Ottawa)
Lowest Resolution	CRESTA/Area	*A CRESTA, State, District, Region, or other similar code describing a major area within a country or the country as a whole*	• U.S.: State code MA (Massachusetts) • Chile: CRESTA code 3 (Santiago

For non-street-level resolution data, the Address Service uses the information in the AIRGeography database to match each set of location information at a specific geocode match level. Touchstone supports the geocode match levels shown in Table 4 for supplied non-street-level address data.

Table 4. Touchstone Geocode Match Levels for Non-Street-Level Address Data

Resolution Level	Geocode Matching Level on the UI	Geocode Match Level Code	Enhanced Geocode Match Level Code	Description
Highest resolution	Postal Code Centroid	POST	POST	Touchstone geocodes the exposure at the centroid for the corresponding postal area.
⇑	City Centroid	CITY	CITY	Touchstone geocodes the exposure at the centroid for the corresponding city.
⇑	CRESTA Centroid	CRES	CRES	Touchstone geocodes the exposure at the centroid for the corresponding CRESTA area.
⇑	County Centroid	CNTY	SUBA	Touchstone geocodes the exposure at the centroid for the corresponding county.
⇑	Country	COUN	COUN	Touchstone geocodes the exposure at the centroid for the country.
Lowest Resolution	None	NONE	NONE	Touchstone cannot determine the geocode.

Geocoding Street-Level Address Data

When geocoding street-level addresses, this stage of the process typically follows the address validation/enhancement step to ensure that the most complete (and validated) address data is used for matching to the underlying geocoding street data.

For street-level resolution data, The Address Service uses the AIRAddressServer database to match the location information at a specific geocode match level. When a matching street segment is found, an interpolation is performed to determine the appropriate relative position of the address between the geocoding endpoints of the matching street segment. The interpolated geocode is then offset perpendicular from the centerline and to the appropriate odd or even side of the street. If a matching street segment cannot be found, the geocoding process falls back to some level of area centroid (street, ZIP9, postal code, city or county), providing a less accurate geocode.

Touchstone supports the geocode match levels shown in Table 5 for street-level address data.

Table 5. Touchstone Geocode Match Levels for Street-Level Address Data

Resolution Level	Geocode Matching Level on the UI	Geocode Match Level Code	Enhanced Geocode Match Level Code	Description
Highest resolution	Point	PT	PT	The highest resolution geocoding available because it is obtained from GPS or satellite images directly on the building. Since this data is obtained as part of the on-site commercial building inspection process, point matches are available only in some commercial building records via augmentation.
⇑	Parcel	PRCL	PRCL	Touchstone places the geocode at the centroid for the land parcel of a given property. This level is the second highest available geocoding resolution. No interpolation is required because each parcel centroid in this parcel-level dataset has a specific address for matching. This level of resolution is only available in some commercial building records via augmentation.
⇑	Address (Exact)	ADDR	SEGI	*Street Segment Imputed:* Touchstone finds the address in a street segment that has a geocode for the endpoints. All key street components match to expected values and acceptable city/state or zip code values. Touchstone calculates (interpolates) the relative location of the address between the segment endpoints.
⇑	Relaxed	RLXA	SEGI	*Street Segment Imputed:* Touchstone imputes a geocode from a matched street segment. However, if the street number is out of range or if some of the key street components, such as street name, directional(s), or street type, are changed during the street validation match, then the highest possible Geo. Match Level Code is a "Relaxed" match.
⇑	Address (Exact)	ADDR	BLCK (Zip9 Centroid)	The streetseqnumstart and streetseqnumend of the street segment are the same (Zip9 Single Address).
⇑	Address (Exact)	ADDR	BLCK (Zip9 Centroid)	The address is found in a street segment, but the street segment has no geocodes available. However, a Zip9 Centroid is available.
⇑	Relaxed	RLXA	BLCK (Zip9 Centroid)	Only a Zip9 is included, or the Zip9 cannot be validated.
⇑	Relaxed	RLXA	STRI	Street Imputed: The address is not found in a street segment, but the address is between the start and end range for the matched street. Touchstone calculates (interpolates) the location of the address between the street endpoints.
⇑	Relaxed	RLXA	STRC	Street Centroid: The street number is not available on the input address, but the street is short enough to have a useful centroid. The house number could be missing from or incorrect in the input address.
⇑	Postal Code Centroid	POST	POST	The street address is not found, and street centroid is not available, or the street is too long to have a useful centroid. Touchstone returns a population-weighted zip code centroid if one is available.
⇑	City Centroid	CITY	CITY	The street address is not found, and street centroid is not available, or the street is too long to have a useful centroid. In addition, Touchstone does not have Zip5 data for this location. That is, no postal centroid is available. Touchstone returns a city centroid.

Resolution Level	Geocode Matching Level on the UI	Geocode Match Level Code	Enhanced Geocode Match Level Code	Description
⇑	County Centroid	CNTY	SUBA	Touchstone places the geocode at the center of the county (from the Area Code database). In this case, no postal or city centroid information is available.
⇑	Country	COUN	COUN	Touchstone places the geocode at the center of the country.
Lowest Resolution	None	NONE	NONE	Touchstone cannot determine the geocode.

Geocoding Latitude and Longitude Coordinates

When a client chooses to supply (and preserve) latitude and longitude coordinates as input data, the Address Service uses these user-supplied geocodes directly in loss analyses. Further, the Address Service performs a lookup of each supplied geocode and attempts to find the nearest supported area resolution. If a match is found, the Address Service back accesses the AIRGeography database to fill as much additional location information with the closest supported area, subarea, and/or postal information for the corresponding exposure. The detailed methodology used to backfill the location information shall be presented to the Professional Team.

Touchstone supports the geocode match levels shown in Table 6 for user-supplied geocodes.

Table 6. Touchstone Geocode Match Levels for User Supplied Geocodes

Geocode Matching Level on the UI	Geocode Match Level Code	Enhanced Geocode Match Level Code	Description
User Supplied	USER	USER	The user has provided the geocode. The accuracy of this type of geocode depends upon the precision of the user supplied data.
None	NONE	NONE	Touchstone cannot determine the geocode.

4. *List and provide a brief description of each model ZIP Code-based database (e.g., ZIP Code centroids).*

There are three databases that are responsible for the storage of ZIP Code-based data, ZIPAll, AIRGeography, and AIRAddressServer.

ZIPAll Database: ZIPAll is the process of mapping all unique ZIP Codes that AIR has found to exist in the past years to the current list of modelable ZIP Codes that are in all U.S. based models for the current model year. The ZIPAll database stores the results of this process and is prepared by the Exposures group within Research. This database is available for internal consumption only and is not released to clients.

AIRGeography Database: The AIRGeography database stores geography-based information derived from the ZIPAll database. It is used by the Touchstone application to geocode area-level address data (when street-level data is not available). This database is maintained by GIS specialists and database engineers. This read-only database is provided to clients as part of the Touchstone installation process.

AIRAddressServer Database: The AIRAddressServer database stores geography-based information derived from the Topologically Integrated Geographic Encoding and Referencing (TIGER) data set and the ZIPAll database. It is used by the Touchstone application to 1) Match parsed street-level addresses to the USPS street data in order to validate the address prior to geocoding and 2) Match the resulting street-level address data to the

TIGER street data in order to determine the geocode value. This database is maintained by GIS specialists and database engineers. This read-only database is provided to clients as part of the Touchstone installation process.

5. *Describe the process for updating model ZIP Code-based databases.*

The methods for updating the ZIP Code-based databases are as follows.

ZIPAll Database: The development of the ZIPAll database involves assessing the validity of population weighted centroids for bounded ZIP Codes from the data provider Nielsen, and mapping all other known ZIP Codes to those bounded ZIP Codes if they are not provided in Nielsen's ZIP Code mapping. ZIP Codes are updated annually with information provided by the United States Postal Service (USPS). Current centroids are compared to prior centroids and metrics, such as distance moved and boundary area change, are created. The most recent census blocks are mapped to the new boundaries using spatial SQL to create an independent verification of the vendor-provided centroids. Any additional ZIP Codes that are created by the USPS after the Nielsen mapping are mapped to bounded ZIP Codes using a point in polygon algorithm and spatial SQL.

AIRGeography Database: The development of the AIRGeography database is a collaborative effort between the Exposures, Product Management, and Database groups. After updates from the ZIPAll database are applied to the tGeography table, count verification and data is compared for all the U.S. records. If discrepancies are found, the Product Management GIS specialist confers with the Exposure's group to identify the source of the error. When all discrepancies have been resolved, the GIS specialist releases the final version of the tGeography table to the Database group. The Database group uses SQL scripts to append the tGeography table to the AIRGeography database, and also to update the other tables in the AIRGeography database. The updates are validated before being finalized for inclusion in the software.

AIRAddressServer Database: The development of the AIRAddressServer database is a collaborative effort between the Exposures, Product Management, and Database groups. The Exposures group provides the ZIPAll database. The GIS specialist in the Product Management group takes the latest commercial release of the ZIPList5 Max data from the ZIPInfo vendor, which matches the same timeline as the versions of the U.S. Postal Service ZIP+4 national and TIGER shapefile data releases, and conflate these separate data sources into the integrated AIRAddressServer database. Various fields counts in the integrated database are then compared to the prior year's integrated database. In addition, address service batch processes are run to compare batch geocoding and address validation match results to the prior versions results.

G-4 Independence of Model Components

Relevant Form: G-1, General Standards Expert Certification

The meteorological, vulnerability, and actuarial components of the model shall each be theoretically sound without compensation for potential bias from the other two components

All components of the AIR model are theoretically sound and independently derived. No component compensates for any potential bias in any of the other components. Furthermore, each component is validated independently.

G-5 Editorial Compliance

Relevant Forms: G-1, General Standards Expert Certification
G-2, Meteorological Standards Expert Certification
G-3, Statistical Standards Expert Certification
G-4, Vulnerability Standards Expert Certification
G-5, Actuarial Standards Expert Certification
G-6, Computer Standards Expert Certification
G-7, Editorial Certification

The submission and any revisions provided to the Commission throughout the review process shall be reviewed and edited by a person or persons with experience in reviewing technical documents who shall certify on Form G-7, Editorial Certification that the submission has been personally reviewed and is editorially correct.

All sections of this submission have been reviewed for grammatical correctness, typographical accuracy and completeness by an experienced technical editor and writer from AIR's communications staff. The primary reviewer read the Report of Activities as of November 1, 2013, and understood the submission requirements prior to working on AIR's submission.

Disclosures

1. Describe the process used for document control of the submission. Describe the process used to ensure that the paper and electronic versions of specific files are identical in content.

The primary reviewer, upon dissemination of individual standards with respective updates from the Report of Activities, maintained contact with personnel responsible for individual standards and supervised each set of standards via AIRPort, a third party application employed by AIR. All updates and changes—by the primary reviewer and/or personnel responsible for standards—were made to the document using Track Changes in Microsoft Word to ensure the progression of the standards changes was properly documented.

Upon completion of the individual standards by personnel, the primary reviewer was notified and responsible for uploading the final document into a separate folder on AIRPort. All final standards were uploaded by the final reviewer only, who then compiled the final submission document in electronic and print form. All personnel providing edits signed off on the end product submission to verify that the content is accurate and reflects their edits. The final reviewer then compared the final submission document in both electronic and print forms.

2. Describe the process used by the signatories on Forms G-1 through G-6 (Standards Expert Certification forms) to ensure that the information contained under each set of standards is accurate and complete.

The signatories on Forms G-1 through G-6 read their respective parts of the submission and confirmed with those who contributed to the relevant sections of the Standards that all data were accurate. They then signed off on the respective Standards section with the primary reviewer, who compiled the final submission document in electronic and print form.

3. Provide a completed Form G-7, Editorial Certification. Provide a link to the location of the form here.

A completed Form G-7 is provided on page 223.

Florida Commission on
Hurricane Loss Projection Methodology

2013 Meteorological Standards

M-1 Base Hurricane Storm Set

(Significant Revision)

Relevant Forms: G-2, Meteorological Standards Expert Certification
M-1, Annual Occurrence Rates
A-2, Base Hurricane Storm Set Statewide Losses
S-1, Probability and Frequency of Florida Landfalling Hurricanes per Year
S-5, Average Annual Zero Deductible Statewide Loss Costs – Historical versus Modeled

A. Annual frequencies used in both model calibration and model validation shall be based upon the National Hurricane Center HURDAT2 starting at 1900 as of August 15, 2013 (or later). Complete additional season increments based on updates to HURDAT2 approved by the Tropical Prediction Center/National Hurricane Center are acceptable modifications to these storm sets. Peer reviewed atmospheric science literature can be used to justify modifications to the Base Hurricane Storm Set.

Model calibration and validation of storm parameters, including annual frequency, make use of the National Hurricane Center's (NHC) latest version of HURDAT2, starting in 1900 and valid as of August 15, 2013.

B. Any trends, weighting, or partitioning shall be justified and consistent with currently accepted scientific literature and statistical techniques. Calibration and validation shall encompass the complete Base Hurricane Storm Set as well as any partitions.

No temporal trending, weighting or partitioning was applied to the Base Hurricane Storm Set. Calibration and validation are based on the complete historical set starting in 1900.

Disclosures

1. *Identify the Base Hurricane Storm Set, the release date, and the time period included to develop and implement landfall and by-passing hurricane frequencies into the model.*

The Base Hurricane Storm Set consists of the latest version of HURDAT2 supplemented with landfall data from Appendix A in the NOAA Technical Memorandum NWS NHC-6. This version of HURDAT2 is valid as of August 15, 2013, and spans the years 1900-2012. Implicit within this version of HURDAT is the Reanalysis Project update, which incorporates reanalysis for storms up to and including 1945.

2. *If the modeling organization has made any modifications to the Base Hurricane Storm Set related to landfall frequency and characteristics, provide justification for such modifications.*

Storms that have not yet been reanalyzed are modified to include landfall points (latitude, longitude, and central pressure) in a similar manner as for the reanalyzed storms in HURDAT2. The landfall points are taken from the supplemented landfall data defined in Disclosure 1. The landfall points are added to the raw six-hourly HURDAT2 data set, thus precluding discontinuities in the track.

3. *Where the model incorporates short-term or long-term modification of the historical data leading to differences between modeled climatology and that in the entire Base Hurricane Storm Set, describe how this is incorporated.*

The model does not incorporate any short-term or long-term modifications to the historical data. The modeled climatology is based on the entire Base Hurricane Storm Set starting in 1900.

4. *Provide a completed Form M-1, Annual Occurrence Rates. Provide a link to the location of the form here.*

A completed Form M-1 is provided on page 225.

M-2 Hurricane Parameters and Characteristics

Relevant Forms: G-2, Meteorological Standards Expert Certification
S-3, Distributions of Stochastic Hurricane Parameters

Methods for depicting all modeled hurricane parameters and characteristics, including but not limited to windspeed, radial distributions of wind and pressure, minimum central pressure, radius of maximum winds, landfall frequency, tracks, spatial and time variant windfields, and conversion factors, shall be based on information documented in currently accepted scientific literature.

Methods for depicting all modeled hurricane characteristics are based on information documented in currently accepted scientific literature. All hurricane parameters have been derived from appropriate sources and validated against available observational data sets.

Disclosures

1. *Identify the hurricane parameters (e.g., central pressure or radius of maximum winds) that are used in the model.*

The hurricane parameters used in the model are identified below:

- Intensity (based on central pressure)
- Peripheral pressure adjustment
- Radius of maximum winds
- Landfall location
- Forward speed
- Storm heading at landfall
- Track (latitude and longitude)
- Gradient wind reduction factor
- Peak weighting factor

2. *Describe the dependencies among variables in the windfield component and how they are represented in the model, including the mathematical dependence of modeled windfield as a function of distance and direction from the center position.*

Most hurricane parameters are considered independent of one another. The following variables are dependent on latitude:

- Central pressure
- Forward speed
- Storm heading
- Air density coefficient
- Coriolis parameter
- Peripheral pressure
- Filling rate

The air density coefficient, Coriolis parameter, and peripheral pressure are direct functions of latitude; the latitudinal dependence for the rest of the parameters is modeled by coastal segment.

The radius of maximum winds is represented using a regression model of the form Rmax = f (Cp, latitude) + ε (error term).

The wind field radial profile is based on the formulation introduced by Willoughby et al. (2006) and depends on Rmax, Vmax and latitude as well as distance from the eye. The wind increases as a power of radius inside the eye and it decays exponentially outside the eye, following a smooth transition between the two regions.

The direction from the center position is included in the asymmetry term, which is proportional to the forward speed of the storm and the cosine of the angle between the wind direction and the storm moving direction.

The adjustment to the gradient wind reduction factor (used to convert upper level winds to surface winds) is dependent on the distance from the eye and an additional factor associated with each storm called the peak weighting factor (used to reflect the vertical slant in the hurricane eye and derived from the research of Powell et al. (2009); (see also Standard M-2, Disclosure 3). The gradient wind reduction factor and the peak weighting factor are generated jointly from a bounded bivariate normal distribution.

Also entering the wind calculation are the friction and gust factors, both depending on the effective roughness length which in turn is determined from the land use land cover data (see also Standard M-4), and a maritime adjustment (derived from the research of Powell et al., 2003) which is dependent on the windspeed.

3. *Identify whether hurricane parameters are modeled as random variables, as functions, or as fixed values for the stochastic storm set. Provide rationale for the choice of parameter representations.*

The hurricane parameters used in the model (variables which are modeled via probability distributions) are identified below:

Intensity: The model utilizes central pressure as the primary hurricane intensity variable. The historical data are modeled using Weibull distributions where the parameters are estimated for each of the thirty-one 100-nautical-mile coastal segments as well as for larger coastal regions, with the final distribution being a mixture of the two. The Weibull form was selected based on goodness-of-fit tests with actual historical data. The use of the Weibull distribution is discussed in more detail in Standard S-1, Disclosure 1.

Radius of Maximum Winds: The probability distribution for radius of maximum winds (R_{max}) is modeled using a regression model of the form: $R_{max} = f(Cp, \text{ latitude}) + \varepsilon$, where $f(Cp, \text{ latitude})$ represents the mean of R_{max} for given values of central pressure and latitude. The error term, ε, is assumed to be normally distributed. The parameters in this regression model are estimated using data available in NOAA Technical Report NWS-38, the HURDAT Reanalysis Project, and the DeMaria Extended Best Track Dataset (EBTRK). The final distribution is truncated using limits that depend on central pressure and are consistent with the range of historically observed values. R_{max} also varies after landfall, following an autoregressive model.

Landfall Location: There are 62 potential landfall segments in the model, each representing ~50 nautical miles of smoothed coastline from Texas to Maine. In Florida, there are 17 landfall segments. The southernmost Florida segment includes a consideration for the Florida Keys. Historical hurricane occurrences since 1900 are used to estimate a smoothed locational frequency distribution. The smoothing technique maintains areas of high versus low frequency and also accounts for the lack of historical landfalls in certain portions of the coastline. Once a segment is chosen, the landfall location is assigned randomly along the segment, from a uniform distribution.

Forward Speed: Forward speed is modeled using a lognormal distribution with parameters estimated for each 100-nautical-mile coastal segment. Separate distributions are estimated for each of these segments to capture the dependence of this variable upon geographical location, particularly latitude. Forward speed is allowed to vary after landfall, following an autoregressive model. The bounds on forward speed are latitude dependent.

Storm Heading: The probability distributions for storm heading at landfall are defined on the 50-mile coastal segments. Upper and lower bounds are placed, based on geographical constraints. The distributions used are mixtures of Normal distributions bounded based on geography and the historical record.

Gradient Wind Reduction Factor (GWRF): The model uses a stochastic GWRF, which varies from storm to storm. The mean value, the distribution about the mean and the radial profile of the GWRF have been developed based on analyses of dropsonde data from 2002 to 2005 (GPS dropsonde data are provided courtesy of the NOAA/AOML/Hurricane Research Division in Miami, Florida), as well as results from published literature (Franklin et al. 2003, Powell et al. 2009). As described in Standard M-2, Disclosure 2, for a given storm, the GWRF is adjusted based on the Peak Weighting Factor (see below) and the distance from the eye. Both parameters (GWRF and PWF) are generated jointly using a bounded Bivariate Normal Distribution (based on Casella and Berger, 1990).

Peak Weighting Factor: The PWF is a stochastic parameter used to reflect the vertical slant in the hurricane eye (Powell et al., 2009). As mentioned above, the PWF and GWRF are generated jointly using a bounded Bivariate Normal Distribution.

The following hurricane parameters are modeled as functions:

Peripheral Pressure: The model uses a latitude dependent peripheral pressure, parameterized based on the work of Knaff and Zehr (2007) as well as analyses of historical storms.

Radial Adjustment to the Gradient Wind Reduction Factor: The stochastically drawn GWRF also varies with distance from the eye and PWF, following a Radial Adjustment Function (RAF). (See also Standard M-2, Disclosure 10.)

4. *Describe how any hurricane parameters are treated differently in the historical and stochastic storm sets (e.g., has a fixed value in one set and not the other).*

Hurricane parameters are treated identically in the historical and the stochastic storm sets, except that parameters for historical hurricanes are derived from historical data sources (and are treated as fixed values) rather than being drawn from distributions fitted to the historical data. In addition, for historical storms peripheral pressure is allowed to deviate from the latitude-based mean value based on synoptic analysis making use of environmental conditions occurring at the time of the event. See also M-2, Disclosure 3.

5. *State whether the model simulates surface winds directly or requires conversion between some other reference level or layer and the surface. Describe the source(s) of conversion factors and the rationale for their use. Describe the process for converting the modeled vortex winds to surface winds including the treatment of the inherent uncertainties in the conversion factor with respect to location of the site compared to the radius of maximum winds over time. Justify the variation in the surface winds conversion factor as a function of hurricane intensity and distance from the hurricane center.*

The model first computes the maximum wind at upper levels and then brings this wind to the surface level (10 meters) via a conversion factor. This factor, the Gradient Wind Reduction Factor (GWRF) described in Standard M-2, Disclosure 3, represents a model parameter which varies stochastically by storm, and for a particular storm varies by location as a function of the PWF and distance from Rmax. The Radial Adjustment Function (RAF) adjusts the GWRF as a function of distance to the eyewall (r) and hours after landfall. Because Rmax varies with time, the RAF is also variable in time for a given storm. The GWRF is independent of storm intensity.

Justification for varying GWRF with distance from the storm center is based on analyses of the spatial distribution of GWRF using operational dropsonde data (data is publicly available from NOAA/AOML/Hurricane Research Division in Miami, Florida). Furthermore, these analyses combined with results from published literature (Franklin et al., 2003; Powell et al., 2009) justify varying GWRF by storm. The mean values of the stochastically drawn GWRF, the distribution about the mean, and the form of the RAF have been developed based on these data and research.

6. *Describe how the windspeeds generated in the windfield model are converted from sustained to gust and identify the averaging time.*

Input to the vulnerability module is 1-minute sustained wind, thus there is no need to convert winds to (3-second) gusts. Conversion of 10-minute averaged wind speeds to 1-minute sustained winds is based on accepted engineering relationships (Simiu and Scanlan, 1996, N. Cook, 1985, and ESDU Engineering Sciences Data, 1994). The conversion factor varies from 1.12 to 1.26, depending on the land use/land cover distribution about a location.

7. *Describe the historical data used as the basis for the model's hurricane tracks. Discuss the appropriateness of the model stochastic hurricane tracks with reference to the historical hurricane database.*

The model is part of an Atlantic basin-wide model that includes Mexico, Central America, the Caribbean Islands, and the U.S. mainland. The methodology used to generate the basin-wide tracks is developed using historical track information. The starting latitude and longitude of each storm is simulated from a bivariate probability distribution derived from historical genesis locations using a bivariate Gaussian smoothing technique. The dependence structure in the historical data at successive six-hourly time intervals is quantified and used to develop time series models that describe the track direction, forward speed and central pressure as the storm moves across the basin.

The analysis of the data shows that first-order Markov models are appropriate for track direction and forward speed. Higher order dependence present in the central pressure along the track is represented using a second-order autoregressive time series model. The parameters of these models are estimated using a procedure that captures the spatial variability in the behavior of the storms in different parts of the Atlantic basin.

The HURDAT2 database provides data at synoptic times, with the inclusion of data at non-synoptic times for critical events of a storm lifetime (time of landfall, maximum intensity, etc.). The dataset allows for a resolution that is sufficient to capture the evolution of each storm across the Atlantic basin. The inclusion of the landfall point for reanalyzed storms as well as recent storms provides the model the necessary information to appropriately change the storm characteristics once it moves inland .In the case of storms that have not yet been reanalyzed, the model uses detailed landfall information available in Appendix A in NOAA Technical Memorandum NWS NHC-6, Tropical Cyclone Reports from NHC (available at http://www.nhc.noaa.gov/pastall.shtml), peer-reviewed publications, UNISYS, Extended Best Track Dataset, and NOAA Technical Reports NWS-23 and NWS-38 to generate storm characteristics at landfall.

The landfall information, including locational frequency and storm intensity, is also used to eliminate tropical storms landfalls and generate post-landfall hurricane tracks. The Atlantic basin-wide tracks are integrated with the post-landfall hurricane tracks using a spline smoothing technique that ensures consistency in intensity, radius of maximum winds and storm heading across the tracks. The methodology produces realistic tracks that resemble the full range of diverse storm tracks that have been observed historically across the Atlantic basin and the U.S. mainland.

8. *If the historical data are partitioned or modified, describe how the hurricane parameters are affected.*

The data have not been temporally partitioned, but for the purpose of parameter estimation the data is grouped by coastal segment, as described in Standard M-2, Disclosure 9. For storms that have not yet been reanalyzed or for which HURDAT2 was missing a landfall point, the landfall information was added to the database. Depending on what information is available in HURDAT2, a track point could be added (time, latitude, longitude and central pressure) or only intensity information (central pressure).

9. *Describe how the coastline is segmented (or partitioned) in determining the parameters for hurricane frequency used in the model. Provide the hurricane frequency distribution by intensity for each segment.*

To determine hurricane probabilities along the coast of Florida, the actual number of hurricane occurrences is tabulated for approximately 50-nautical-mile segments. For intensity distributions, 100-nautical-mile segments are used (i.e. consecutive 50-nautical-mile segments). The number of occurrences for each segment is then smoothed by setting it equal to a weighted average of the landfall counts for each segment and the surrounding segments.

The intent of the smoothing procedure is to eliminate or reduce the random variation in the limited historical data while maintaining areas of high and low risk. The smoothing is based on a procedure well-documented in the literature (e.g., NOAA Technical Report NWS-38, page 75). The historical hurricane frequency distribution by intensity for each 100-mile coastal segment is shown in Figure 10.

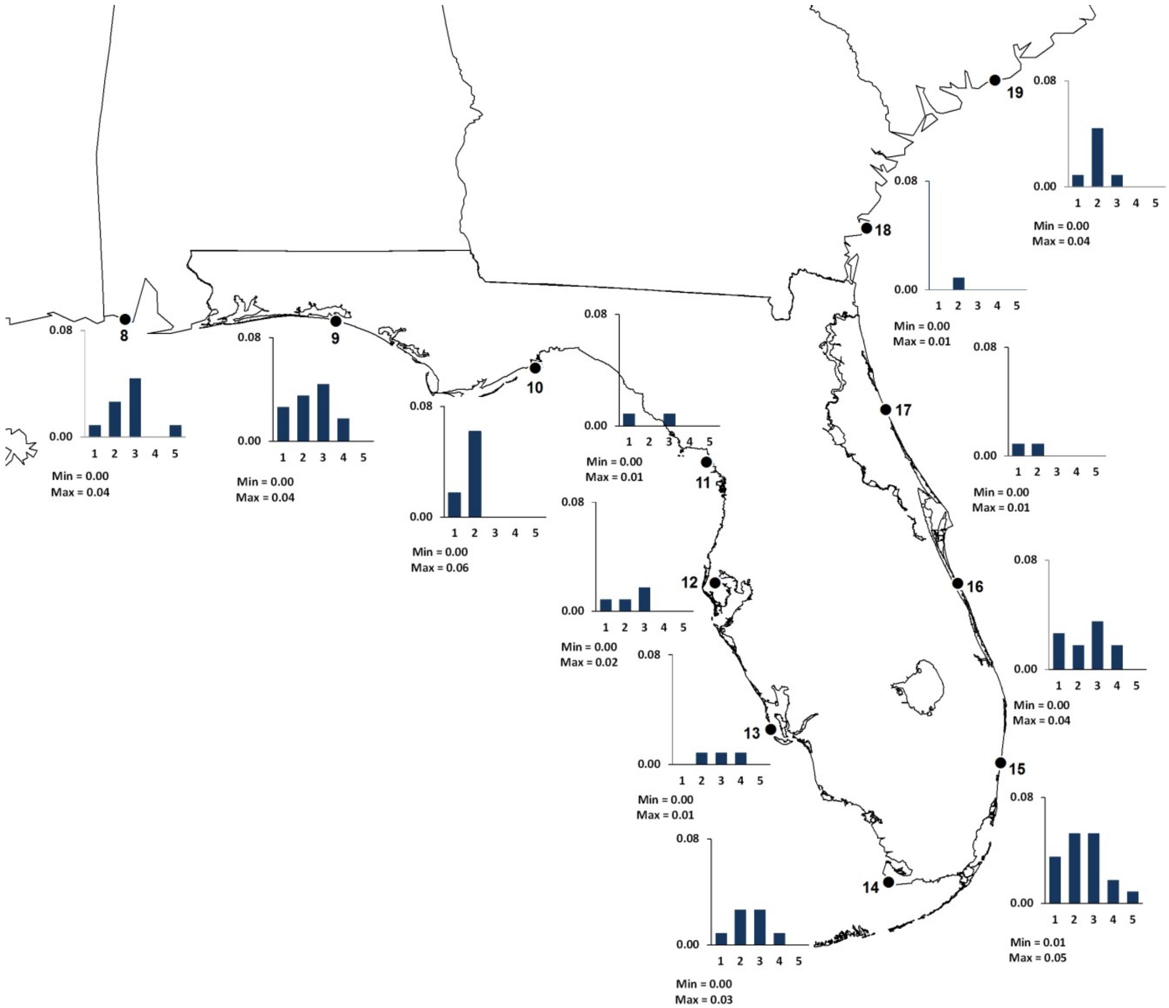


Figure 10. Historical Hurricane Frequency by Coastal Segment, 1900–2012

10. *Describe any evolution of the functional representation of hurricane parameters during an individual storm life cycle.*

The radius of maximum winds and the forward speed associated with a storm change post-landfall following specific autoregressive models.

The adjustment to the stochastically drawn GWRF has a time evolution post landfall: the adjustment is constant for three hours after landfall and then it decreases to zero over the next six hours. Hence no adjustment is applied to the GWRF after nine hours after landfall. This evolution is in line with the research that references the effects of a maritime environment (Powell et al., 2009).

M-3 Hurricane Probabilities

(Significant Revision)

Relevant Forms: G-2, Meteorological Standards Expert Certification
M-1, Annual Occurrence Rates
A-2, Base Hurricane Storm Set Statewide Losses
S-1, Probability and Frequency of Florida Landfalling Hurricanes per Year
S-3, Distributions of Stochastic Hurricane Parameters

A. Modeled probability distributions of hurricane parameters and characteristics shall be consistent with historical hurricanes in the Atlantic basin.

The modeled probability distributions for landfall location, hurricane intensity, forward speed, radius of maximum winds, storm heading at landfall and gradient wind reduction factor are consistent with observed historical hurricanes in the Atlantic basin and are bounded by observed extremes.

The probability distribution for landfall location is defined on 50-nautical-mile coastal segments. Goodness-of-fit tests show a close agreement between historical and modeled landfall frequencies by Florida segments. Also, for the state as a whole, the modeled average annual frequency of 0.58 landfalling hurricanes per year agrees closely with the average annual historical frequency of 0.54 landfalling hurricanes per year.

Hurricane intensity is modeled as a mixture of Weibull distributions. Weibull distributions are fitted to the historical data for each 100-nautical-mile coastal segment. Separate Weibulls are then estimated for various regions along the coast. The intensity distribution used for each segment is a mixture of the regional Weibulls and the segment Weibull with appropriate weights applied. The Weibull distribution was selected based on goodness-of-fit tests with actual historical data. The Weibull scale and shape parameters, α and β, are estimated using the maximum likelihood estimation method. The use of Weibull distributions is discussed further in Standard S-1, Disclosure 1.

Forward speed is modeled using a Lognormal distribution. Use of this distribution is documented in the literature. The average simulated forward speed for the state of Florida is 13.8 mph and the average forward speed calculated from hurricanes occurring between 1900 and 2012 is 14.1 mph. The maximum forward speed varies by coastal segment.

The radius of maximum winds is simulated using a regression model in which the mean is a function of central pressure and latitude. The model incorporates the fact that stronger storms tend to have a smaller radius than less intense storms. Also, due to the dependence on latitude, the average radius increases as one moves poleward. The average simulated radius for Florida landfalling hurricanes is 24.8 miles. The average radius calculated from historical storms occurring between 1900 and 2012 is 25.7 miles.

Landfall angle (or storm heading) is measured clockwise (+) or counterclockwise (-) with 0 representing due North. Separate distributions for storm heading at landfall are fitted to each 50-nautical-mile segment of coastline. Storm heading is modeled as combined Normal distributions, and bounded based on the historical record, geographical constraints and meteorological expertise. Diagnostic checks show a reasonable agreement between historical and modeled values.

The probability distribution for the gradient wind reduction factor is a Normal distribution with parameters estimated from data derived using the regression equation from Powell et al. (2009), with input based on HURDAT data. The fitted Normal distribution is consistent with that described in the paper. The mean of both the modeled distribution and the historical data is 0.88.

The fitted probability distribution of the peak weighting factor is similarly consistent with the empirical distribution of the factor, as derived from the recent work of Powell et al. (2009). The empirical distribution of the factor is skewed but can be approximated by a Normal distribution after an inverse power transformation of the data. The mean of both the modeled distribution and the historical data is 1.08.

B. ***Modeled hurricane landfall frequency distributions shall reflect the Base Hurricane Storm Set used for category 1 to 5 hurricanes and shall be consistent with those observed for each coastal segment of Florida and neighboring states (Alabama, Georgia, and Mississippi).***

The modeled hurricane probabilities for category 1-5 hurricanes reasonably match the historical record through 2012 and are consistent with those observed for each geographical area of Florida, Alabama, Georgia and Mississippi. The annual probabilities are shown in Table 36 of Form M-1.

C. ***Models shall use maximum one-minute sustained 10-meter windspeed when defining hurricane landfall intensity. This applies both to the Base Hurricane Storm Set used to develop landfall frequency distributions as a function of coastal location and to the modeled winds in each hurricane which causes damage. The associated maximum one-minute sustained 10-meter windspeed shall be within the range of windspeeds (in statute miles per hour) categorized by the Saffir-Simpson Scale.***

Saffir-Simpson Hurricane Scale:

Category	Winds (mph)	Damage
1	74 – 95	Minimal
2	96 – 110	Moderate
3	111 – 129	Extensive
4	130 – 156	Extreme
5	157 or higher	Catastrophic

The model uses maximum 1-minute sustained 10-meter windspeed when defining hurricane landfall intensity for both the Base Hurricane Storm Set and the modeled windspeeds. The Saffir-Simpson scale is used to determine the values in Form M-1.

The Saffir-Simpson Hurricane Wind Scale underwent a minor modification for 2012, broadening the Category 4 wind speed range by one mile per hour (mph) at each end of the range.

Disclosures

1. *List assumptions used in creating the hurricane characteristic databases.*

No assumptions are made in developing these databases. The primary databases used are given in Table 7 below.

Table 7. Primary Databases

Database	Model Component	Public/Proprietary
Track, forward speed, storm angle from HURDAT2	Event Generation	Public
V_{max}, landfall, intensity from HURDAT2	Event Generation	Public
Smoothed coastline file with 62 landfall segments	Event Generation	Proprietary
Surface terrain characteristics (land use) from NLCD 2011	Wind Speed Generation	Public
ZIP Code centroid database	Wind Speed Generation	Proprietary
Rmax from Extended Best Track (EBT) and NOAA WSR88D RADAR data	Event Generation	Public
HRD dropsonde data for development of PWF and GWRF	Wind Speed Generation	Public

2. *Provide a brief rationale for the probability distributions used for all hurricane parameters and characteristics.*

A summary of the rationale for the probability distributions used for the hurricane parameters is provided in Form S-3 of the Statistical Standards on page 244.

M-4 Hurricane Windfield Structure

(Significant Revision)

Relevant Forms: G-2, Meteorological Standards Expert Certification
M-2, Maps of Maximum Winds
A-2, Base Hurricane Storm Set Statewide Losses

A. Windfields generated by the model shall be consistent with observed historical storms affecting Florida.

The modeled windfield is consistent with the distribution of observed winds for historical storms affecting Florida.

B. The land use and land cover database shall be consistent with National Land Cover Database (NLCD) 2006 or later. Use of alternate data sets shall be justified.

The land use and land cover database is consistent with National Land Cover Database (NLCD) 2011.

C. The translation of land use and land cover or other source information into a surface roughness distribution shall be consistent with current state-of-the-science and shall be implemented with appropriate geographic information system data.

The model uses the latest United States Geological Survey (USGS) National Land Cover Database 2011 (NLCD 2011) data as published in 2014 (Homer, et al., 2012, Jin, et al., 2013). Appropriate roughness lengths are assigned to each category based upon accepted scientific literature (Cook, 1985, Simiu and Scanlan, 1996, Grimmond and Oke, 1999, Grell et al., 1995, Chen and Dudhia, 2001, and Benjamin et al., 2002).

D. With respect to multi-story buildings, the model windfield shall account for the effects of the vertical variation of winds if not accounted for in the vulnerability functions.

The effect of vertical variation of winds is accounted for in the vulnerability functions.

Disclosures

1. *Provide a rotational windspeed (y-axis) versus radius (x-axis) plot of the average or default symmetric wind profile used in the model and justify the choice of this wind profile.*

The windspeed radial profile is developed based on the radial variation of upper level winds as described in Willoughby et al. (2006). In this formulation, the profile was developed as a statistical fit to the observations, using reconnaissance data from 493 hurricanes during the 1977 to 2000 time period from flights in the Atlantic and Eastern Pacific basins. The profile is defined by three equations: one for the area inside the eyewall, one for the eyewall region and one for the area outside the eyewall. Reasonable validation against observational data justifies the use of this wind profile. Figure 11 shows the wind profile for an average Florida storm.

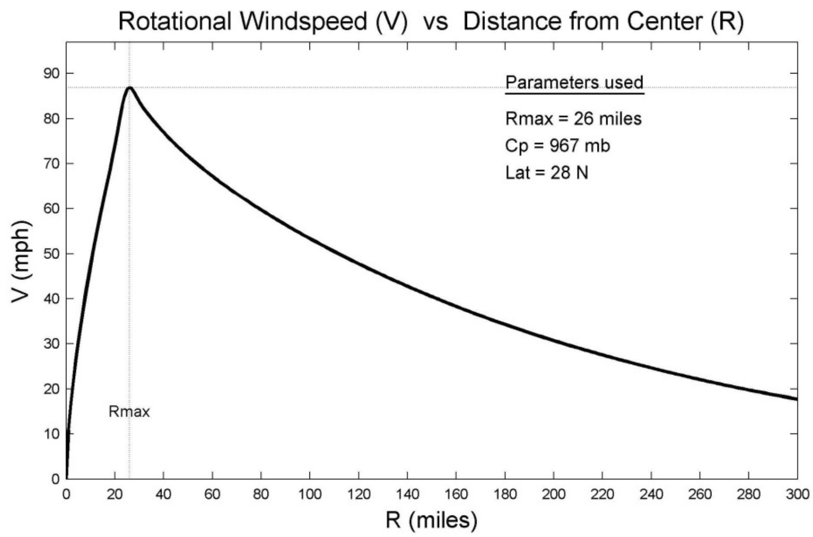


Figure 11. Symmetric Gradient Wind Profile (Assuming Updated Florida Mean Values of Rmax, Cp and Latitude)

2. *If the model windfield has been modified in any way from the previous submission, provide a rotational windspeed (y-axis) versus radius (x-axis) plot of the average or default symmetric wind profile for both the new and old functions. The choice of average or default shall be consistent for the new and old functions.*

The model windfield has not been modified since the previous submission.

3. *If the model windfield has been modified in any way from the previous submission, describe variations between the new and old windfield functions with reference to historical storms.*

The model windfield has not been modified since the previous submission.

4. *Describe how the vertical variation of winds is accounted for in the model where applicable. Document and justify any difference in the methodology for treating historical and stochastic storm sets.*

Vertical variability in boundary layer winds is accounted for implicitly in the use of a log-law profile for developing adjustment factors for friction and averaging time specific to a location's surface roughness value. As discussed under Standard M-4.A above, the vulnerability module accounts for the effect of the vertical variation of winds through the development of vulnerability functions for structures with varying heights. There are no differences in the treatment of historical and stochastic storms.

5. *Describe the relevance of the formulation of gust factor(s) used in the model.*

The model uses a factor to convert 10-minute to 1-minute sustained wind. This conversion is based on accepted engineering relationships (Simiu and Scanlan, 1996, N. Cook, 1985, and ESDU Engineering Sciences Data, 1994) and varies from 1.12 to 1.26, as a function of land use land cover.

6. *Identify all non-meteorological variables that affect windspeed estimation (e.g., surface roughness, topography, etc.).*

Surface roughness and averaging distance are non-meteorological variables that affect wind speed estimation. Topographic effects are not considered in the local wind estimation process.

7. *Provide the collection and publication dates of the land use and land cover data used in the model and justify their timeliness for Florida.*

The model uses the National Land Cover Database 2011 (NLCD 2011), which is the most recent national land cover product available from the Multi-Resolution Land Characteristics (MRLC) Consortium. The NLCD 2011 is a digital, satellite-derived land use/land cover database containing information collected in 2011. The hurricane model covers 30 states, including Florida, and therefore requires a consistent and unified U.S. LULC database. The dataset used in the model is the most recent national LULC data available.

8. *Describe the methodology used to convert land use and land cover information into a spatial distribution of roughness coefficients in Florida and adjacent states.*

The model uses the NLCD 2011 classifications by category and assigns appropriate roughness lengths based upon available scientific literature. These classifications are provided at 30-meter resolution, and are then resampled to 220 meters.

Local roughness factors are used to define an effective roughness for a given location. The effective roughness is the average surface roughness for an area out to an upstream radius of 6.2 miles (10 km) for the gust factor and 9.3 miles (15 km) for the friction factor. The effective roughness is representative of the mean land surface acting on the wind field (ESDU Engineering Sciences Data, 1994).

To define ZIP Code level properties, the values within a radius of 5-km of the population based ZIP Code centroid are averaged. This particular averaging radius was used to approximate the mean area for modeled ZIP Codes, 75 km^2, as determined via GIS analysis.

9. *Demonstrate the consistency of the spatial distribution of model-generated winds with observed windfields for hurricanes affecting Florida. Describe and justify the appropriateness of the databases used in the windfield validations.*

Spatial variability of winds across the footprint of a hurricane is a function of a variety of factors. These factors include (a) the radial profile of winds from eye to periphery, (b) the radius of maximum winds, (c) the forward speed, (d) the latitude, (e) the local surface roughness characteristics and (f) filling. Each of these factors is accounted for in the windfield formula and is therefore reflected in model-generated wind speeds. Figure 12 and Figure 13 demonstrate that the distribution of model-generated winds for two historical storms (Hurricanes Charley 2004 and Dennis 2005) is consistent with the distribution of observed winds.

This process is justified by using data from appropriate sources, including data from Tropical Cyclone Reports, standard METAR reports, and Texas Tech University. Additionally appropriate quality control procedures were applied to the data in order to flag any questionable observations. In some cases, such as observations at non-standard height or averaging time, adjustments were made using published techniques.

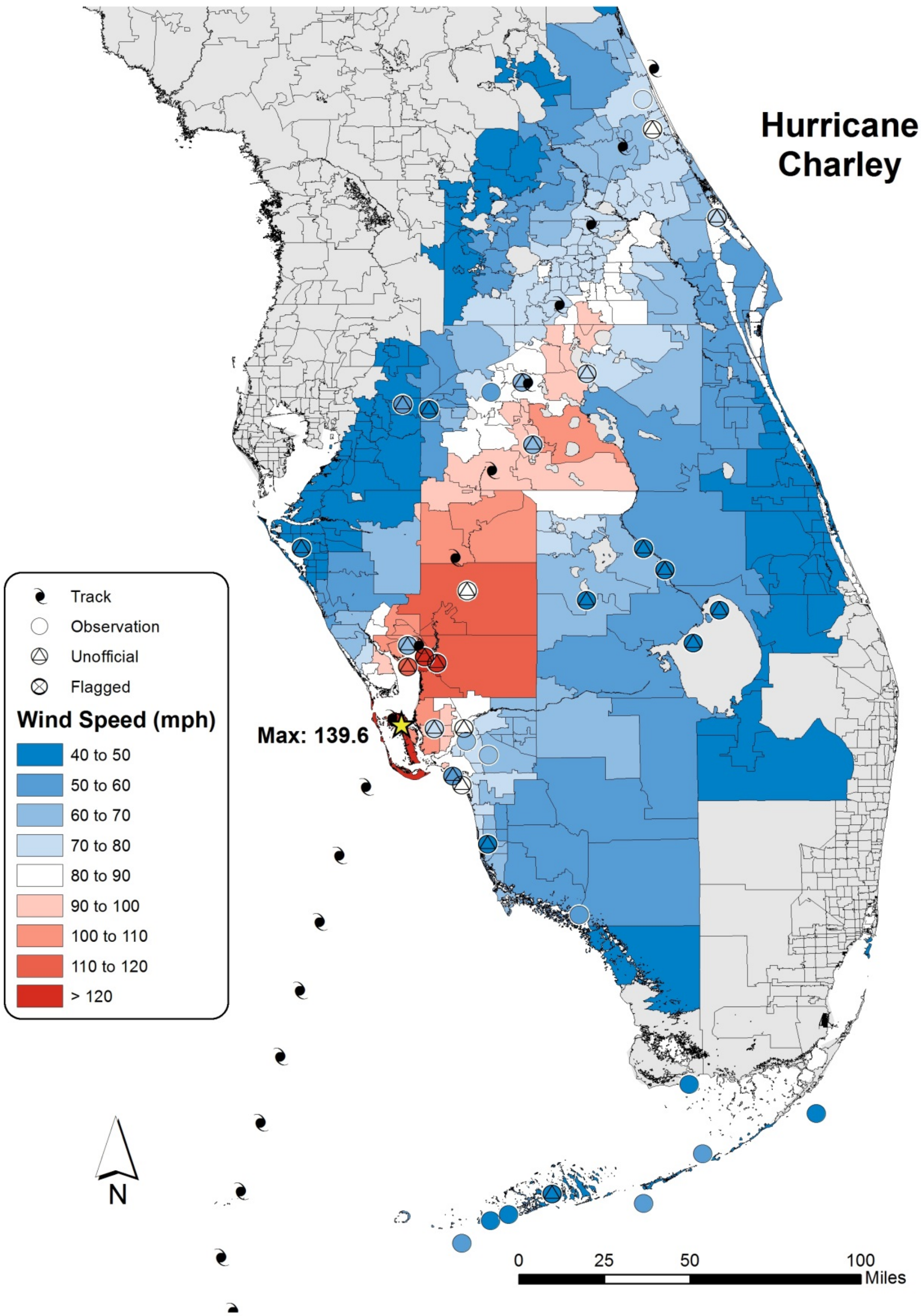


Figure 12. Observed and Modeled Wind Speeds, Hurricanes Charley (2004)

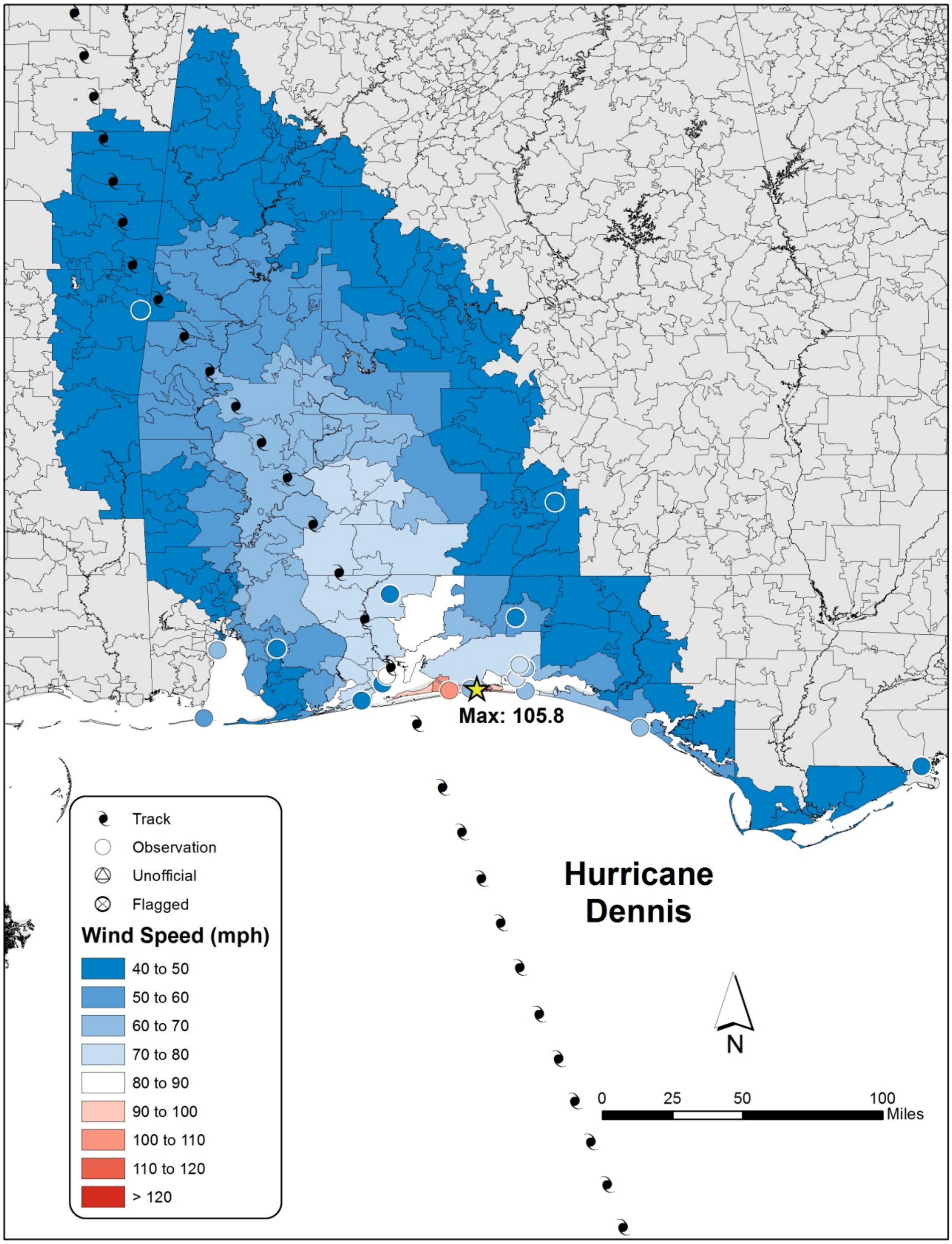


Figure 13. Observed and Modeled Wind Speeds, Hurricanes Dennis (2005)

10. *Describe how the model's windfield is consistent with the inherent differences in windfields for such diverse hurricanes as Hurricane Charley (2004), Hurricane Jeanne (2004), and Hurricane Wilma (2005).*

Historical data shows that tropical cyclones affecting Florida can be quite diverse. Sources of diversity in the windfields of Florida hurricanes include intensity at landfall, storm decay after landfall, forward speed and radius of maximum winds. The windfield model accounts for the response of hurricane winds to each of these parameters.

The landfalling hurricanes of 2004 and 2005 provide a good sample of diversity in these storm parameters. In these seasons, hurricane intensity spanned the spectrum from very intense (e.g., Charley 2004) to weak (e.g., Katrina 2005, Florida landfall). The rate of intensity decay after landfall (typically referred to as filling) in some storms was relatively slow (e.g., Wilma 2005) while in others it was rapid (e.g., Charley 2004). Forward speed varied from slow (e.g., Jeanne 2004) to fast (e.g., Wilma 2005). And finally, the radius of maximum winds varied from small (e.g., Charley 2004) to large (e.g., Wilma 2005).

Despite the diversity in these basic storm parameters, all of which relate directly to the windfield, the modeled wind speeds are realistic and unbiased. To better demonstrate this, we include below a comparison between modeled and observed winds for Charley (2004), Jeanne (2004) and Wilma (2005).

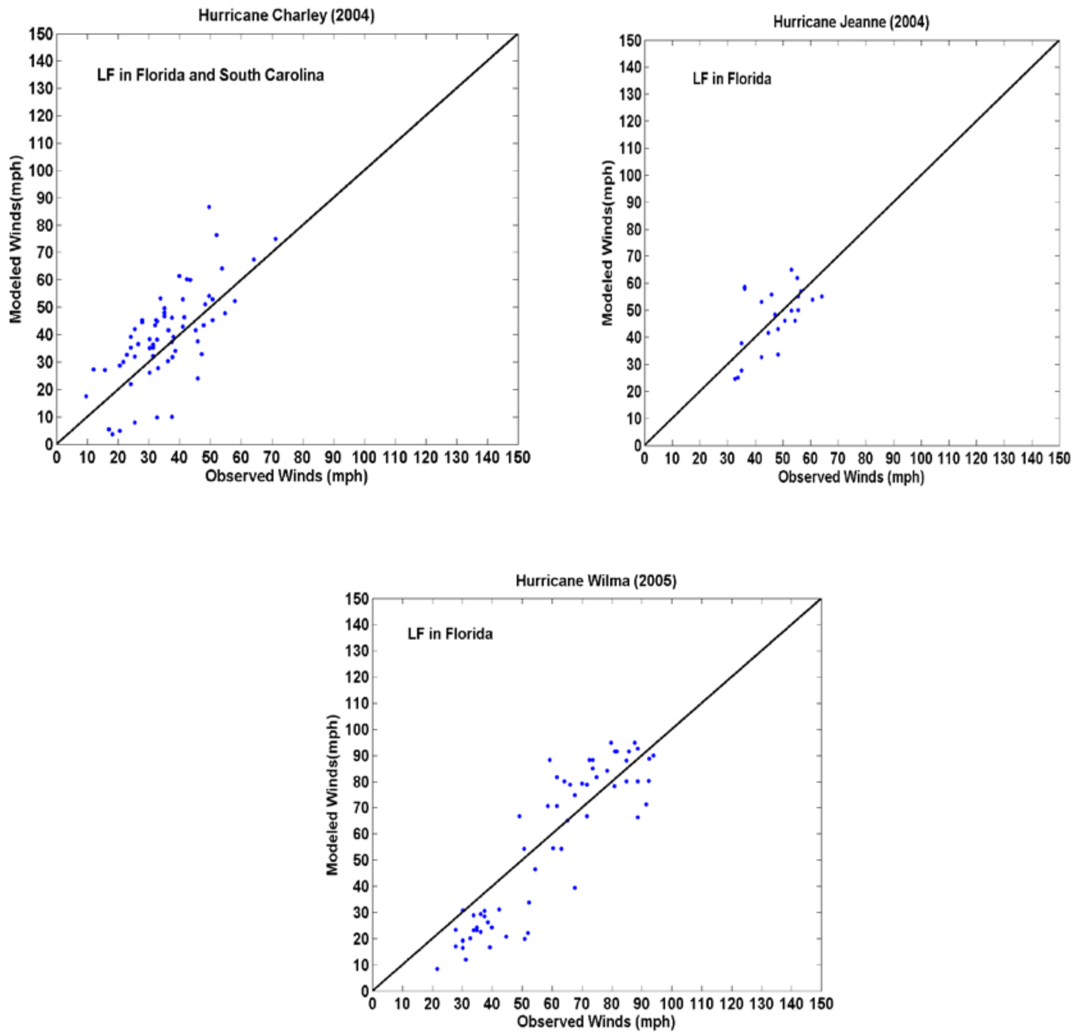


Figure 14. Scatter Plots of Modeled vs Observed Winds for Hurricane Charley (2004), Jeanne (2004) and Wilma (2005)

11. *Describe any variations in the treatment of the model windfield for stochastic versus historical storms and justify this variation.*

The treatment of the model windfield does not vary between stochastic and historical storms.

12. *Provide a completed Form M-2, Maps of Maximum Winds. Explain the differences between the spatial distributions of maximum winds for open terrain and actual terrain for historical storms. Provide a link to the location of the form here.*

A completed Form M-2 can be found on page 229. The use of open versus actual terrain generally results in higher wind speeds in the open terrain cases due to the lower average friction relative to actual terrain. However, because the open terrain roughness is slightly higher than the values for water some exceptions do occur in areas adjacent to the coast. In these areas, replacing the water roughness value with that for open terrain results in decreased winds compared to the actual terrain case.

M-5 Landfall and Over-Land Weakening Methodologies

(Significant Revision)

Relevant Form: G-2, Meteorological Standards Expert Certification

A. *The hurricane over-land weakening rate methodology used by the model shall be consistent with historical records and with current state-of-the-science.*

The model's over-land weakening rates, or filling rates, compare favorably with the historical records for storms of all intensities and are consistent with filling rate methodologies published in recent peer reviewed journals.

B. *The transition of winds from over-water to over-land within the model shall be consistent with current state-of-the-science.*

The transition of winds from over-water to over-land within the model is determined explicitly using local land cover information that varies by wind direction. The methodology used is based on established meteorological and engineering relationships for boundary layer winds. The methodology has been refined using the latest high-fidelity state-of-the-science wind data from recent research field projects.

Disclosures

1. *Describe and justify the functional form of hurricane decay rates used by the model.*

Once over land, the hurricane moves away from its source of energy, i.e., warm ocean water. As a result, the eye "fills" and the central pressure increases (winds degrade) with increasing time after landfall. The filling functions give the reduction in the pressure deficit (i.e. the difference between the central storm pressure and the pressure at the periphery of the storm) as a function of time since landfall. A faster forward speed will cause a hurricane to maintain its intensity further inland than a slow moving storm with the same initial intensity (pressure deficit).

The functional form of the pressure deficit decay function is:

$$\Delta P_t = P_p - P_{eye \cdot lf}\left(1 + LF_{offset} * t^{C_1} * \exp(-C_2 * t)\right)$$

where:

ΔP_t = Pressure deficit at a given time after landfall

P_p = Atmospheric pressure at the periphery of the storm

$P_{eye.lf}$ = Central pressure of the storm at landfall

LF_{offset} = Initial reduction of the pressure deficit at landfall

T = Time after landfall in hours

C_1 = Time shaping constant

C_2 = Exponential decay rate constant

Note that the function parameters vary by coastal region and smoothing algorithms are applied such that there is no sudden jump between regions.

This formulation is justified as it computes the necessary change in intensity parameter relevant to the model (i.e. change in central pressure as a function of time). The hurricane filling functions provide reliable weakening rates for the state of Florida and neighboring states and are consistent with inland decay functions, such as those developed by Kaplan and DeMaria (1995), further justifying their use.

Perturbations to the model's standard filling relationships are allowed to account for the low probability of tropical cyclones undergoing an episodic period of re-intensification after landfall. The implementation of such filling perturbations is motivated by the work of Bosart and Lackmann (1995), Hart and Evans (2001) and Arndt et al. (2009), and is based on observed historical storms. The procedure is only applied to storms which would likely undergo a transitioning phase and eventually reach 42° latitude. Within the state of Florida, such perturbations occur only in a very small number of stochastic events.

2. *Provide a graphical representation of the modeled decay rates for Florida hurricanes over time compared to wind observations.*

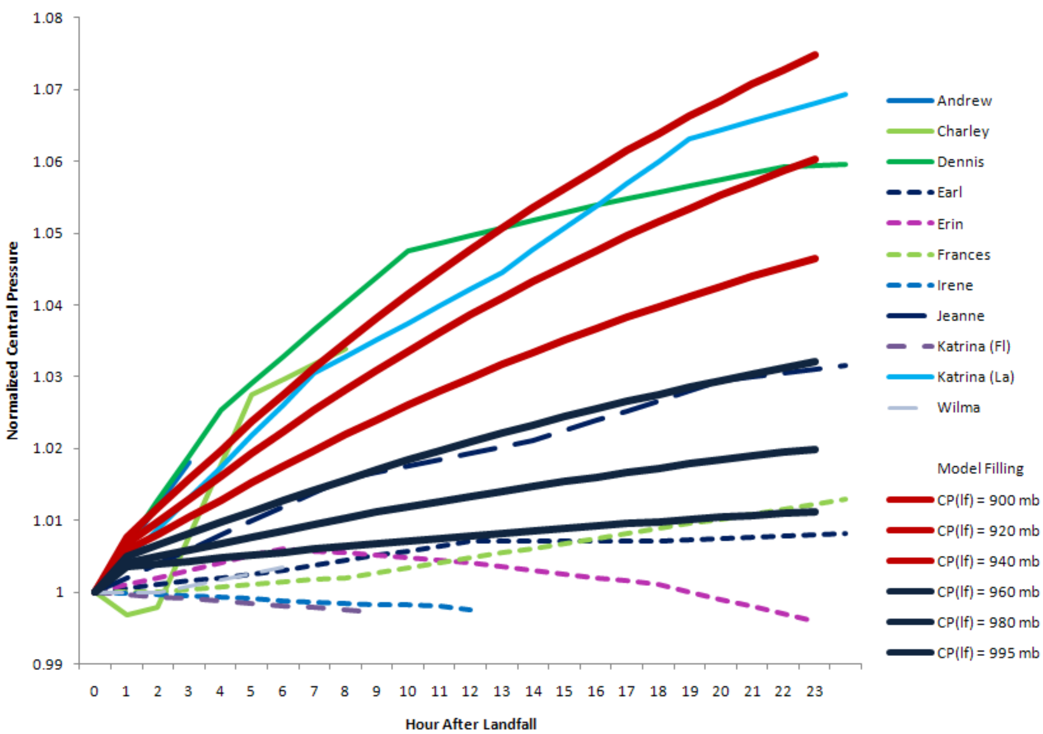


Figure 15. Modeled filling as a Function of Hour After Landfall for Weak (Blue) and Strong (Red) Hurricanes as Compared to Historical Florida Hurricanes

The model uses filling in terms of central pressure. Figure 15 shows the modeled filling as a normalized rate relative to the landfall central pressure at a range of storm intensities. The same plotting methodology was applied to central pressure for recent historical Florida events (1975-2005) for comparison.

3. *Describe the transition from over-water to over-land boundary layer simulated in the model.*

A hurricane travelling inland encounters different types of terrain, and the associated wind speeds will adjust to the new underlying surface. The distance over which this adjustment takes place is used to define an averaging distance. As the wind encounters the land surface, downwind of any large scale water body (e.g. ocean, Lake Okeechobee), a new boundary layer develops. The use of the averaging distance allows for a smooth and realistic transition at the boundary between these two surfaces. An adjustment is made to wind speeds modeled near the coast to account for the period before which over-water winds have settled to the underlying land surface. This adjustment is a function of the percentage of water within the directional averaging distance, as well as wind speed and is based on the work of Powell et al., (2003).

In addition, the direction of the wind at a given time is also considered. The wind direction at a given location is computed during each modeled wind computation time step, and the land characteristics upwind of the location are used in making the local wind adjustments.

4. *Describe any changes in hurricane parameters, other than intensity, resulting from the transition from over-water to over-land.*

The radial profile of the stochastically drawn gradient wind reduction factor is adjusted to account for the disruption of the hurricane due to landfall. Over a six-hour transition period starting three hours after landfall, the gradient wind adjustment factor along the profile converges to a constant value. For multiple landfalling storms, the radial profile is restored over water and allowed to decay again during subsequent landfalls.

5. *Describe the representation in the model of passage over non-continental U.S. land masses on hurricanes affecting Florida.*

The impact of any non-continental U.S. land masses on hurricanes affecting Florida is implicit in the historical data used to develop modeled storm parameters. Because of this, the impact of such land masses is inherently accounted for in all simulated storms.

6. *Document any differences in the treatment of decay rates in the model for stochastic hurricanes compared to historical hurricanes affecting Florida.*

Historical hurricanes affecting Florida use the actual observed changes in central pressure as determined from historical data. Central pressure for Florida hurricane events in the stochastic model decay after landfall using the decay function discussed in Standard M-5, Disclosure 1.

M-6 Logical Relationships of Hurricane Characteristics

Relevant Forms: G-2, Meteorological Standards Expert Certification
M-3, Radius of Maximum Winds and Radii of Standard Wind Thresholds

A. The magnitude of asymmetry shall increase as the translation speed increases, all other factors held constant.

The magnitude of asymmetry increases as the translation speed increases, all other factors held constant.

B. The mean windspeed shall decrease with increasing surface roughness (friction), all other factors held constant.

The mean windspeed decreases with increasing surface roughness (friction), all other factors held constant.

Disclosures

1. *Describe how the asymmetric structure of hurricanes is represented in the model.*

The term that resolves the asymmetric structure of the hurricane is a function of the translation speed of the storm and the angle between the wind direction and the storm moving direction. This contribution (expressed as a wind in miles per hour) is *added* to the total wind associated with the storm.

2. *Provide a completed Form M-3, Radius of Maximum Winds and Radii of Standard Wind Thresholds. Provide a link to the location of the form here.*

A completed Form M-3 is provided on page 235.

3. *Discuss the radii values for each wind threshold in Form M-3 (Radius of Maximum Winds and Radii of Standard Wind Thresholds) with reference to available hurricane observations such as those in HURDAT2. Justify the appropriateness of the databases used in the radii validations.*

Table 8. HURDAT2 Radii Values for Each Wind Threshold in Form M-3

Cp (mb)	Outer Radii > 73 mph (mi)			Outer Radii > 40 mph (mi)		
	Min	Max	Median	Min	Max	Median
990	2.88	86.31	11.51	17.26	345.23	103.57
980	5.75	73.36	20.14	37.40	414.28	130.90
970	7.19	123.71	28.77	51.78	483.33	135.22
960	11.51	123.71	43.15	57.54	460.31	178.37
950	11.51	96.38	53.22	76.24	460.31	163.99
940	21.58	109.32	60.42	83.43	477.57	172.62
930	23.02	94.94	64.01	86.31	241.66	176.93
920	33.08	86.31	51.78	122.27	187.00	150.32
910	60.42	94.94	77.68	143.85	201.39	179.81
900	57.54	92.06	74.80	189.88	197.07	193.47

The wind radii values in Form M-3 have been compared to data from the Hurdat2 dataset (see Table 8 above) for the 40 and 73 mph wind radii. Comparisons are generally favorable, particularly for hurricane force wind radii. The minimum tropical storm force wind radii also compare well, while the maximum radii tend to be lower. However, the HURDAT2 median values for both hurricane and tropical storm radii all fall in the wind radii range displayed in Form M-3, except storms with a central pressure of 900 mb. No comparisons to the 110 mph wind radii are available.

Florida Commission on Hurricane Loss Projection Methodology

2013 Statistical Standards

S-1 Modeled Results and Goodness-of-Fit

Relevant Forms: G-3, Statistical Standards Expert Certification
M-1, Annual Occurrence Rates
S-1, Probability and Frequency of Florida Landfalling Hurricanes per Year
S-2A, Examples of Loss Exceedance Estimates (2007 FHCF Exposure Data)
S-2B, Examples of Loss Exceedance Estimates (2012 FHCF Exposure Data)
S-3, Distributions of Stochastic Hurricane Parameters
S-4, Validation Comparisons
S-5, Average Annual Zero Deductible Statewide Loss Costs – Historical versus Modeled

A. The use of historical data in developing the model shall be supported by rigorous methods published in currently accepted scientific literature.

The historical data have been used to develop the probability distributions for key model variables such as annual hurricane frequency, landfall location, central pressure, radius of maximum winds, forward speed and track direction. Where appropriate, spatial smoothing and meteorological adjustments have been used to overcome spatial gaps and other limitations caused by the relative scarcity of the historical data.

The probability distributions used for individual input variables include Negative Binomial for annual landfall frequency, Weibull for central pressure and Lognormal for forward speed. The parameters of these distributions have been estimated using the maximum likelihood method. The adequacy of the fit has been examined using established procedures such as the Kolmogorov-Smirnov and the Shapiro-Wilk tests. Graphical comparisons using quantile-quantile (Q-Q) plots and other procedures have also been performed to confirm the agreement between the historical data and the fitted probability distributions.

B. Modeled and historical results shall reflect statistical agreement using currently accepted scientific and statistical methods for the academic disciplines appropriate for the various model components or characteristics.

Agreement between modeled and historical hurricane characteristics is confirmed using widely accepted scientific and statistical methods. The simulated values have been carefully examined and determined to be reasonable based both on statistical and meteorological grounds.

Disclosures

1. *Identify the form of the probability distributions used for each function or variable, if applicable. Identify statistical techniques used for the estimates and the specific goodness-of-fit tests applied. Describe whether the p-values associated with the fitted distributions provide a reasonable agreement with the historical data. Provide a completed Form S-3, Distributions of Stochastic Hurricane Parameters. Provide a link to the location of the form here.*

A completed Form S-3 is provided on page 244.

Annual Frequency of Occurrence

Storm frequency is modeled using a Negative Binomial distribution fitted to the number of annual hurricane landfalls in the U.S. since 1900. An analysis of the historical data shows the variance in excess of the mean; therefore, choice of Negative Binomial to model landfall frequency is more appropriate than a Poisson distribution, which assumes equality in mean and variance. The Negative Binomial is also known as a gamma-Poisson mixture, with the assumption that the mean of the Poisson is continuous and follows a gamma distribution. These considerations, combined with goodness-of-fit results, justify the use of the Negative Binomial distribution.

The parameters of this probability distribution are estimated using the maximum likelihood method. The adequacy of the fit is examined graphically and tested using Pearson's chi-square goodness-of-fit test. The value of the test statistics is small and its associated p-value indicates no lack of fit.

Landfall Location

The probability distribution for landfall location is based on the number of historical hurricane landfalls per approximately 50 nautical mile segment along the coast. Due to the relative scarcity of historical data at this spatial resolution the estimation involves smoothing of the historical frequencies as well as meteorological adjustments to arrive at credible landfall probabilities. The checks performed on the final landfall distribution include graphical and numerical comparisons of historical and simulated landfall frequencies as well as Chi-square goodness-of-fit tests. The associated p-values indicate no lack-of-fit.

Central Pressure

The probability distribution for central pressure is a Weibull distribution with the shape and scale parameters estimated for each 100-mile coastline segment. The distributions of the historical data on central pressure are typically skewed since very intense hurricanes are less frequent than weak hurricanes. The two-parameter Weibull distribution has a very flexible shape and is able to capture the skewness present in the historical data on central pressure.

The maximum likelihood method is used for the parameter estimation. A second calculation combines the data for six larger regions and computes Weibull parameter estimates for each of these regions. The final probability distribution used for each segment is a mixture of the segment and regional Weibull distributions.

The adequacy of the segment and regional Weibull distributions is tested using the Kolmogorov-Smirnov goodness-of-fit test. The empirical and fitted probability distributions are also compared using Q-Q plots and other graphical methods. In addition, the historical and simulated central pressure distributions are compared graphically for each 100-mile coastal segment. The various checks performed, along with associated p-values, confirm that the fitted distributions provide a reasonable approximation for central pressure.

Radius of Maximum Winds

For each simulated hurricane, the radius of maximum winds is simulated from a regression model that relates the radius to central pressure and latitude. The error term in this model is assumed to follow a Normal distribution. The parameters are estimated using least squares and standard residual checks are performed to determine the adequacy of the fitted model. The resulting values are bounded based on central pressure to produce a final distribution for the radius. The consistency between historical and simulated values is demonstrated using scatter diagrams, as well as segment-by-segment comparisons of observed and simulated values.

Forward Speed

Forward speed is generated from a Lognormal distribution with parameters estimated for each 100-mile segment. The parameters are estimated using the maximum likelihood method by computing the mean and variance of the log-transformed data. The adequacy of the fit is again tested using the Shapiro-Wilk goodness-of-fit test and by comparing the empirical and fitted cumulative distribution functions. Q-Q plots were also constructed. In addition, the historical and simulated values are compared graphically for each 100-

mile coastal segment. The checks performed, including the examination of p-values, indicate no lack-of-fit and suggest that the lognormal distribution provides a reasonable probability distribution for forward speed.

Storm Heading at Landfall

Landfall angle is measured clockwise (+) or counterclockwise (-) with 0 representing due North. Separate distributions for storm heading at landfall are estimated for each 50–nautical-mile segment of coastline. Storm heading is modeled as combined Normal distributions, and bounded based on the historical record, geographical constraints and meteorological expertise. Diagnostic checks show a reasonable agreement between historical and modeled values.

Gradient Wind Reduction Factor

The gradient wind reduction factor is modeled using a Normal distribution with parameters estimated from data derived using the regression equation from Powell et al. (2009), with input based on HURDAT data. The adequacy of the fit is tested using the Shapiro-Wilks and Shapiro-Francia goodness-of-fit tests for normality which have p-values of 0.13 and 0.25, respectively. Graphs of the empirical distribution functions and Q-Q plot confirm the adequacy of the fit.

Peak Weighting Factor

The probability distribution of the PWF can be approximated by a Normal distribution applied to an inverse power transformation of PWF. The adequacy of the normal approximation is confirmed by the Shapiro-Wilks and Shapiro-Francia goodness-of-fit tests which have p-values of 0.07 and 0.15, respectively. Graphs of the empirical distribution functions and Q-Q plot confirm the fit. A moderate correlation between GWRF and PWF is incorporated using a bivariate Normal distribution.

Storm Tracks

AIR's storm track generation procedure is based on the historical storm tracks available in the HURDAT database. The track information in this database is available at six-hour time intervals. A time series analysis was performed to determine appropriate models for the dependence present in key model variables from one time period to the next. This included an examination of the autocorrelation function of the original and differenced data corresponding to each model variable.

This analysis showed that a random walk with drift is appropriate for the track direction. A first-order autoregressive model is appropriate for forward speed, while a second-order autoregressive model is required to adequately represent central pressure along the track. To capture the spatial variability in the storm characteristics across the Atlantic basin, the parameters in these models were estimated by binning the data into grids that captured the spatial variation. Diagnostic checks on the model included grid-by-grid comparisons of the historical and simulated storm frequencies and intensity distributions across the basin.

Physical Damage

The vulnerability functions developed by AIR are based on published structural engineering research, wind engineering principles, damage surveys conducted by wind engineering experts and analysis of actual loss data. Over the years, AIR has compiled an extensive database of claims data from clients with large portfolios for historical hurricanes affecting various regions along the coast. Validation has been performed by comparing simulated and actual loss data by state, county, ZIP Code and by line of business.

2. *Describe the nature and results of the tests performed to validate the windspeeds generated.*

Extensive comparisons have been performed between model generated wind speeds and observations to check for spatial extent of the winds and their amplitude. Observational data has been gathered from NHC's Tropical Cyclone Reports as well as other data sources, like HURDAT2, dropsonde data, Texas Tech high-resolution data and various published reports for 36 historical storms (11 Florida storms). Comparisons performed include scatter plots of model winds versus observed winds, wind distribution against distance from the eye and storm model footprint (hourly or over storm lifetime) versus point wind observations, h*Wind data (Landsea et al., 2004; Powell et al., 1998) or DeMaria radii (Demuth et al., 2006). Mean statistics were computed for wind differences over all amplitudes or at different wind bands. Below in Table 9 we include a set of validation tests performed for Hurricane Andrew (1992).

Table 9. Validation Tests Performed for Hurricane Andrew (1992)

Storm	Sample Size	ExplVar (%)	Correlation	MBE (mph)
Andrew	31	82.81	0.91	5.40

where MBE = Mean Bias Error = Mean(ModelWind) - Mean(ObsWind)

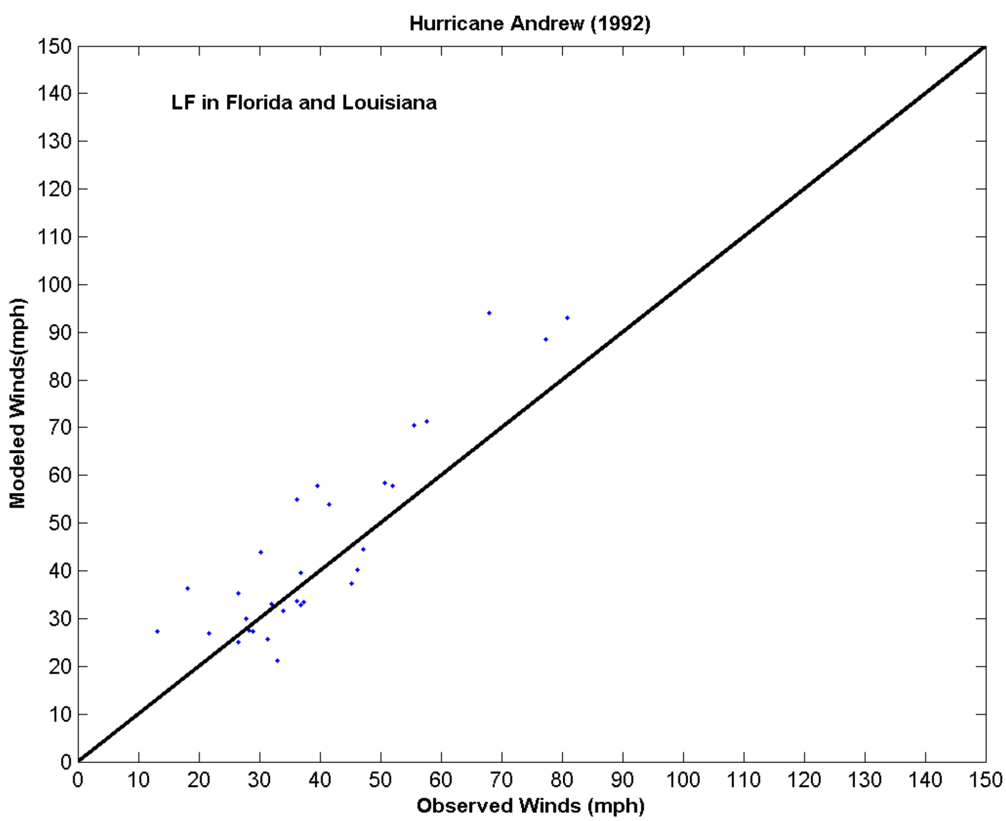


Figure 16. Modeled Versus Observed Surface Winds for Hurricane Andrew (1992)

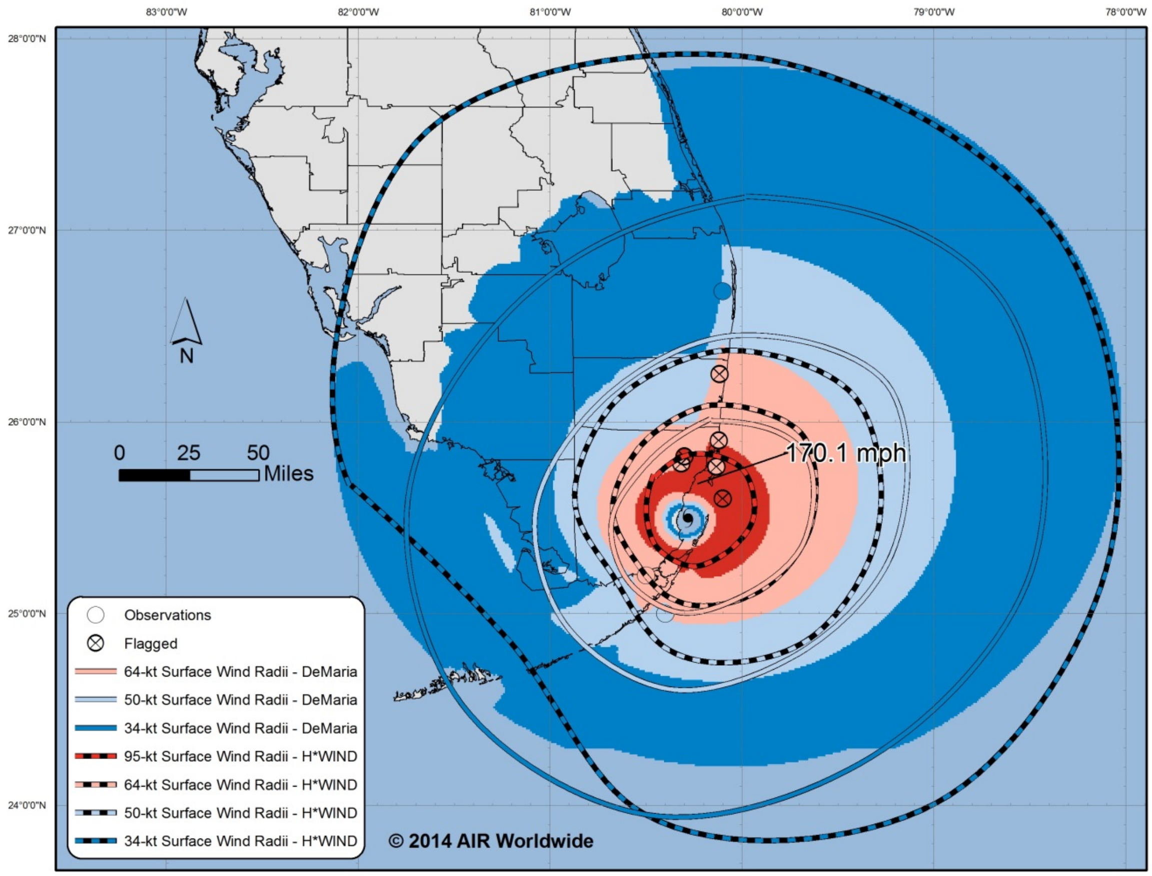


Figure 17. Snapshot of Hurricane Andrew's Footprint at Landfall (Colors). Overlaid are Observed Wind Radii (Contours) Derived From DeMaria and H*wind, Along With Station Wind Observations (Colored Circles)

The minimum wind speed has not been included in Figure 17 and Figure 18. The wind footprints shown on the maps have a minimum wind speed of 40 mph.

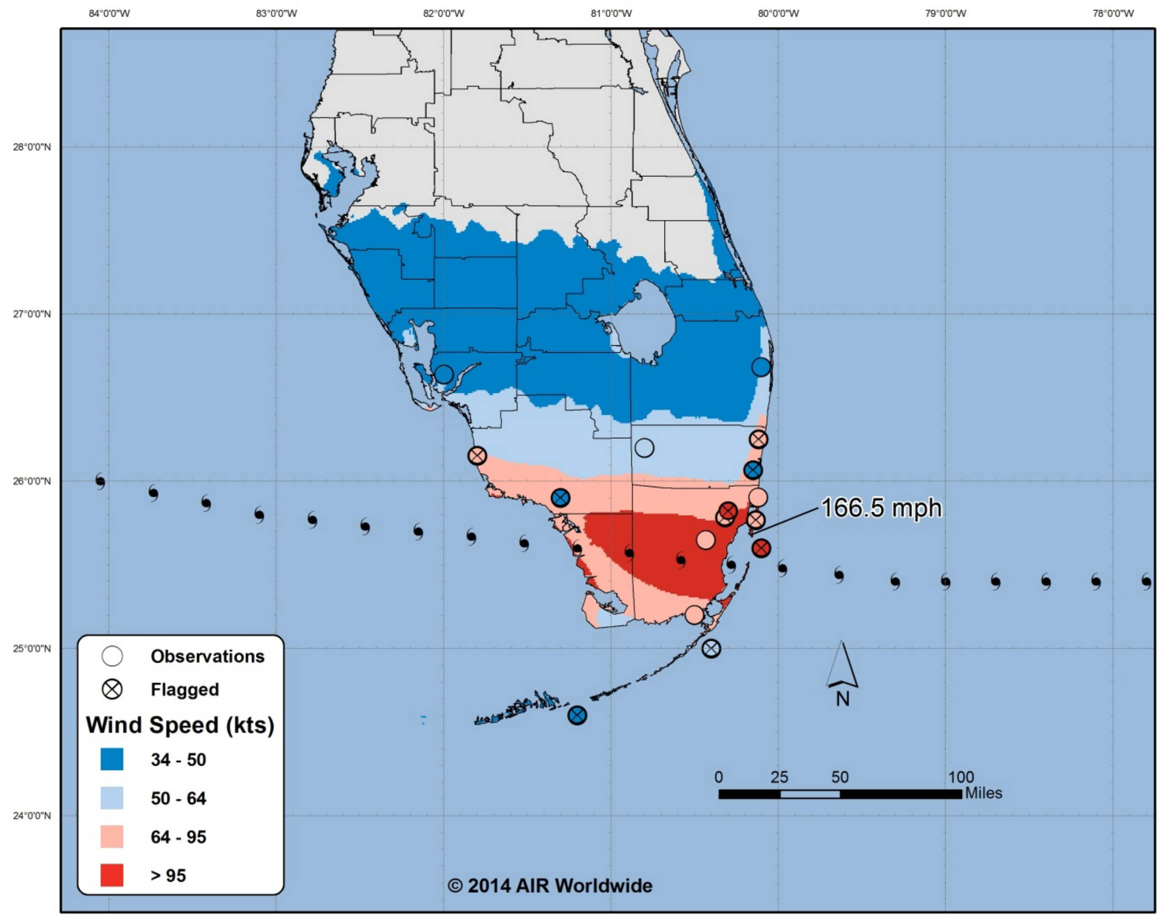


Figure 18. Hurricane Andrew's Maximum Wind Footprint (Colors) Overlaid With Station Wind

3. *Provide the date of loss of the insurance company data available for validation and verification of the model.*

AIR has actual insurance company loss data for the following storms: Hurricanes Hugo (1989), Bob (1991), Andrew (1992), Erin (1995), Opal (1995), Bertha (1996), Fran (1996), Bonnie (1998), Earl (1998), Frances (1998), Georges (1998), Floyd (1999), Irene (1999), and Georges (2001), Charley (2004), Ivan (2004), Frances (2004), Jeanne (2004), Dennis (2005), Rita (2005), Wilma (2005), Katrina (2005), Ike (2008), Irene (2011), and Sandy (2012).

4. *Provide an assessment of uncertainty in loss costs for output ranges using confidence intervals or other accepted scientific characterizations of uncertainty.*

Past studies conducted by AIR have examined the contribution of model parameters such as central pressure, forward speed, radius of maximum winds and the gradient wind reduction factor to the uncertainty in estimated loss costs. These studies have shown that the gradient wind reduction factor is a large contributor to the uncertainty in the loss costs.

This finding is supported by the results from the Form S-6 analysis performed as part of our 2010 submission. Additional loss runs have been performed to assess the contribution of this factor to the uncertainty in the county-level loss costs. For example, eliminating the stochastic variability and setting its value equal to the distribution mean reduced the estimated losses by approximately 20 percent statewide. A significant reduction in the variance of the loss costs was also observed for most of the counties. By comparison, eliminating the variability in the peak weighting factor did not have a significant impact on the estimated loss costs.

5. *Justify any differences between the historical and modeled results using current accepted scientific and statistical methods in the appropriate disciplines.*

The historical results are based on a sample of 113 years of hurricane experience. Because of sampling variability and other sources of uncertainty, one would not expect an exact agreement between historical and modeled results. However, goodness-of-fit statistics and other measures show a reasonable agreement between historical and modeled results.

6. *Provide graphical comparisons of modeled and historical data and goodness-of-fit tests. Examples include hurricane frequencies, tracks, intensities, and physical damage.*

Annual Landfall Frequency

Figure 19 compares the historical distribution of annual U.S. landfalls to a fitted Negative Binomial distribution. As can be seen, the agreement between the two distributions is quite close and shows no evidence of lack of fit. The calculated value of the Chi-square statistic is 1.15, which for 3 degrees of freedom gives a p-value of 0.76.

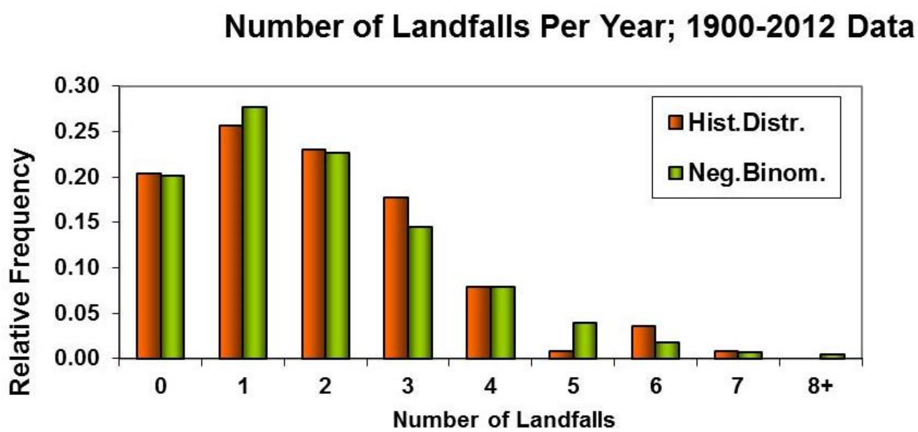


Figure 19. Historical and Modeled U.S. Annual Landfall Probability Distributions

Hurricane Tracks

The following maps compare the tracks of historical and randomly sampled simulated hurricanes making landfall in a 50-mile coastal segment in Southeast Florida. The overall behavior of the historical and simulated tracks is similar.

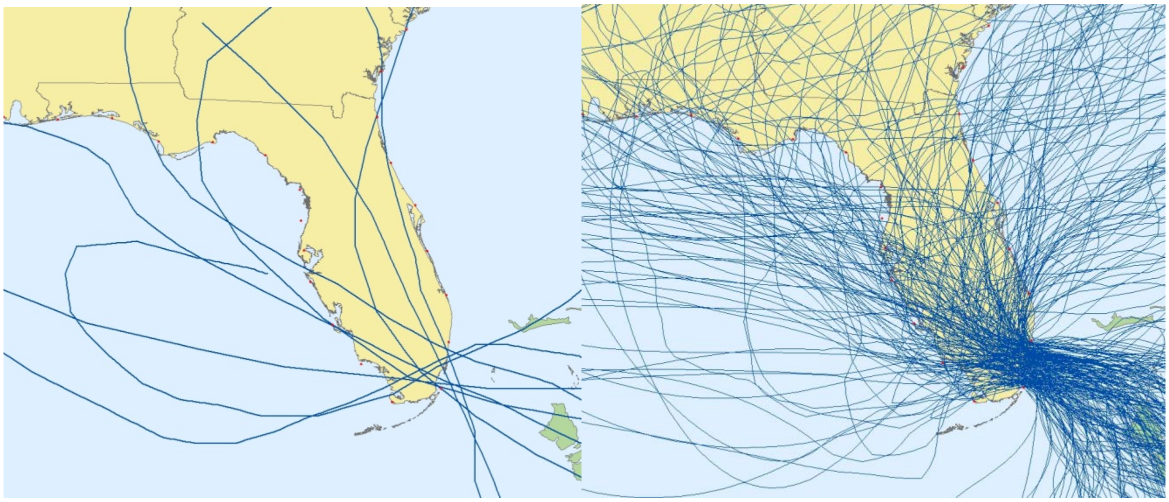
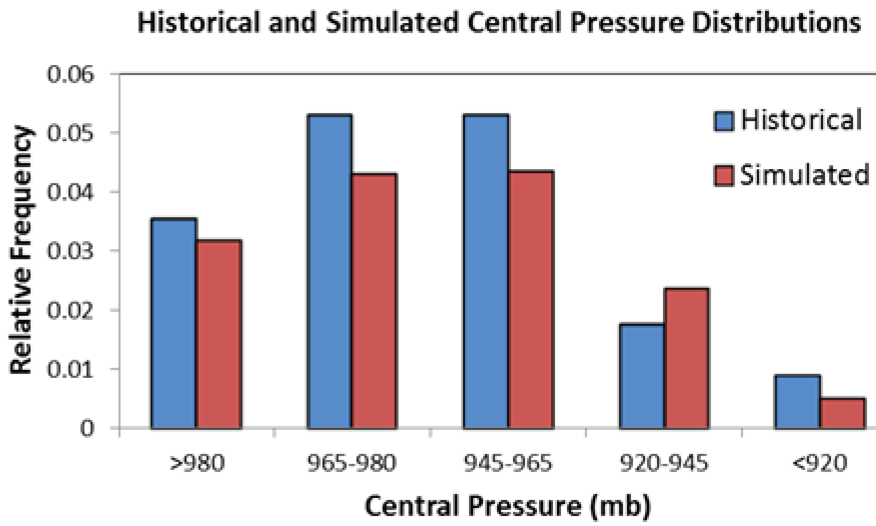


Figure 20. Historical (left) and Simulated (Right) Hurricanes Landfalling in SE Florida

Intensities

Figure 21 compares the historical and simulated central pressure distributions for a 100-mile segment in Southeast Florida. The simulated frequencies are based on Weibull distributions fitted to the historical data. Goodness-of-fit summaries are included to illustrate some of the statistical tests that were performed for this variable.



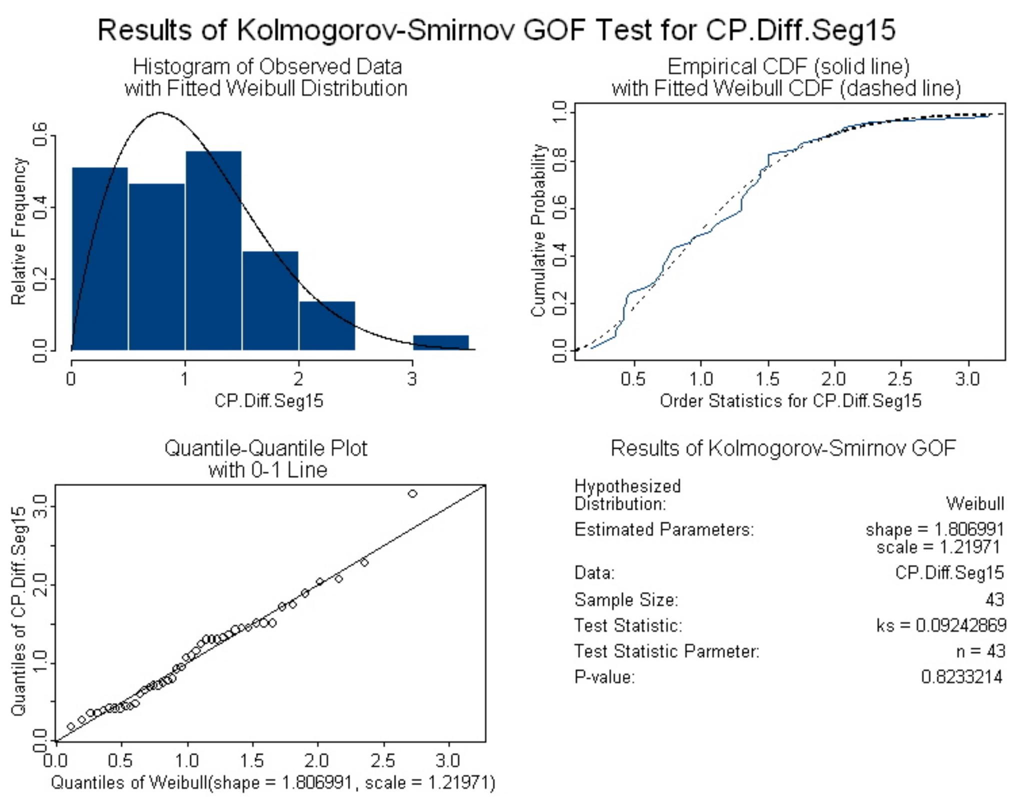


Figure 21. Goodness-of-Fit Comparisons for a 100-Mile Florida Segment

Physical Damage

Figure 22 shows historical and simulated damage ratios versus wind speed for Coverage A based on ZIP Code level data. Each observation refers to an individual ZIP Code. The agreement between the historical and simulated damage ratios is reasonable. This is confirmed by a paired two-sample t-test on the means, which has a p-value of 0.15.

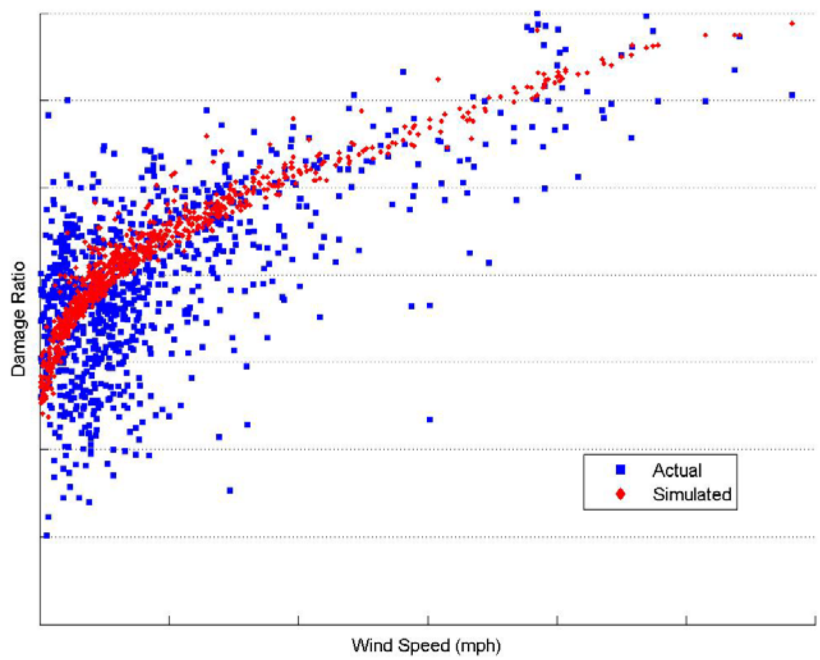


Figure 22. Sample Damage Ratio Comparison

7. *Provide a completed Form S-1, Probability and Frequency of Florida Landfalling Hurricanes per Year. Provide a link to the location of the form here.*

A completed Form S-1 is provided on page 239.

8. *Provide a completed Form S-2A, Examples of Loss Exceedance Estimates, using the 2007 Florida Hurricane Catastrophe Fund aggregate personal and commercial residential exposure data. Provide a link to the location of the form here.*

A completed Form S-2A is provided on page 240.

9. *Provide a completed Form S-2B, Examples of Loss Exceedance Estimates, using the 2012 Florida Hurricane Catastrophe Fund aggregate personal and commercial residential exposure data. Provide a link to the location of the form here.*

A completed Form S-2B is provided on page 242.

S-2 Sensitivity Analysis for Model Output

Relevant Forms: G-3, Statistical Standards Expert Certification
S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis

The modeling organization shall have assessed the sensitivity of temporal and spatial outputs with respect to the simultaneous variation of input variables using currently accepted scientific and statistical methods in the appropriate disciplines and have taken appropriate action.

AIR has assessed the sensitivity of temporal and spatial outputs with respect to the simultaneous variation of input variables using currently accepted scientific and statistical methods and has taken appropriate action.

Disclosures

1. *Identify the most sensitive aspect of the model and the basis for making this determination. Provide a full discussion of the degree to which these sensitivities affect output results and illustrate with an example.*

The most sensitive aspects of the model include the gradient wind reduction factor, far field pressure and central pressure. Variation in these parameters can have a large impact on the modeled wind speeds and the resulting losses. This determination is based on past studies conducted by AIR, as well as the Form S-6 analysis performed as part of our submission under the 2009 Standards.

The Form S-6 analysis included six model parameters: central pressure, radius of maximum winds, forward speed, far field pressure, gradient wind reduction factor and peak weighting factor. The sensitivity analysis for loss costs uses standardized regression coefficients associated with all six input parameters for Category 1, 3 and 5 hurricanes. The results showed that the gradient wind reduction factor has the most influence on the magnitude of the loss costs across all hurricane categories. For Category 1 hurricanes, far field pressure and central pressure have the second and third most influence on the magnitude of the lost costs. However, as the storm category increases the influence of central pressure and far field pressure decreases. The influence of Rmax increases with category and is the second most sensitive parameter for Category 3 and 5 hurricanes.

An analysis of the temporal sensitivities of the loss costs was not performed since the model does not output the loss costs by hour. However, the sensitivities of wind speeds both spatially and temporally were studied using the hypothetical storms in Form S-6.

Figure 23 to Figure 25 show the standardized regression coefficients vs time for Category 1, 3 and 5 hurricanes at landfall. At hour 0, immediately before landfall, modeled wind speeds at the landfall location are most sensitive to the gradient wind reduction factor, followed by Rmax for Category 1 hurricanes. For Category 3 and 5 hurricanes, modeled wind speeds are most sensitive to Rmax, followed by the gradient wind reduction factor.

As noted above, the results presented here refer to wind speeds at the landfall location. However, the sensitivities are location dependent and can vary greatly depending on the specific location selected.

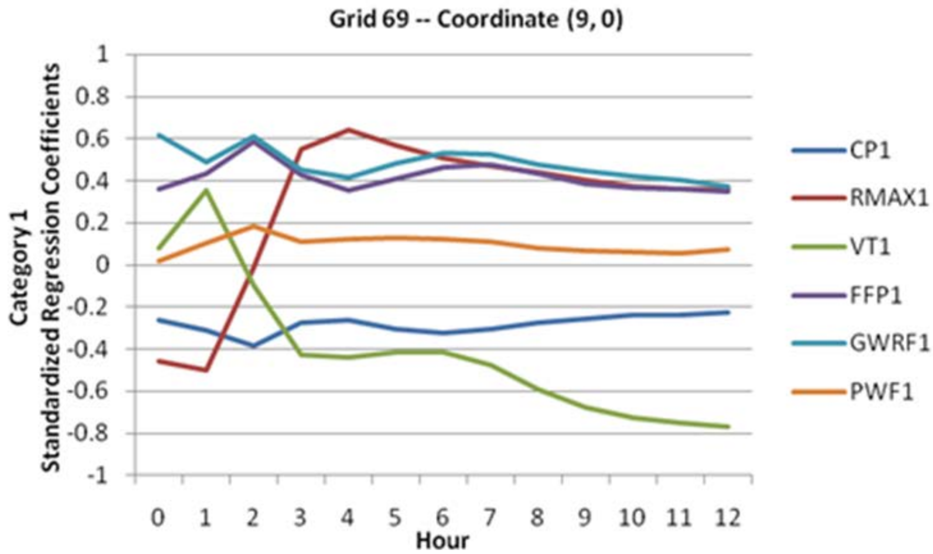


Figure 23. Standardized Regression Coefficients vs Time at Grid Coordinates (9,0) For Category 1

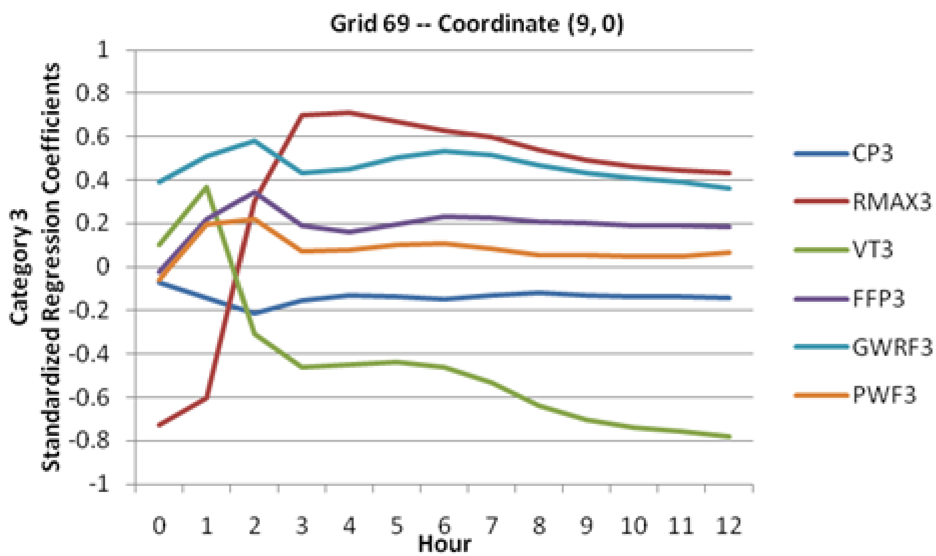


Figure 24. Standardized Regression Coefficients vs Time at Grid Coordinates (9,0) for Category 3

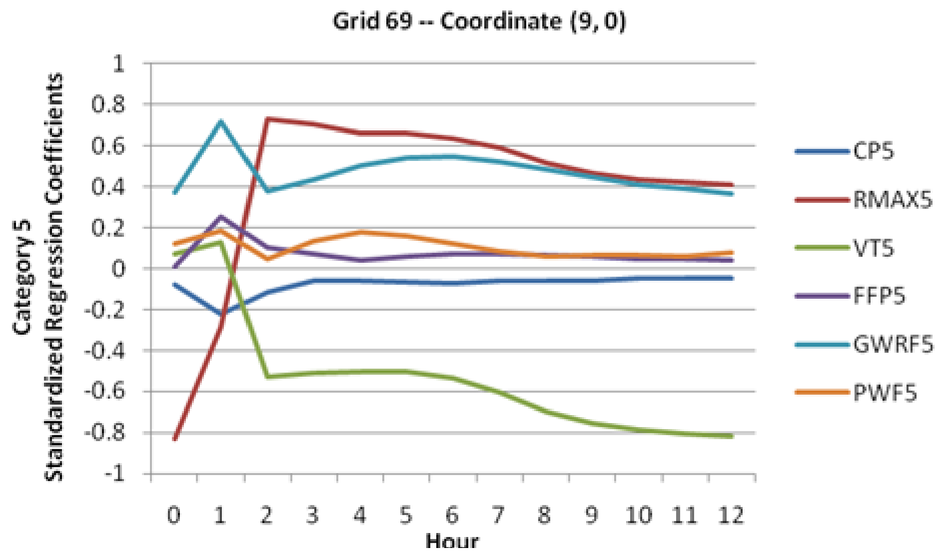


Figure 25. Standardized Regression Coefficients vs Time at Grid Coordinates (9,0) for Category 5

2. *Describe how other aspects of the model may have a significant impact on the sensitivities in output results and the basis for making this determination.*

The modeled loss costs can be sensitive to assumptions about annual landfall frequency as well as landfall location. This is illustrated by studies conducted by AIR to assess the relationship between sea surface temperatures (SST) and hurricane frequency in different coastal regions.

3. *Describe and justify action or inaction as a result of the sensitivity analyses performed.*

The results of the sensitivity analysis have been carefully reviewed and found to be reasonable. No specific action was taken after reviewing the results. However, results from the sensitivity studies performed provide valuable insight into the effects of changing the probability distributions of individual input parameters on modeled wind speeds and lost costs.

4. *Provide a completed Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis. (Requirement for models submitted by modeling organizations which have not previously provided the Commission with this analysis. For models previously found acceptable, the Commission will determine, at the meeting to review modeling organization submissions, if an existing modeling organization will be required to provide Form S-6 (Hypothetical Events for Sensitivity and Uncertainty Analysis) prior to the Professional Team on-site review). If applicable, provide a link to the location of the form here.*

Form S-6 was submitted as a requirement under the 2009 Standards. The results are unchanged.

S-3 Uncertainty Analysis for Model Output

Relevant Forms: G-3, Statistical Standards Expert Certification
S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis

The modeling organization shall have performed an uncertainty analysis on the temporal and spatial outputs of the model using currently accepted scientific and statistical methods in the appropriate disciplines and have taken appropriate action. The analysis shall identify and quantify the extent that input variables impact the uncertainty in model output as the input variables are simultaneously varied.

AIR has performed an uncertainty analysis on the temporal and spatial outputs of the model using currently accepted scientific and statistical methods and has taken appropriate action. Our analysis has identified and quantified the extent that input variables impact the uncertainty in model output as input variables are simultaneously varied.

Disclosures

1. *Identify the major contributors to the uncertainty in model outputs and the basis for making this determination. Provide a full discussion of the degree to which these uncertainties affect output results and illustrate with an example.*

The gradient wind reduction factor is a major contributor to the uncertainty in modeled wind speeds as well as loss costs. Far field pressure and central pressure also contribute to uncertainty in loss costs. This determination is based on past studies conducted by AIR, as well as the Form S-6 analysis performed as part of our submission under the 2009 Standards.

The uncertainty analysis performed in Form S-6 showed that the gradient wind reduction factor makes the largest contribution to the uncertainty in loss cost for all categories of hurricanes. For Category 1 hurricanes, far field pressure makes the second largest contribution followed by central pressure, and then Rmax. The contribution of Rmax increases as the storm intensity increases. The peak weighting factor and forward speed, on the other hand, do not make significant contributions to the uncertainty in the loss costs for any of the categories.

The hypothetical storms in Form S-6 were also used to study the uncertainties associated with spatial and temporal wind speeds. Some results from this analysis are given in Figure 26 to Figure 28, which show the relative influence of different input parameters by hour for Category 1, 3 and 5 hurricanes on wind speeds at the landfall location. At hour 0, immediately before landfall, modeled wind speeds are most influenced by Rmax. At hours 1 and 2, when the landfall location tends to be within the eye wall for the weaker hurricanes, the gradient wind reduction factor dominates while Rmax again becomes important during subsequent hours. For Category 5 hurricanes, which have a smaller Rmax, the contribution of Rmax drops significantly at hour 1 before increasing again at hour 2. As expected, forward speed is an important contributor to uncertainty in wind speeds at the landfall location at later hours when the storms are farther away from the landfall point. All the uncertainties are location dependent and can vary greatly depending on the specific location considered.

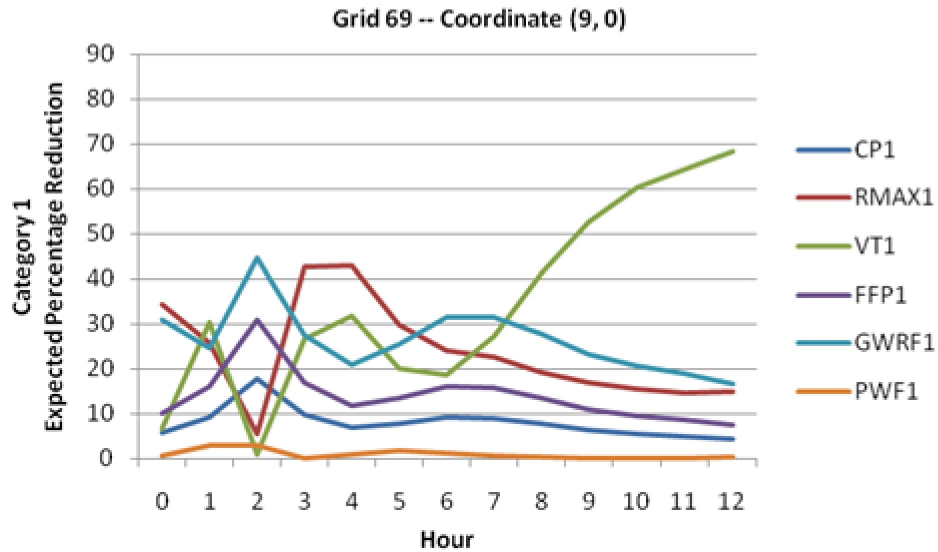


Figure 26. Expected Percentage Reduction vs Time at Grid Coordinates (9,0) for Category 1

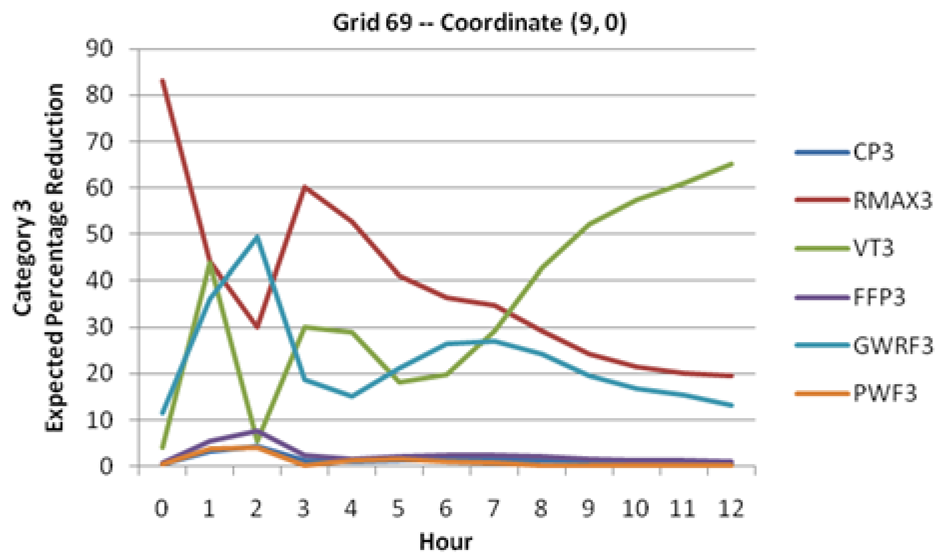


Figure 27. Expected Percentage Reduction vs Time at Grid Coordinates (9,0) for Category 3

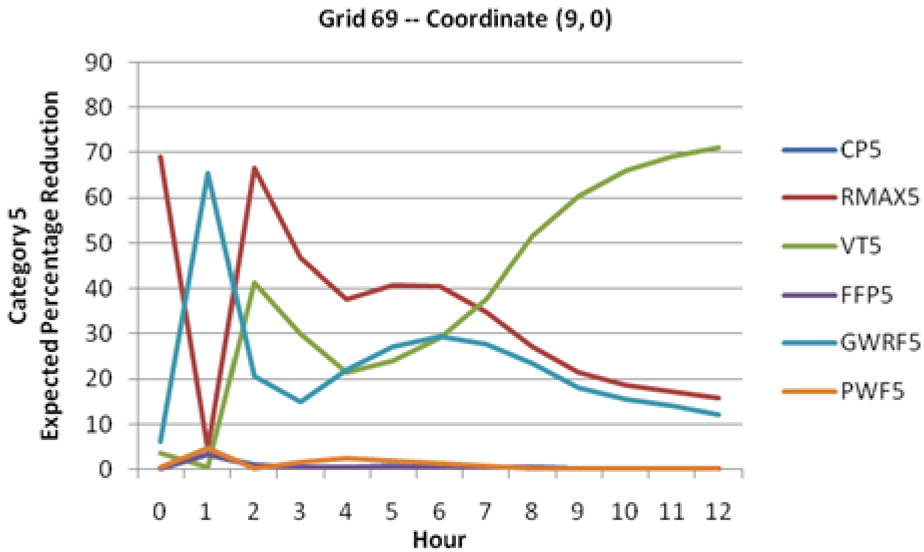


Figure 28. Expected Percentage Reduction vs Time at Grid Coordinates (9,0) for Category 5

Describe how other aspects of the model may have a significant impact on the uncertainties in output results and the basis for making this determination.

Our work on the relationship between SST and the frequency and intensity of landfalling storms confirms earlier findings that frequency and intensity have a significant impact on the uncertainty in modeled losses.

2. *Describe and justify action or inaction as a result of the uncertainty analyses performed.*

Past studies performed by AIR have shown that the gradient wind reduction factor is a major contributor to uncertainty in loss costs. These results were considered in the implementation of this parameter in the current version of the model.

3. *Form S-6 (Hypothetical Events for Sensitivity and Uncertainty Analysis), if disclosed under Standard S-2 (Sensitivity Analysis for Model Output), will be used in the verification of Standard S-3 (Uncertainty Analysis for Model Output).*

Form S-6 was submitted as a requirement under the 2009 Standards. The results are unchanged.

S-4 County Level Aggregation

Relevant Form: G-3, Statistical Standards Expert Certification

At the county level of aggregation, the contribution to the error in loss cost estimates attributable to the sampling process shall be negligible.

Convergence graphs and inspection of the loss costs for increasing sample sizes indicate the sampling error is negligible for the 50,000-year simulation used to generate the loss costs.

Disclosure

1. *Describe the sampling plan used to obtain the average annual loss costs and output ranges. For a direct Monte Carlo simulation, indicate steps taken to determine sample size. For an importance sampling design, describe the underpinnings of the design.*

AIR uses constrained Monte Carlo simulation to obtain the average annual loss costs and output ranges. The constrained Monte Carlo method used is designed to expedite convergence and reduce the sampling error in the loss cost estimates by ensuring that the probability distributions for annual landfall frequency, landfall location and landfall intensity agree with the true underlying probability distributions as closely as possible in a 50,000-year simulation. Convergence tests applied to the resulting loss costs show that the sampling errors in the loss costs are negligible.

S-5 Replication of Known Hurricane Losses

Relevant Forms: G-3, Statistical Standards Expert Certification
S-4, Validation Comparisons

The model shall estimate incurred losses in an unbiased manner on a sufficient body of past hurricane events from more than one company, including the most current data available to the modeling organization. This standard applies separately to personal residential and, to the extent data are available, to commercial residential. Personal residential experience may be used to replicate structure-only and contents-only losses. The replications shall be produced on an objective body of loss data by county or an appropriate level of geographic detail and shall include loss data from both 2004 and 2005.

Losses generated by the model's simulation of past hurricane events reasonably replicate actual incurred losses from those events. This is true for both personal residential of various construction types and for mobile homes, as well as for various coverages. County-level comparisons also show reasonable agreement between modeled and incurred losses.

Disclosures

1. *Describe the nature and results of the analyses performed to validate the loss projections generated by the model for personal and commercial residential separately. Include analyses for the 2004 and 2005 hurricane seasons.*

Table 10 through Table 15 show how AIR's simulated damage ratios compare, in total and by coverage and construction, to the damage ratios of specific client companies for key storms including 2004 and 2005 storms: Hurricanes Andrew, Bonnie, Charley, Erin, Frances, Ivan, Jeanne, Wilma and Katrina. Note that the losses in the tables have been scaled to protect the identity of the companies

Table 10. Actual Vs Modeled Losses for Nine Storms and Nine Companies (Personal Residential)

Event	Company	Actual Loss ($)	Modeled Loss ($)
Andrew	A	699,699,029	579,482,583
Andrew	C	30,876,447	55,993,751
Andrew Total		**730,575,476**	**635,476,334**
Bonnie	A	3,658,288	15,666,169
Bonnie	B	1,824,581	1,612,472
Bonnie	D	7,600,011	22,785,996
Bonnie Total		**13,082,881**	**40,064,637**
Charley	G	14,393,377	11,223,888
Charley	I	12,923,883	16,414,173
Charley	J	67,874,885	52,986,409
Charley Total		**95,192,146**	**80,624,470**
Erin	B	2,752,119	4,473,248
Erin	C	11,533,903	18,268,370
Erin Total		**14,286,022**	**22,741,618**
Frances	G	10,767,210	7,469,600
Frances	I	10,766,571	14,371,578
Frances	J	10,712,272	25,574,000
Frances Total		**32,246,053**	**47,415,177**
Ivan	G	3,912,201	2,959,830
Ivan	I	5,943,129	43,169,738
Ivan	J	1,631,418	1,313,798
Ivan Total		**11,486,747**	**47,443,365**
Jeanne	G	2,721,086	5,594,722
Jeanne	I	9,551,018	11,370,857
Jeanne	J	17,743,163	21,644,585
Jeanne Total		30,015,268	38,610,163
Wilma	M	14,345,569	14,580,375
Wilma	N	152,698,832	163,727,485
Wilma Total		167,044,401	178,307,860
Katrina	N	22,480,522	37,428,984
Katrina Total		22,480,522	37,428,984

Table 11. Actual vs Modeled Losses for Six Storms and Two Companies (Commercial Residential)

Event	Company	Actual Loss ($)	Modeled Loss ($)
Charley	N	65,465,443	96,273,858
Charley Total		**65,465,443**	**96,273,858**
Frances	N	60,324,157	32,169,465
Frances Total		**60,324,157**	**32,169,465**
Ivan	N	22,407,198	22,555,777
Ivan Total		**22,407,198**	**22,555,777**
Jeanne	N	11,708,119	23,816,284
Jeanne Total		**11,708,119**	**23,816,284**
Wilma	M	14,953,340	36,310,496
Wilma	N	125,190,942	95,820,976
Wilma Total		**140,144,282**	**132,131,473**
Katrina	N	7,139,327	12,222,306
Katrina Total		**7,139,327**	**12,222,306**

Table 12. Actual vs Modeled Losses by Coverage for Nine Storms and Eight Companies (Personal Residential)

Coverage	Event	Company	Actual Loss ($)	Modeled Loss ($)
A	Andrew	A	479,053,020	449,017,538
A	Andrew	C	22,888,773	40,243,667
A	Erin	C	10,474,623	15,910,729
A	Bonnie	A	3,351,850	13,748,235
A	Bonnie	D	5,020,586	20,343,101
A	Charley	G	12,330,422	9,596,262
A	Frances	G	9,755,813	6,607,925
A	Ivan	I	5,089,896	37,357,724
A	Jeanne	I	8,517,935	9,885,570
A	Charley	J	62,338,151	47,473,882
A	Frances	J	10,271,271	23,536,566
A	Wilma	M	14,021,469	13,200,817
A	Wilma	N	51,124,993	42,284,860
A	Katrina	N	6,527,939	5,240,420
Total			**700,766,741**	**734,447,296**

Coverage	Event	Company	Actual Loss ($)	Modeled Loss ($)
C	Andrew	A	176,041,470	81,003,639
C	Andrew	C	6,160,344	11,813,184
C	Erin	C	815,171	2,084,615
C	Bonnie	A	275,299	1,522,321
C	Bonnie	D	2,187,319	2,130,456
C	Charley	G	1,576,019	1,302,428
C	Frances	G	772,325	730,028
C	Ivan	I	697,428	5,115,412
C	Jeanne	I	791,274	1,314,930
C	Charley	J	4,087,662	4,050,518
C	Frances	J	315,552	1,719,695
C	Wilma	M	270,656	1,038,501
C	Wilma	N	1,813,070	3,351,497
C	Katrina	N	233,899	288,004
Total			**196,037,488**	**117,465,226**
D	Andrew	A	44,604,539	49,461,407
D	Andrew	C	1,827,330	3,936,900
D	Erin	C	244,109	273,026
D	Bonnie	A	31,140	395,614
D	Bonnie	D	392,106	312,439
D	Charley	G	486,936	325,199
D	Frances	G	239,072	131,647
D	Ivan	I	155,805	696,601
D	Jeanne	I	241,809	170,357
D	Charley	J	1,449,072	1,462,009
D	Frances	J	125,449	317,739
D	Wilma	M	53,444	341,057
D	Wilma	N	369,507	202,486
D	Katrina	N	48,011	8,622
Total			**50,268,329**	**58,035,103**

Table 13. Actual vs Modeled Losses by Construction Type for Nine Storms and Eight Companies (Personal Residential)

Construction	Event	Company	Actual Loss ($)	Modeled Loss ($)
Frame	Andrew	A	49,465,744	19,244,414
Frame	Andrew	C	8,987,526	15,238,263
Frame	Erin	C	6,881,690	10,049,133
Frame	Bonnie	B	1,140,291	1,076,967
Frame	Erin	B	2,646,930	1,597,893
Frame	Charley	G	2,435,653	2,052,840
Frame	Frances	G	4,553,820	2,171,654
Frame	Ivan	I	2,325,399	17,343,432
Frame	Jeanne	I	2,939,507	3,239,003
Frame	Charley	J	8,453,254	11,602,418
Frame	Frances	J	2,851,694	4,405,150
Frame	Wilma	M	1,078,031	870,738
Frame	Wilma	N	15,303,256	21,662,020
Frame	Katrina	N	1,380,416	2,199,771
Total			**110,443,211**	**112,753,695**
Masonry	Andrew	A	650,233,285	560,238,169
Masonry	Andrew	C	19,929,848	34,643,646
Masonry	Erin	C	2,987,052	4,479,543
Masonry	Bonnie	B	110,017	71,763
Masonry	Bonnie	A	427,406	1,323,033
Masonry	Charley	G	11,908,319	9,094,595
Masonry	Frances	G	6,135,762	5,210,662
Masonry	Ivan	I	1,029,801	3,588,767
Masonry	Jeanne	I	6,082,968	7,369,504
Masonry	Charley	J	59,301,884	41,224,190
Masonry	Frances	J	7,830,728	21,059,567
Masonry	Wilma	M	12,859,659	12,857,470
Masonry	Wilma	N	115,532,204	105,675,541
Masonry	Katrina	N	11,937,900	18,092,910
Total			**906,306,831**	**824,929,360**
Mobile Home	Erin	B	105,189	723,602
Mobile Home	Andrew	C	485,193	2,644,635
Mobile Home	Erin	C	663,292	3,194,401
Mobile Home	Wilma	N	15,874,921	16,648,828
Mobile Home	Katrina	N	1,466,506	964,672
Total			**18,595,101**	**24,176,138**

Table 14. Actual vs Modeled Losses by Construction Type for Six Storms and Two Companies (Commercial Residential)

Construction	Event	Company	Actual Loss ($)	Modeled Loss ($)
Masonry	Charley	N	14,725,592	18,094,173
Masonry	Frances	N	31,950,677	14,891,538
Masonry	Ivan	N	9,921,781	2,305,172
Masonry	Jeanne	N	5,139,136	10,883,118
Masonry	Wilma	M	11,356,070	30,384,588
Masonry	Wilma	N	57,537,128	49,097,675
Masonry	Katrina	N	4,252,495	7,663,372
Total			**134,882,878**	**133,319,636**
Concrete	Charley	N	2,026,714	1,235,654
Concrete	Frances	N	18,957,693	5,633,999
Concrete	Ivan	N	2,819,463	4,651,561
Concrete	Jeanne	N	1,170,862	4,047,738
Concrete	Wilma	M	2,221,720	2,224,235
Concrete	Wilma	N	60,983,157	35,343,541
Concrete	Katrina	N	2,810,102	3,484,252
Total			**90,989,711**	**56,620,979**

Table 15. Actual vs Modeled Losses by County for One Company—Hurricane Bonnie

	Actual			Modeled		
County	**Exposure**	**Loss**	**Loss/Exposure**	**Exposure**	**Loss**	**Loss/Exposure**
Brunswick	185,761,296	902,555	0.004859	185,761,296	1,394,449	0.007507
Duplin	9,712,367	10,593	0.001091	9,712,367	61,297	0.006311
Lenoir	60,723,614	5,396	0.000089	60,723,614	313,879	0.005169
Onslow	673,111,082	881,104	0.001309	673,111,082	4,536,356	0.006739
Pender	34,660,493	88,708	0.002559	34,660,493	377,985	0.010905
Total	**963,968,852**	**1,888,356**	**0.001959**	**963,968,852**	**6,683,965**	**0.006934**

2. *Provide a completed Form S-4, Validation Comparisons. Provide a link to the location of the form here.*

A completed Form S-4 is provided in Appendix 3 on page 248.

S-6 Comparison of Projected Hurricane Loss Costs

Relevant Forms: G-3, Statistical Standards Expert Certification
S-5, Average Annual Zero Deductible Statewide Loss Costs – Historical versus Modeled

The difference, due to uncertainty, between historical and modeled annual average statewide loss costs shall be reasonable, given the body of data, by established statistical expectations and norms.

The average annual historical statewide personal and commercial residential loss costs, produced using the 2007 FHCF exposure data and the historical storm set covering the period 1900-2012, is $3.734 billion (and $3.536 billion using the 2012 FHCF exposure data). The average annual statewide personal and commercial residential loss costs, produced by the model using a 50,000-year simulation, is $4.580 billion (and $4.337 billion using the 2012 FHCF exposure data). The difference between these two sets of numbers is statistically reasonable.

Disclosures

1. *Describe the nature and results of the tests performed to validate the expected loss projections generated. If a set of simulated hurricanes or simulation trials was used to determine these loss projections, specify the convergence tests that were used and the results. Specify the number of hurricanes or trials that were used.*

Confidence intervals constructed for the difference between the historical and simulated average annual loss costs show that the difference between the two sets of loss costs is statistically reasonable. The validation of projected loss costs also includes comparisons of actual and simulated losses for several historical events that have occurred during the past decade. The use of the AIR model for real-time loss estimation, in particular, has shown that the model provides accurate loss projections once the landfall location, storm tracks and storm parameters are available with a reasonable degree of certainty. Claims information from data contributing insurers have also been used to validate the simulated loss costs as shown in Standard S-5 above.

As described elsewhere in this document, AIR has carefully validated all model components including meteorological input variables such as annual frequency, landfall location and storm intensity. Loss cost maps have been inspected for smoothness and consistency and found to reasonably reflect differences in landfall rates and storm characteristics for different parts of Florida.

For the purpose of ratemaking in Florida, AIR uses a stochastic catalog based on 50,000 simulation years. Sample size calculations, convergence charts, and numerical comparisons of loss costs for increasing number of iterations have been used to establish convergence.

2. *Identify and justify differences, if any, in how the model produces loss costs for specific historical events versus loss costs for events in the stochastic hurricane set.*

The methodology for producing loss costs for historical events is the same as that used for generating loss costs for events in the stochastic catalog.

3. *Provide a completed Form S-5, Average Annual Zero Deductible Statewide Loss Costs – Historical versus Modeled. Provide a link to the location of the form here.*

A completed Form S-5 is provided on page 257.

Florida Commission on Hurricane Loss Projection Methodology

2013 Vulnerability Standards

V-1 Derivation of Building Vulnerability Functions

(Significant Revision)

Relevant Forms: G-4, Vulnerability Standards Expert Certification
V-1, One Hypothetical Event
A-6, Logical Relationship to Risk (Trade Secret item)

A. Development of the building vulnerability functions shall be based on at least one of the following: (1) historical data, (2) tests, (3) rational structural analysis, and (4) site inspections. Any development of the building vulnerability functions based on rational structural analysis, site inspections, and tests shall be supported by historical data.

The original AIR U.S. hurricane model vulnerability functions, developed in 1985, were primarily based on structural engineering research publications, damage surveys conducted by wind engineering experts, and analyses of available loss data. Over time the original damage functions have been fine-tuned based on component level structural analysis developed by wind engineering experts, the results of post-disaster field surveys from major events both in the U.S. and abroad, recently published research studies, computational simulations, and analysis, and detailed analyses of additional detailed loss data from clients.

B. The method of derivation of the building vulnerability functions and their associated uncertainties shall be theoretically sound and consistent with fundamental engineering principles.

The AIR vulnerability functions have been developed by experts in both wind and structural engineering and based on published engineering research. The functions have been validated based on results of damage surveys and on actual claims data provided by client companies. The methods have been peer reviewed internally and by external experts and is theoretically sound. The vulnerability functions include probability distributions around the mean damage ratios to capture the uncertainty in damage at a given level of wind speed. These probability distributions have also been developed based on published research, as well as findings from damage surveys and actual insurance loss data.

C. Residential building stock classification shall be representative of Florida construction for personal and commercial residential properties.

The residential building stock classification set is derived from census, tax assessor data, engineering surveys, construction reports, and other similar data sources. Building stock classifications are then chosen to be representative of these datasets, and vulnerability functions are developed accordingly. The occupancy and construction classifications in the AIR model are representative of the building stock in Florida.

D. Building height/number of stories, primary construction material, year of construction, location, building code, and other construction characteristics, as applicable, shall be used in the derivation and application of building vulnerability functions.

The AIR U.S. Hurricane Model uses vulnerability functions for approximately 32 different residential construction types enumerated in Disclosure V.1.2. These construction types are dependent upon the primary construction materials of the structural framing and walls, or characteristics of each structure. The model also includes AIR's Individual Risk Model (Appendix 9) that accounts for a wide range of construction characteristics. For residential, single family homes, the vulnerability functions do not vary by height/stories. The building vulnerability functions do vary by height/stories for commercial residential type structures. The model considers three height categories as discussed under Disclosure V.1.7.

The AIR vulnerability model includes temporal and regional adjustments that account for changes in building codes and their enforcement, changes in building construction practices and other factors affecting the regional vulnerability over time. The model differentiates between different building design regions in Florida, based on building codes and other design guidelines, and the model's vulnerability functions are modified accordingly. It is assumed, for example, that buildings in the southern, coastal part of the state are characterized by higher degree of wind resistivity than those in more northern and central regions. The model also differentiates buildings built in different time periods throughout Florida. Engineering judgment and published research data went into the initial development of the vulnerability adjustments, and subsequent refinement of these factors has been based upon exposure and loss data provided by clients.

The resulting vulnerability functions reflect the evolution of building codes and the higher level of engineering attention in newer construction relative to older construction. They have been validated by comparing actual losses with simulated losses for different areas and time periods in Florida and have been found to be reasonable and theoretically sound. Claims data from recent hurricanes in Florida indicate that buildings built prior to 1995 are significantly more vulnerable than buildings built after 1995. The AIR model includes year-built categories: pre-1995, 1995-2001, 2002-2008 and Post-2008. Between 1995 to 2001 and 2002 to 2008, there is a continuous change in the year-built adjustment to account for structural aging and similar factors. For each year-built category, the Individual Risk Model (Appendix 9) has been used to estimate these modifiers.

Separate vulnerability functions have been developed for buildings built to the minimum requirements of Florida Building Code (beginning with FBC 2001). Six unique building categories (described in Appendix 9) were identified in the entire state of Florida by taking into consideration the design wind speed, the terrain exposure category, and the requirements of Wind-borne Debris Region and High-Velocity Hurricane Zone, as specified in the 2001 Florida Building Code. The vulnerability functions for these six unique building categories were derived using the building features and mitigation measures from the AIR individual risk module that meet the minimum requirements of the 2001 Florida Building Code.

E. Vulnerability functions shall be separately derived for commercial residential building structures, personal residential building structures, mobile homes, and appurtenant structures.

AIR engineers have developed separate vulnerability functions for the primary structure, for both residential and commercial occupancies, as well as for mobile homes, and appurtenant structures.

F. The minimum windspeed that generates damage shall be consistent with fundamental engineering principles.

The model begins calculating losses when the modeled wind speeds achieve a one-minute sustained value of 40 mph. This minimum wind speed assumption is reasonable based on findings from engineering research, damage surveys and actual claims data from historical events.

G. ***Building vulnerability functions shall include damage as attributable to windspeed and wind pressure, water infiltration, and missile impact associated with hurricanes. Building vulnerability functions shall not include explicit damage to the building due to flood, storm surge, or wave action.***

The wind vulnerability functions in the AIR hurricane model do not include any explicit damage of flood, storm surge and wave actions. Wind vulnerability functions in the AIR model have been validated with wind damage data and insurance claims data; they explicitly account for wind speed (which produces wind pressure) as well as implicitly account for damage resulting from water infiltration and missile impact, to the extent that it is reflected in the insurance company loss data.

Disclosures

1. *Describe any modifications to the building vulnerability component in the model since the previously accepted model.*

The building vulnerability component, comprising both the wind and the storm surge vulnerability models, of the U.S. Hurricane Model has been updated since the release of the previously accepted model. The changes since the previously accepted model include:

a) The wind vulnerability model for mobile homes has been enhanced to capture regional vulnerability impacts and variations in vulnerability based on the year of construction, in relation to the use of Housing and Urban Development (HUD) codes. Existing and newly available detailed claims data were used to update the vulnerability functions.
b) Adjustments to the structural wind vulnerability based upon the size (i.e. square footage) of a residential structure have been incorporated, developed through computational simulations and validation against company loss data.
c) The surge vulnerability model, which is independent of the wind vulnerability model, has been updated and enhanced in conjunction with development of the new storm surge hazard modeling. This vulnerability model was developed at a component level, covering the occupancy and construction classes already in use by the wind vulnerability model and the current storm surge vulnerability model. Additionally, secondary characteristics (e.g. foundation type, basement condition, etc.) have been developed for use by the storm surge vulnerability model to refine the loss estimates.
d) The “No attached wall structures” option within the secondary characteristic group encompassing “Wall Attached Structures”, as detailed in Appendix 9, has been adjusted to maintain consistency between the other options within this grouping.
e) Vulnerability adjustments that account for structural aging and building technology changes have been updated to be relevant through 2014. Accordingly, adjustments to the modeled year built categories for Florida have been incorporated. The year built categories have been updated to: pre-1995, 1995-2001, 2002-2008 and Post-2008.
f) The pre-computed factors which adjust the base wind structural vulnerability accordingly when the user provides no year built information, as opposed to a known year built, have been updated to be relevant through 2014. This includes adjusting the underlying year built weighting assumptions to utilize the latest census and tax assessor data regarding building stock age.

These modifications to the wind and surge vulnerability components of the AIR U.S. Hurricane Model have been based on engineering research, computational simulations, damage reports, peer review, and historical loss and insurance claims data provided by insurance companies.

2. *Provide a flow chart documenting the process by which the building vulnerability functions are derived and implemented.*

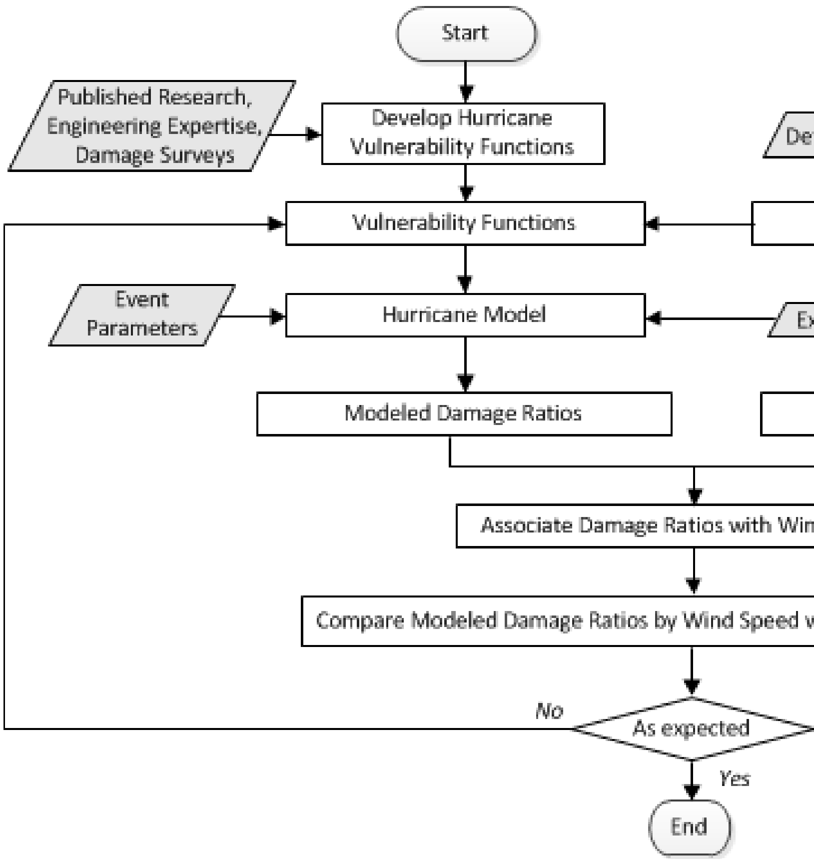


Figure 29. Derivation and Implementation of AIR Vulnerability Functions

3. *Describe the nature and extent of actual insurance claims data used to develop the model's building vulnerability functions. Describe in detail what is included, such as, number of policies, number of insurers, date of loss, and number of units of dollar exposure, separated into personal residential, commercial residential, and mobile home.*

Insurance claims and loss data used to develop the model's vulnerability functions comes from multiple sources and client companies. Not all companies or sources provide the same level of detail. Loss data for actual events normally consists of claim counts, paid losses, ZIP Code or location level information, and line of business. Loss data also is frequently provided by date of loss, policy form, coverage, and may contain construction and/or occupancy details and/or secondary characteristics. AIR has been provided with detailed data by several client companies covering in excess of $2.5 trillion of personal, $6 billion of mobile homes, and $75 billion of commercial residential exposure.

AIR was first provided actual claims data in 1986 when developing the model for the E.W. Blanch Company. Three primary companies submitted detailed loss data for hurricanes Alicia (1983), Diana (1984), Bob (1985), Danny (1985), Elena (1985), Gloria (1985), Juan (1985) and Kate (1985). The loss data included details by county or state, by line of business, claim counts, paid and incurred losses. Detailed exposure data was also available for each company, which included number of risks, amount of insurance and deductibles by five-digit ZIP Code.

In 1989, at the request of a client, AIR performed a "blind" validation test for hurricanes Frederic (1979), Allen (1980), Alicia (1983), Diana (1984), Danny (1985), Elena (1985), Gloria (1985), Juan (1985) and Kate (1985) based on detailed exposure data (also number of risks, amount of insurance and deductibles by five digit ZIP Code). Aggregate losses for each hurricane were provided to AIR after the test. The AIR test results were judged by the client to be "quite good."

Since 1992, many of our primary company clients, from whom we have detailed exposure data, have also provided detailed loss data for hurricanes Andrew, Opal, Erin, Bertha, and Fran for validation purposes. Data sets from several permutations of client company/storm losses have been analyzed. Loss data received from these companies is at the ZIP Code level and often by construction class and coverage.

Additional data has been provided by our clients for 1998 hurricanes Bonnie, Earl and Georges a well as Tropical Storm Frances. Data sets from several permutations of client company/storm losses have been analyzed. Loss data received from these companies is at the ZIP Code or policy level.

AIR has also received claims data from several client companies for the significant 2004 and 2005 Florida storms: hurricanes Charley, Frances, Ivan, Jeanne, Dennis, Katrina, Rita, and Wilma. More recent data has also been obtained for events since 2008 which have occurred elsewhere in the U.S.: hurricanes Ike, Irene, Isaac, and Sandy.

In summary, the AIR simulation model vulnerability functions are based on loss data spanning many companies and hurricanes affecting different geographical areas, not Florida exclusively. New data is analyzed as it becomes available, and any results or findings relevant to the model functionality are incorporated into the appropriate version once all validation of the data is complete. Examples of the comparison between actual loss data and the AIR vulnerability model are shown in Figure 30 through Figure 35.

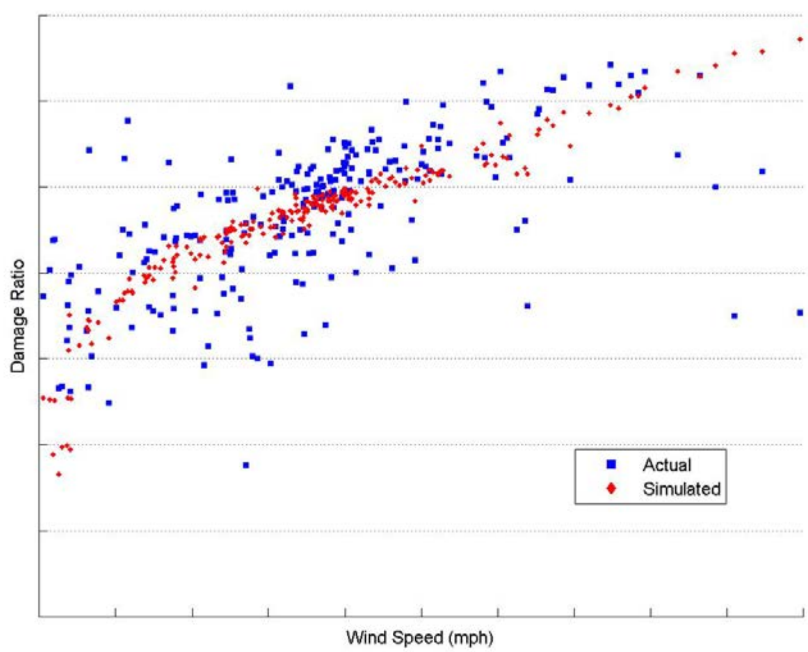


Figure 30. Actual and Simulated Damage Ratios vs Wind Speed: Coverage A—Single Company, Single Storm

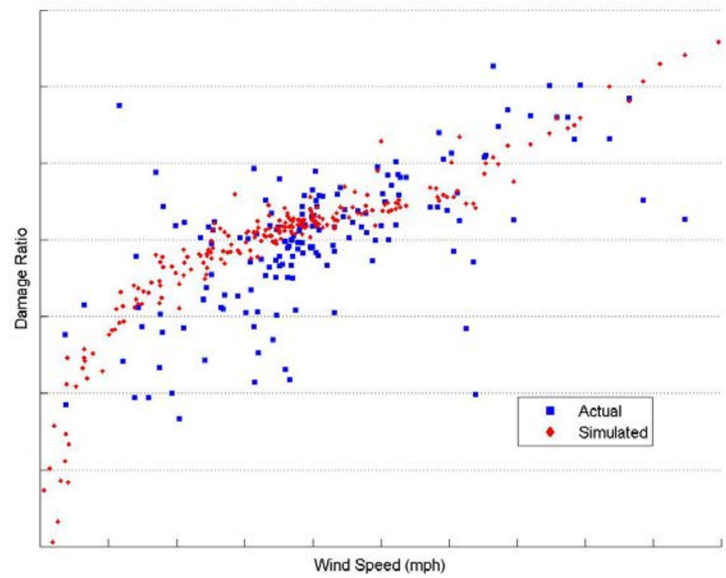


Figure 31. Actual and Simulated Damage Ratios vs Wind Speed: Coverage C—Single Company, Single Storm

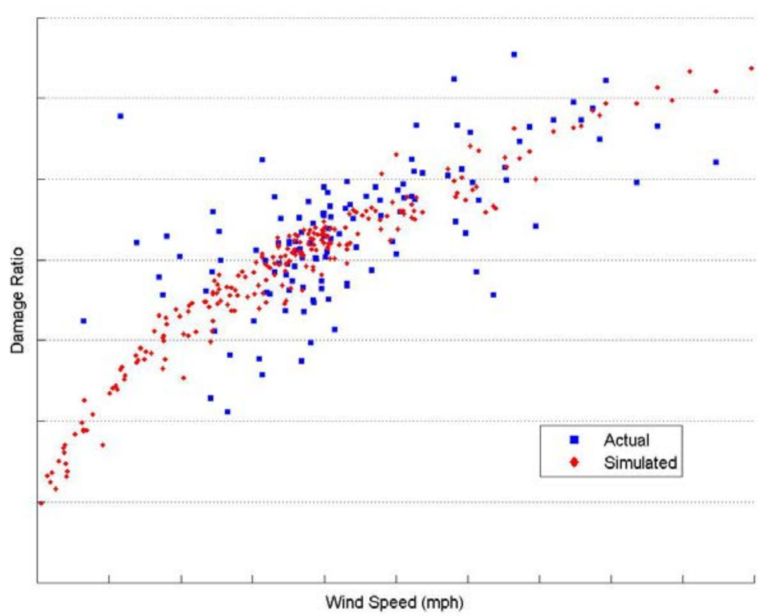


Figure 32. Actual and Simulated Damage Ratios vs Wind Speed: Coverage D—Single Company, Single Storm

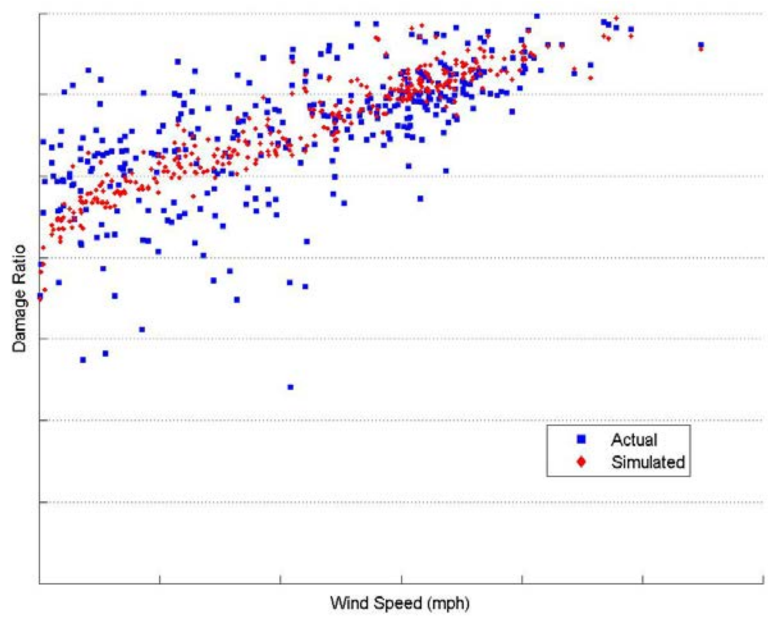


Figure 33. Actual and Simulated Damage Ratios vs Wind Speed: Mobile Homes—Single Company, Single Storm

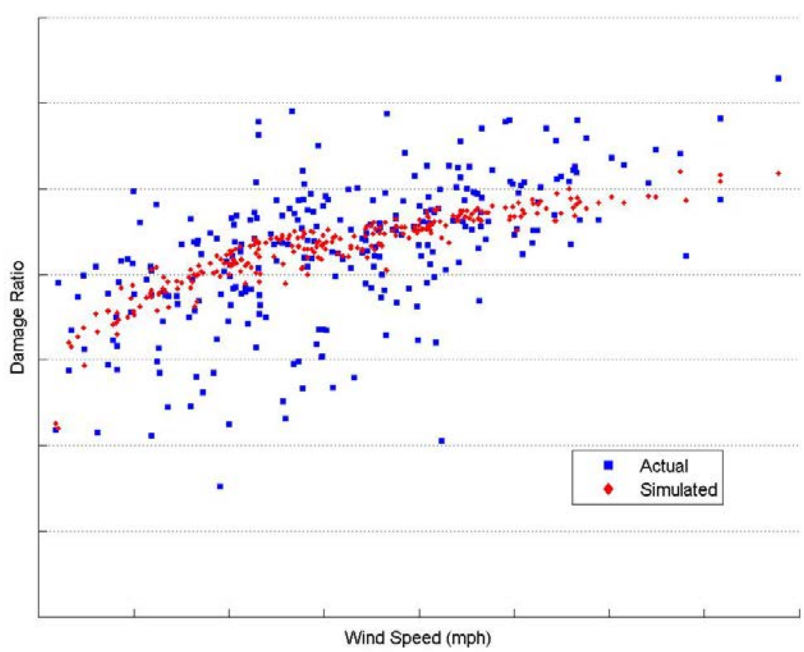


Figure 34. Actual and Simulated Damage Ratios vs Wind Speed: Frame—Single Company, Single Storm

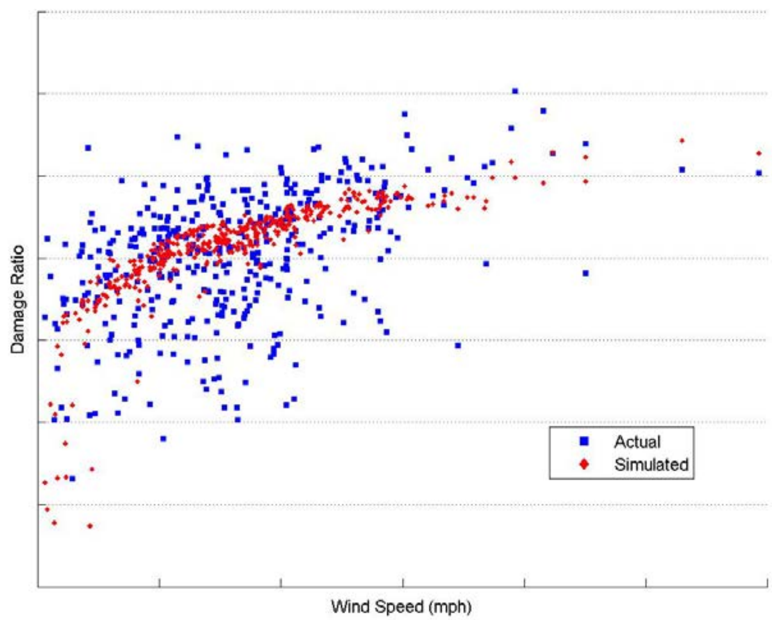


Figure 35. Actual and Simulated Damage Ratios vs Wind Speed: Masonry—Single Company, Single Storm

4. *Describe the data, methods, and processes used for the development of the building vulnerability functions.*

The vulnerability functions developed by AIR have been constructed through comprehensive engineering analysis, which includes data derived from post-event damage surveys, expert consultations, and analysis of claims and industry loss data. The engineering analysis relies on fundamental structural engineering principles, the diverse academic and industry background of AIR's engineering team, past and current construction methodologies (including the use of building codes and regulations), and continued assessment of the available engineering and scientific literature (e.g., Journal of Wind Engineering and Industrial Aerodynamics, Journal of Structural Engineering, etc.).

The vulnerability functions have also been peer reviewed externally by leading experts in structural engineering to acquire an unbiased opinion and point of view. Additionally, when claims or loss data is available, the functions are again assessed to ensure a reasonable outcome. The figure in Disclosure V-1.2 (Figure 29) shows how the development of the vulnerability model through these components interacts.

5. *Summarize site inspections, including the source, and provide a brief description of the resulting use of these data in development, validation, or verification of building vulnerability functions.*

AIR engineers and scientists have surveyed all significant loss causing events since Hugo in 1989, including the notable events such as Andrew, Fran, Georges, Floyd, Charley, Frances, Ivan, Jeanne, Dennis, Katrina, Rita, Wilma, Gustav, Ike, Irene, and, most recently, Sandy in 2012. Additionally, AIR engineers and scientists have surveyed damage in the aftermath of major storms outside of the mainland U.S., including Hurricane Floyd in the Bahamas, Hurricane Fabian in Bermuda, Tropical Cyclone Yasi in Australia, Hurricane Irene in the Caribbean, Tropical Storm Iselle in Hawaii, and Hurricane Gonzalo in Bermuda. These surveys improve our understanding of the response of structures to winds, including damage mechanisms. Such damage investigations provide, for example, information on the relative vulnerability of various construction types and building components used in the development and validation of the vulnerability relationships.

Based on AIR's damage investigations, buildings can generally be classified as "engineered" or "non-engineered" structures. Most residential dwellings are generally classified as non-engineered. A typical example is a wood frame single-family dwelling, a construction that may not have received much attention from a structural engineer. Most commercial structures, often built in accordance with building codes and under the supervision of a structural engineer, are classified as engineered structures. A typical example of an engineered structure is a high-rise reinforced concrete building.

In general, an engineered building is more wind resistant than a non-engineered building. The 2004 and 2005 post-disaster surveys, conducted by AIR engineers and scientists indicate that low-rise commercial and residential-commercial wood frame and masonry buildings—that do not get as much engineering attention as the high-rise buildings—have similar vulnerability as their residential counterparts. Recent damage surveys have also indicated that the year-built of a residential dwelling provides important information in determining its vulnerability. Newly-built buildings were observed to perform better than their older counterpart buildings.

Wind damage primarily affects non-structural elements, such as windows, cladding or other components of the building envelope. Field surveys indicate that the initial point of failure wood-framed homes often occurs at the roof, likely due to the improper fastening of the roof covering, sheathing, support structure and building frame. Other roof system failures could be attributed to the lifting and peeling of metal edge flashings, and from here additional damage will propagate. Uplift of the roof edges allows the wind to penetrate underneath the roof membrane, resulting in a pressure rise beneath the membrane and removal of the roof covering. At high wind speeds, the integrity of the entire structure can be compromised, particularly in cases where the roof provides lateral stability by supporting the tops of the building's walls.

Thus, three damage regimes can be identified for residential buildings: a) the low damage regime corresponding to wind speeds of less than about 90 mph, where damage is limited to roof covering and cladding, b) the medium damage regime where damage propagates to roof sheathing, connections and openings and c) the catastrophic damage regime corresponding to wind speeds in excess of 130 mph, where the roof framing is severely damaged, resulting in lateral instability of walls causing further collapse and complete destruction of the building. In the case of engineered buildings, damage typically occurs to non-structural components like mechanical equipment, roofing, cladding and windows; complete structural collapse is extremely rare.

In certain parts of the United States, masonry building systems are the prevalent construction method for residential and commercial residential construction. When masonry is used as the exterior wall material, the walls are normally constructed to full height and then wood floors and the roof are framed into the masonry. Damage investigations have confirmed that such construction results in continuous exterior walls and thus a stronger structural frame, resulting in exterior walls that are more resistant to winds and windborne debris impacts as compared to wood frame buildings.

While exploring the damage caused by Hurricane Georges (1998) and Tropical Storm Frances (1998), AIR engineers validated the effects of wind duration on damage estimation, a fundamental component of the AIR vulnerability model. Damage resulting from a slower moving (longer duration) storm can be higher because of the cumulative effects of wind.

Information obtained from post-disaster damage investigations, has been incorporated in the development and validation of the vulnerability model.

6. *Describe the research used in the development of the model's building vulnerability functions.*

The AIR U.S. Hurricane Vulnerability Model is based on AIR's wind engineering expertise, details obtained through engineering research publications, computational simulations and analysis performed by AIR, damage surveys conducted by AIR's wind engineering experts and collaborators, and analysis of loss data to develop vulnerability functions (see process diagram in Disclosure V-1.2, Figure 29). AIR engineers have surveyed many significant loss causing events since 1989. AIR has also received detailed claims and loss data from client companies, as well as from ISO and other insurance focused organizations. Damage survey findings and analysis of loss data have been used to fine-tune vulnerability functions over time.

7. *Describe the categories of the different building vulnerability functions. Specifically, include descriptions of the building types and characteristics, building height, number of stories, regions within the state of Florida, year of construction, and occupancy types in which a unique building vulnerability function is used. Provide the total number of building vulnerability functions available for use in the model for personal and commercial residential classifications.*

The AIR building vulnerability functions are categorized by construction, occupancy, and height. Secondary risk characteristics are implemented as a modification to the underlying vulnerability functions and described in Appendix 9, and can be implemented through both direct user input and/or through input of exposure location and year of construction information.

The AIR model has many unique vulnerability functions depending on the building construction type, height, occupancy type, year-built, gross area as well as secondary features .Generalizations of these construction types, which are representative of our vulnerability classifications, are given in Table 16, and the modeled height categories are provided in Table 17. The AIR model includes year-built categories: pre-1995, 1995-2001, 2002-2008, and Post-2008. Between 1995 to 2001, and 2002 to 2008, there is a year-by-year change in the year-built adjustment to account for structural aging, a general behavior in the vulnerability as observed in actual loss data. Table 18 lists all the mitigation measures in the AIR model.

Table 16. Residential Construction Types in the AIR Model

Residential and Apartment or Condominium Buildings	
Construction Type	**General Description**
Wood Frame	Wood frame structures tend to be mostly low rise (one to three stories, occasionally four stories). Stud walls are typically constructed of 2 inch by 4 or 6 inch wood members vertically set 16 or 24 inches apart. These walls are braced by plywood or by diagonals made of wood or steel. Many detached single and low-rise multiple family residences in the United States are of stud wall wood frame construction.
Masonry Veneer	Wood frame structures with one width of non-load bearing concrete, stone or clay brick attached to the stud wall.
Unreinforced Masonry	Unreinforced masonry buildings consist of structures in which there is no steel reinforcing within a load bearing masonry wall, floors, roofs, and internal partitions in these bearing wall buildings are usually of wood.
Reinforced Masonry	Reinforced masonry construction consists of load bearing walls of reinforced brick or concrete-block masonry. Floor and roof joists constructed with wood framing are common.
Reinforced Concrete	Reinforced concrete buildings consist of reinforced concrete columns and beams.
Steel	Steel frame buildings consist of steel columns and beams.
Light Metal	Light Metal buildings are made of light gauge steel frame and are usually clad with lightweight metal or asbestos siding and roof, often corrugated. They typically are lowrise structures.
Unknown	Represents a weighted average of all of the above construction types except the mobile homes

Mobile Homes	
Construction Type	**General Description**
Mobile home with no tie-downs	This code would be used for mobile homes (manufactured homes) with no anchoring systems present.
Mobile home with partial tie-downs	This code would be used for mobile homes (manufactured homes) when the tie downs are either over-the-top ties, or frame ties but not both or with fewer ties than recommended by the manufacturer.
Mobile home with full tie-downs	This code would be used for mobile homes (manufactured homes) when the anchoring systems are both over-the-top ties, and frame ties. Typically 10 frame ties and 7 over the top ties are required for full tie down in singlewide mobile homes.
Mobile Homes	Represents a weighted average of tie-down types, including no tie-downs. This code would be used for mobile homes (manufactured homes) when the tie down information is unknown.

These construction types are typically provided by primary insurer client companies.

Table 17. Height Bands for Different Construction Types in the AIR Model

Occupancy	Construction	Height Categories (# of Stories)
Residential Buildings (Single Family Homes)	All	Any height
Apartment or Condominium Buildings	Wood Frame	1, >1
	Masonry veneer	1, >1
	Unreinforced Masonry	1, 2-3, >3
	Reinforced Masonry	1, 2-3, >3
	Reinforced Concrete	1-3, 4-7, >7
	Steel	1-3, 4-7, >7
	Light Metal	All height
	Unknown	1-3, 4-7, >7

Apartments and condominiums usually receive a similar degree of engineering attention as that of general commercial construction. From a structural viewpoint, therefore, commercial construction and apartments/condominiums are quite similar. Nevertheless, apartments and condominiums have some building components that make them more susceptible to windstorms than other commercial construction. For example, the more vulnerable components found in apartments and condominiums include balconies, awnings, and double sliding glass doors etc. These components often have little engineering attention at the design and construction stages and hence can lead to apartments/condominiums being more vulnerable than commercial construction in general.

For residential structures, vulnerability functions do not vary by height (See Table 17). However, AIR engineers have developed separate vulnerability functions for several height ranges for apartment/condominium structures. Vulnerability functions, through the use of the Individual Risk Model (see Appendix 9), also vary by year-built of construction for both residential and commercial structures to account for changes in the building codes and construction practices, structural aging and other factors. The AIR model includes year-built categories: pre-1995, 1995-2001, 2002-2008, and Post-2008. Between 1995 to

2001, and 2002 to 2008, there is a year-by-year change in the year-built adjustment to account for structural aging, a general behavior in the vulnerability as observed in actual loss data.

Regional variation in vulnerability across Florida and the United States, similar to the year of construction adjustment, is captured through the use of AIR's secondary risk characteristics. Regions are generally delineated through the synthesis of building codes, both through the design wind speed/load maps provided and through explicit identification of vulnerable areas, such as wind-borne debris regions or the High-Velocity Hurricane Zone (HVHZ) outlined in the Florida building codes. The model combines this information with the location details provided by client companies to develop the appropriate vulnerability for the structure.

8. *Describe the process by which local construction practices and building code adoption and enforcement are considered in the model.*

The U.S. Hurricane Model considers the regional variation in building code as explained in V-1 D and Disclosure V.1.7. Depending upon the design wind speed maps, terrain exposure categories, and requirements for Wind-borne Debris Region (WBDR) and the High-Velocity Hurricane Zone (HVHZ), the vulnerability within the State of Florida will vary across multiple regions. Further, variation in local construction practices, building code adoption and enforcement can be captured within the loss estimation model through the use of AIR's secondary risk characteristics (see Appendix 9), in which the users can input detailed building features as appropriate.

9. *Describe the development of the vulnerability functions for appurtenant structures.*

The vulnerability functions for appurtenant structures were developed through analysis of claims data, published research on vulnerability characteristics and through damage surveys when possible. The process for developing vulnerability functions for this coverage type is the same as that presented in Disclosure V1-2.

10. *Describe the relationship between building structure and appurtenant structure vulnerability functions.*

The building structure and appurtenant structure vulnerability functions are independent, and damage is calculated separately. This means that the damage to appurtenant structures is calculated directly from the impacting hazard, but in a manner consistent with that of the primary building damage calculation. If the structural characteristics of the appurtenant structure are known, the model allows for the flexibility to calculate the damage separately from the primary structure based on its own individual characteristics.

11. *Describe the assumptions, data, methods, and processes used to develop building vulnerability functions for unknown residential construction types.*

The vulnerability functions used for a residential exposure where the construction is unknown are obtained through a weighted averaging of the known vulnerability curves of the individual residential construction classes within a particular state/region. For example, typical construction types/classes that may be used for residential single-family dwellings are wood frame and masonry. In most cases these are the typical construction types/classes used to classify residential structures as identified in the data provided by our client companies or through census/taxassessor data. The composite vulnerability curve, used when the construction type is listed as unknown, is based on a building-inventory weighted average of the different construction classes within the area considered (i.e. state, region, etc.).

The AIR model supports regional variation in vulnerability when the construction risk characteristic is unknown. The regional variation is based upon AIR's knowledge of building code procedures and practices in place, adjusting the vulnerability curves accordingly. Thus, an unknown vulnerability function exists for each occupancy class and within a region, based on the distribution and vulnerability of known structures from industry sources (see response to V.1.C in this section).

It should be noted that the unknown construction vulnerability for residential occupancy does not apply weight from the mobile home type. In most cases, the client is able to supply mobile home exposures separately. Since the vulnerability of mobile homes is much greater than that of other construction types, it would not be appropriate to use this construction class in the composite function for residential "unknown." Please refer to Appendix 9 for a full discussion of the secondary characteristic methodology which accounts for regional variations in construction.

12. *Describe the assumptions, data, methods, and processes used to develop building vulnerability functions when some primary characteristics are unknown.*

In the AIR model, primary characteristics are considered to be the following: construction, occupancy, height, and year built. Disclosure V-1.11 discusses how the AIR model generates a vulnerability function for unknown construction classes. When the occupancy provided by the user is unknown, the model will use a vulnerability function that was developed as a weighted average of known occupancy and construction types based upon AIR's understanding of the industry exposure. The process for developing an unknown occupancy vulnerability function is the same as that performed for developing the unknown construction vulnerability function.

The process is similar when the year built is unknown or not provided. In this case, vulnerability functions for each year are pre-calculated. These pre-calculated vulnerability functions are a result of utilizing the secondary risk characteristics presented in Appendix 9. The individual known year vulnerability functions are then combined to create a vulnerability function for unknown year of construction, and that combination is a weighted average of the known distribution of housing stock age based on AIR's industrial exposure (incorporating census and tax assessor data).

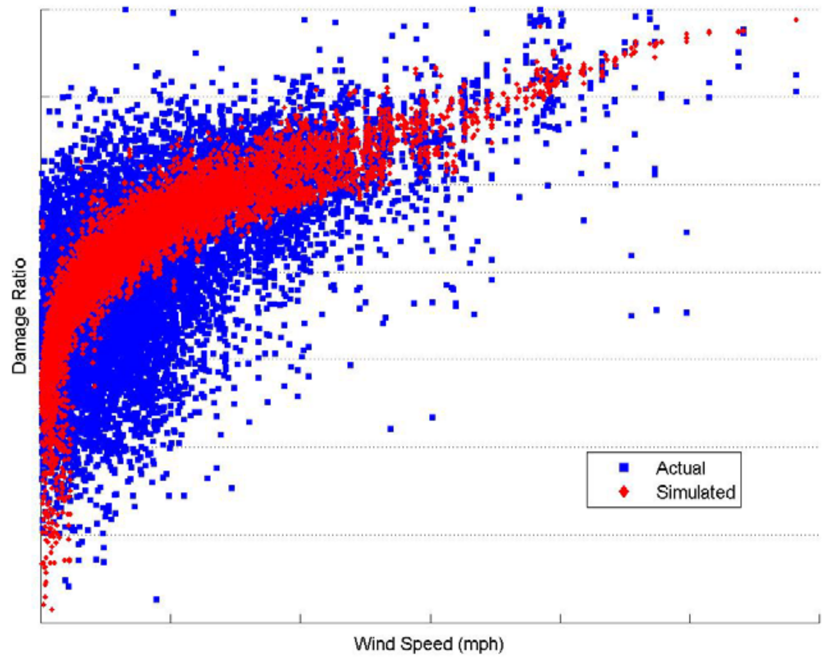
13. *Describe the assumptions, data, methods, and processes used to develop building vulnerability functions for various construction types for renters and condo-unit owners.*

The assumptions, data, methods, and processes used to develop vulnerability functions for various construction types related to renters and condo-unit exposures are the same as those used to develop vulnerability functions for single family residential exposures described in Disclosure V-1.6, and follows the process in Disclosure V-1.2.

14. *Describe any assumptions, data, methods, and processes used to develop and validate building vulnerability functions concerning insurance company claims.*

AIR validates the model's vulnerability functions at many levels, from an aggregate industry level loss perspective down to claims at individual policies or locations. When the client provides exposure information, AIR will supply the provided information to the model, including policy characteristics and terms. The subsequent claims data corresponding to the exposure may or may not include loss information which contains the application of policy characteristics and terms. AIR will compare the claims data, based on the knowledge of whether the values provided include policy conditions, with modeled output that contains both loss information before the application of policy conditions (ground-up) and after the application of policy terms (gross). This process is extended for all coverages where data is provided.

To demonstrate the model performance and validation, Figure 36 shows actual versus simulated damage ratios for structures and appurtenant structures, based on data made available to AIR from various companies across many historical storms at a ZIP Code level. The actual damage ratios reflect actual loss data from the available claims data provided for multiple storms. The variability in the modeled mean damage ratio reflects the impact of the duration of damaging wind speeds throughout the storm at the corresponding locations.



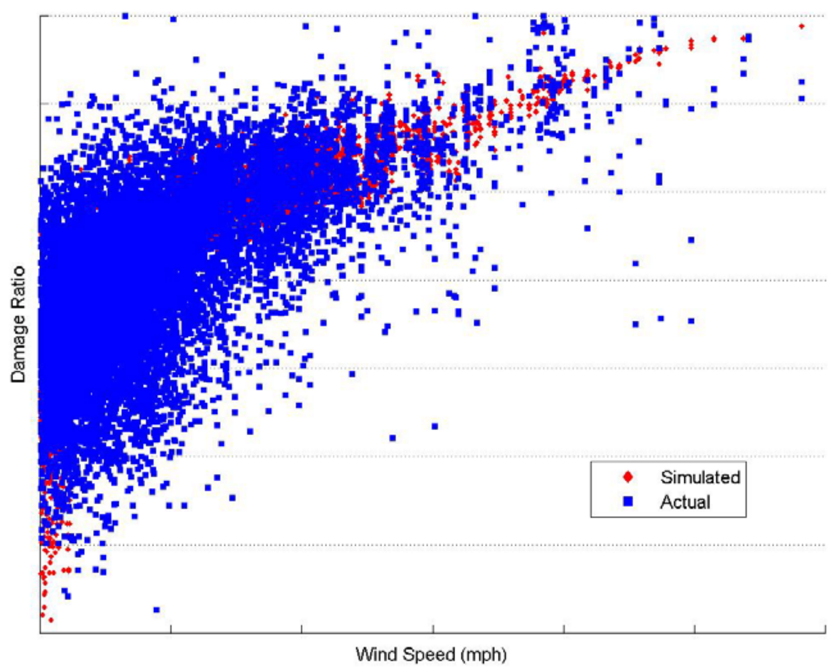
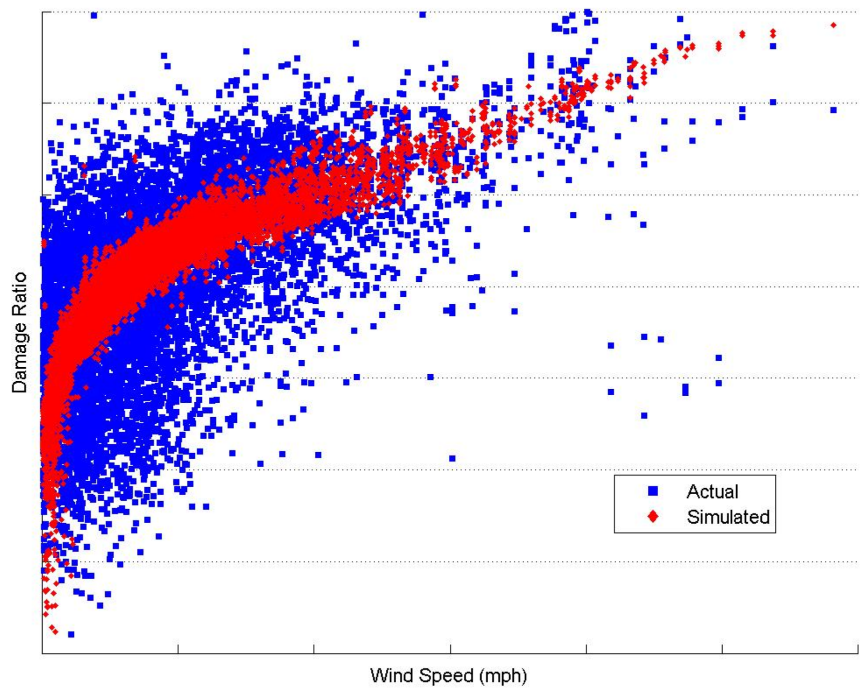


Figure 36. Actual and Modeled Damage Ratios vs Wind Speed, Structures & Appurtenant Structures

15. *Demonstrate that building vulnerability function relationships (building structures and appurtenant structures) are consistent with insurance claims data.*

Figure 37 demonstrates the comparison of insurance claims data with simulated damage ratios for single-family, residential frame homes (both building and appurtenant structures) for several different companies and historic events. Figure 38 demonstrates the same comparison for masonry type homes (both building and appurtenant structures).

Figure 39 demonstrates the same comparison as the previous figures for mobile homes (both building and appurtenant structures). The results demonstrate consistency between the model and insurance claims at various levels, including the results presented in Disclosure V-1.14.



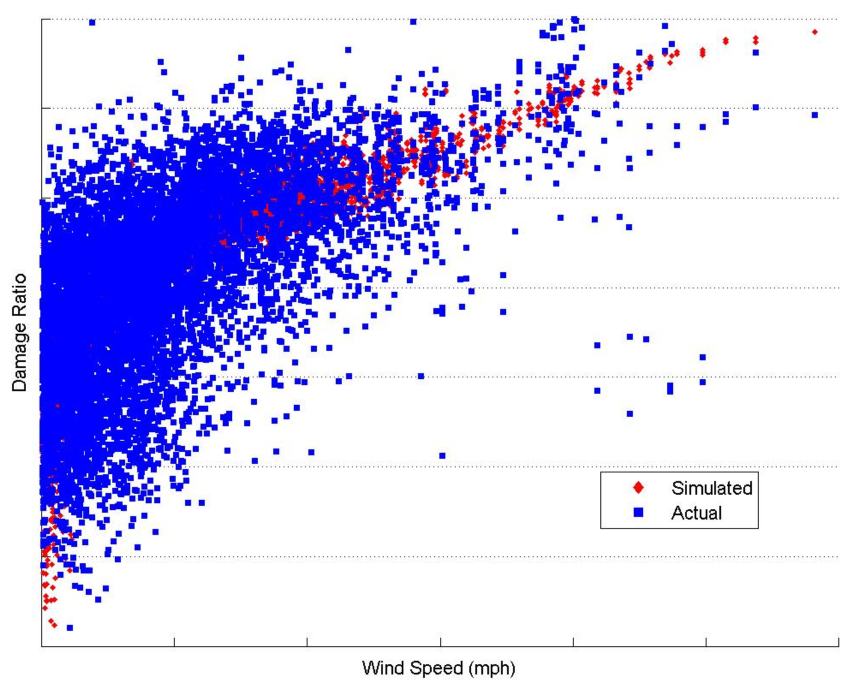
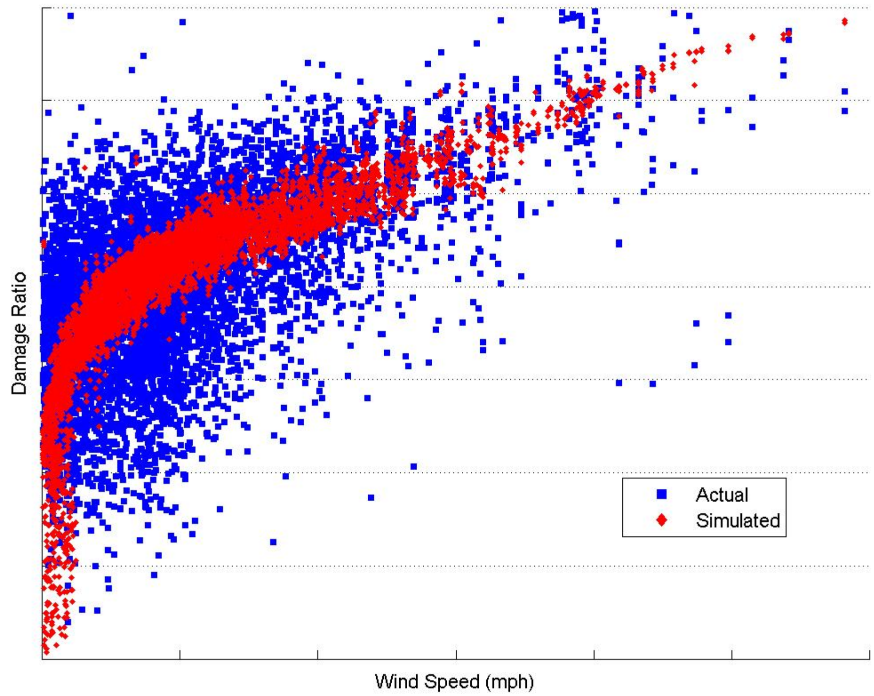


Figure 37. Actual and Modeled Damage Ratios vs Wind Speed, Frame



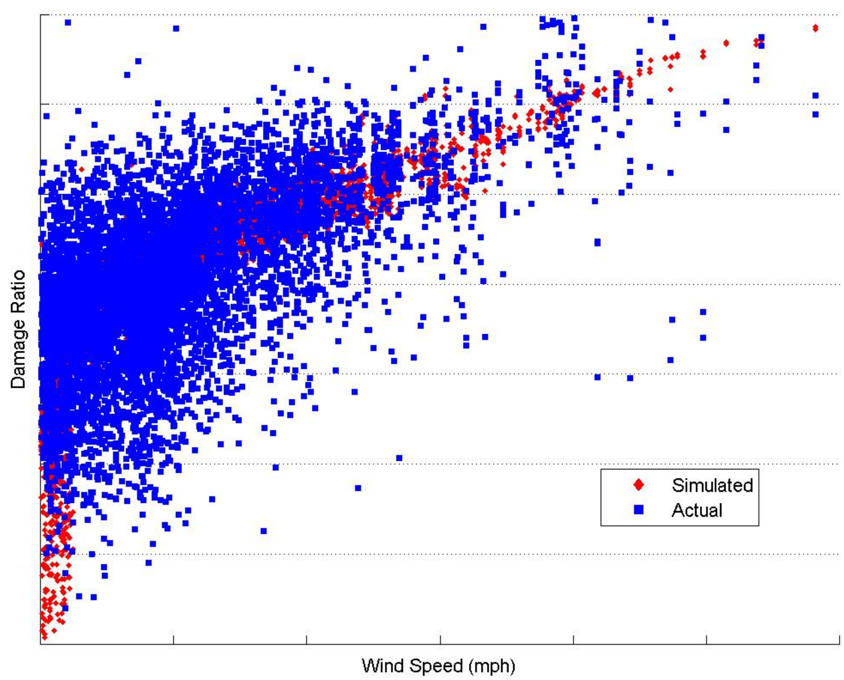
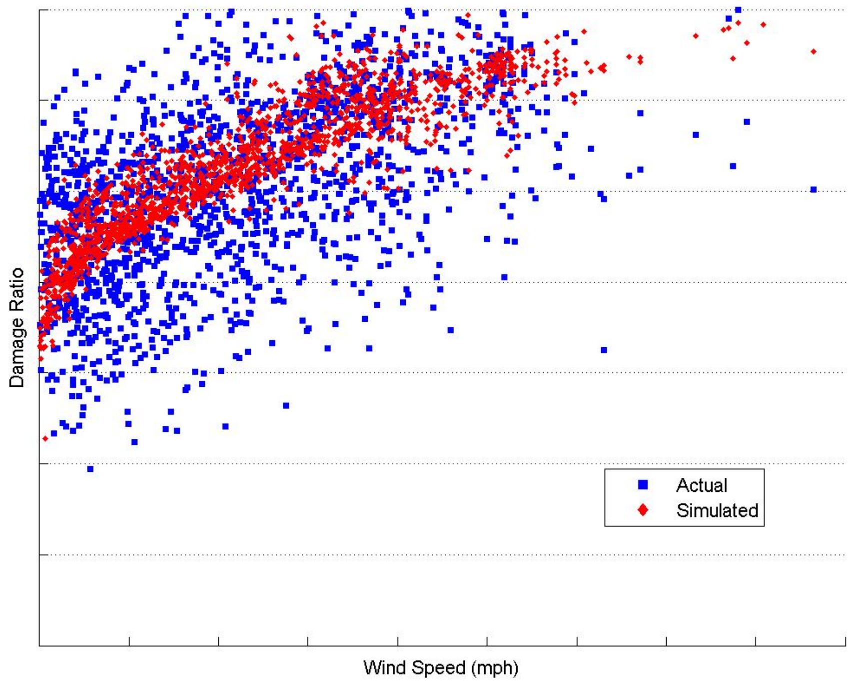


Figure 38. Actual and Modeled Damage Ratios vs Wind Speed, Masonry



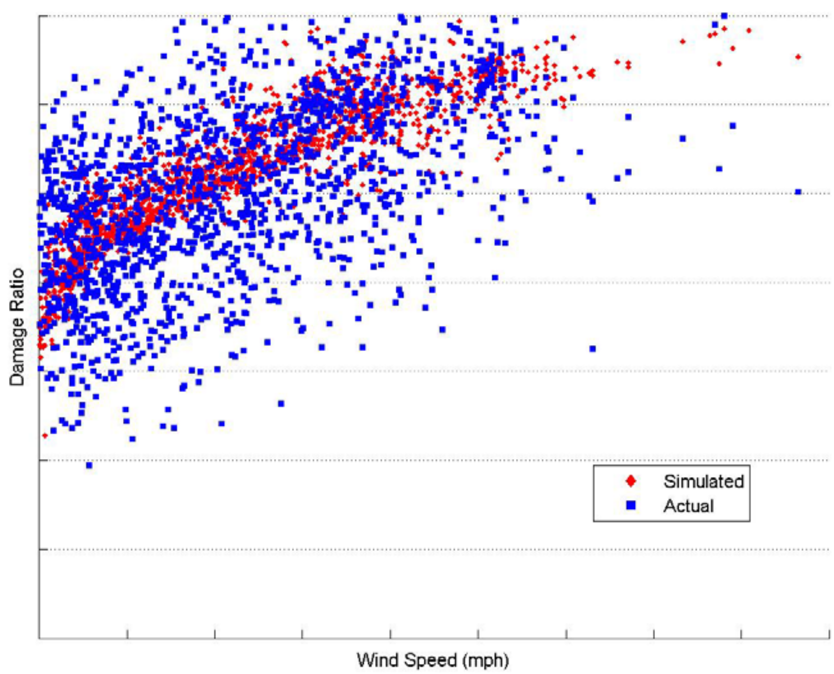


Figure 39. Actual and Modeled Damage Ratios vs Wind Speed, Mobile Home

16. *Identify the one-minute average sustained windspeed and the windspeed reference height at which the model begins to estimate damage.*

The model begins to estimate damage to structures when the one minute sustained wind speed, at a reference height of 10 meters, is greater than (or equal to) 40 miles per hour.

17. *Describe how the duration of windspeeds at a particular location over the life of a hurricane is considered.*

The vulnerability model calculates damage utilizing a complete time profile of wind speeds (above 40 mph, as described in Disclosure V.1-16) for each location affected, thus capturing the effects wind duration on structures. Design wind loads are routinely exceeded in tropical cyclones, often with only moderate intensity. With no reserve strength, a fastener or connector that has been pulled out from an uplift load can compromise the integrity of the building envelope. Wind damage is manifested at the weak links in a structural system. As each connector is overwhelmed, loads are transferred to the next point of vulnerability. The longer the duration of high winds, the longer this process continues and the greater the resulting damage from overwhelmed connections. (More information can be obtained from the following research paper: "Statistical Analysis of 2004 and 2005 Hurricane Claims Data," Proceedings of the 11th Americas Conference on Wind Engineering, San Juan, Puerto Rico, June 22-26, 2009. (Available at: http://www.iawe.org/Proceedings/11ACWE/11ACWE-Jain.Vineet2.pdf)

The cumulative effects of winds can be examined using a dynamic approach. In order to estimate damage to a property at any point in time, it is important to take into account the extent of the damage that has occurred in the preceding period. Each damage ratio is applied in succession to the remaining undamaged portion of the exposure from the preceding period. Figure 40 illustrates this process.

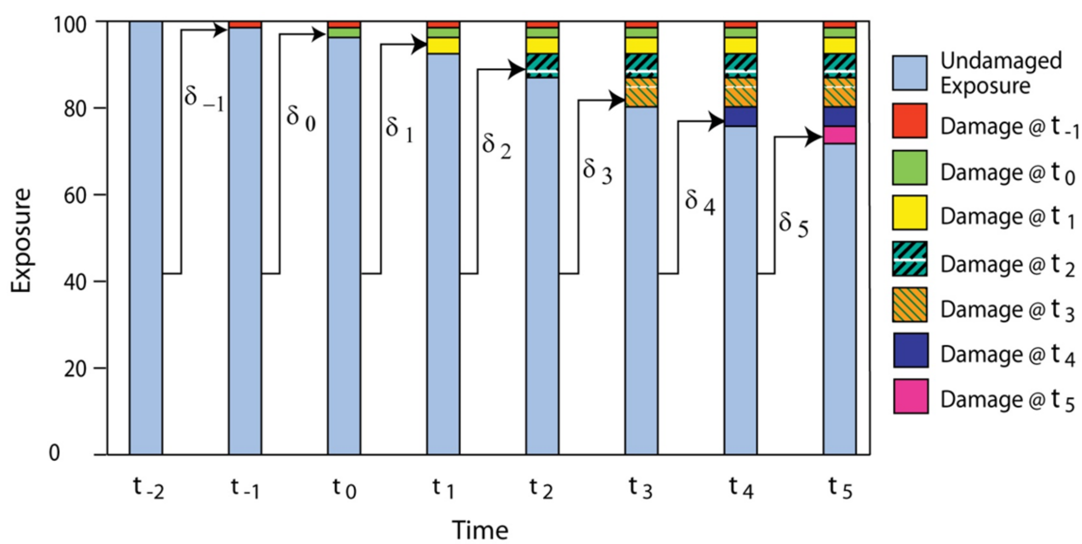


Figure 40. Process of Accounting for the Impact of Wind Duration

At t_{-2}, before the hurricane has made landfall, there is zero or negligible damage. At time t_{-1}, prior to landfall with peripheral wind speeds above 40 mph, the damage ratio δ_{-1} is calculated as a percentage of the full replacement value. At t_0, when the storm makes landfall, the damage ratio δ_0 is applied to the percentage of the property that was left undamaged in the previous period. This process continues until wind speeds once again fall below 40 mph.

Calculating damage only when winds are at their maximum, for example at t_3, and applying a single damage ratio, δ_3, to the full replacement value would ignore the cumulative effects of prolonged winds. Thus, the damage estimation module of the U.S. Hurricane Model considers the complete time profile of wind speeds at each location.

18. *Describe how the model addresses wind borne missile impact damage and water infiltration.*

The AIR vulnerability model implicitly accounts for the impact of wind borne debris and water infiltration damage, to the extent that such damage is captured or reflected in the insurance claims data which underlies the model validation. To the extent that the client knows the site conditions of the exposure, the impact of various debris sources on the vulnerability can be captured using additional secondary characteristic selections, as outlined in Appendix 9. Similarly, the ability of a structure to resist water infiltration through various mitigation features can also be captured using secondary characteristic selections.

19. *Provide a completed Form V-1, One Hypothetical Event. Provide a link to the location of the form here.*

A completed Form V-1 is provided on page 261.

V-2 Derivation of Contents and Time Element Vulnerability Functions

(Significant Revision)

Relevant Form: G-4, Vulnerability Standards Expert Certification

A. Development of the contents and time element vulnerability functions shall be based on at least one of the following: (1) historical data, (2) tests, (3) rational structural analysis, and (4) site inspections. Any development of the contents and time element vulnerability functions based on rational structural analysis, site inspections, and tests shall be supported by historical data.

The U.S. Hurricane Model vulnerability functions for contents and time element impact, are primarily based on engineering and insurance related research publications, damage surveys conducted by wind engineering and damage experts, and analyses of available loss data. Over time, the damage functions have been fine-tuned based on the results of post-disaster field surveys from major events both in the U.S. and abroad, recently published research studies, computational simulations and analysis if possible, and on detailed analyses of loss data from clients.

B. The relationship between the modeled building and contents vulnerability functions and historical building and contents losses shall be reasonable.

The relationship among the modeled structure damage ratios and modeled contents damage ratios is reasonable based on comparisons to client data, as shown in Figure 41. Comparisons between the model result and insurance claims data are also demonstrated in Disclosure V-2.14.

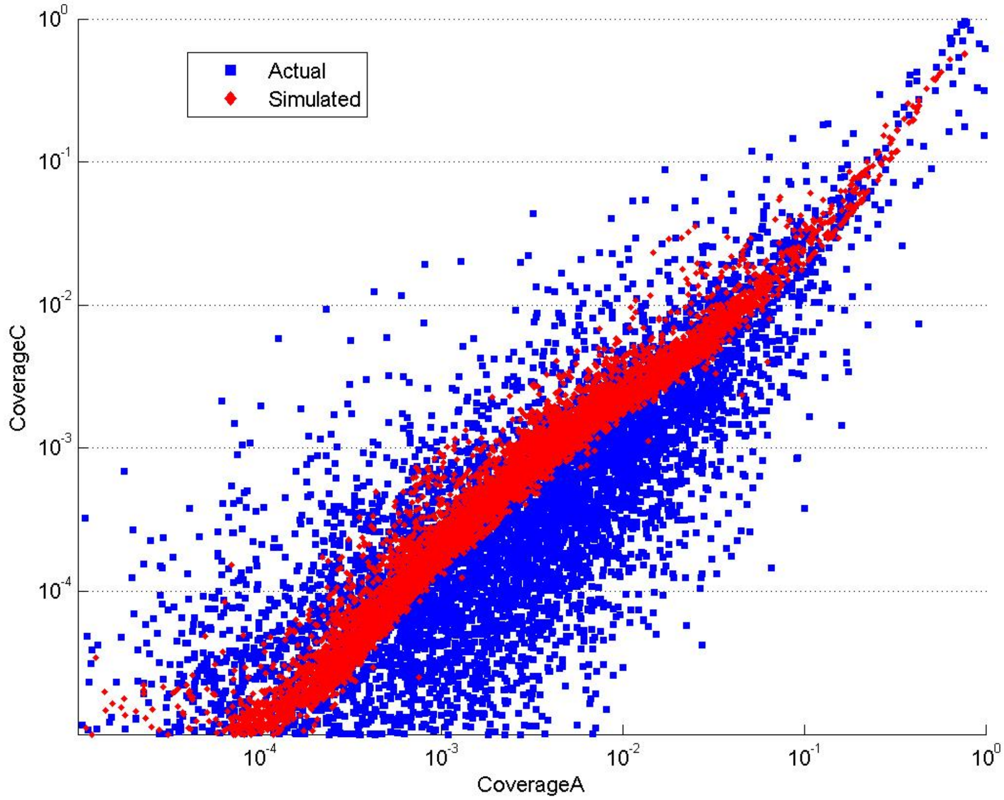


Figure 41. Relationship of Content (Coverage C) Mean Damage Ratio to Building (Coverage A) Damage Ratio for Historical Data and Modeled Results

C. Time element vulnerability function derivations shall consider the estimated time required to repair or replace the property.

Losses due to time element coverage is based on the mean building damage, the time estimated to make repair to or to reconstruct the damaged building and the estimated cost of time element coverage per a time period. Implicit in the estimated time to make repairs are any estimated losses that may occur due to damage to the surrounding infrastructure and for incurred costs to temporarily relocate the displaced occupants.

D. The relationship between the modeled building and time element vulnerability functions and historical building and time element losses shall be reasonable.

Comparisons between the model result and insurance claims data are also demonstrated in Disclosure V-2.14. The relationship among the modeled building mean damage and the time element mean damage is reasonable based on comparisons to client data, as shown in Figure 42. The resulting historical claims data shown includes data from companies who may have made assumptions about time element losses based on structural damage.

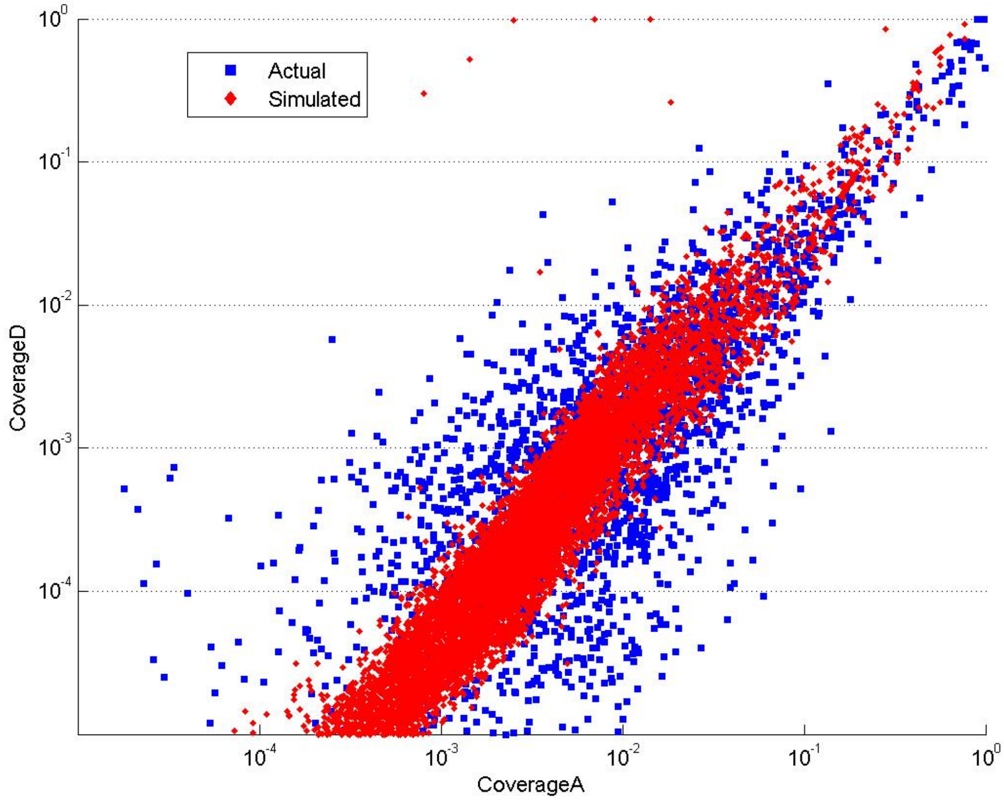


Figure 42. Relationship of Time Element (Coverage D) Mean Damage Ratio to Building (Coverage A) Damage Ratio for Historical Data and Modeled Results

E. Time element vulnerability functions used by the model shall include time element coverage claims associated with wind, flood, and storm surge damage to the infrastructure caused by a hurricane.

The vulnerability model considers time element losses or claims that can arise from damage to the infrastructure, as a result of wind, flood, and storm surge, to the extent that such losses are reflected in damage survey or insurance claims data used for validation purposes.

Disclosures

1. *Describe any modifications to the contents and time element vulnerability component in the model since the previously accepted model.*

There have been no modifications to the contents or time element vulnerability components of the U.S. Hurricane Model since the previously accepted model, as they relate to wind. Vulnerability of contents as they relate to storm surge damage have been updated along with the building vulnerability functions for storm surge as described in Disclosure V-1.1.

2. *Provide a flow chart documenting the process by which the contents vulnerability functions are derived and implemented.*

The process for deriving and implementing the contents vulnerability functions in the AIR model is the same as that used for developing and implementing the building vulnerability functions, as outlined in Disclosure V-1.2.

3. *Describe the data and methods used to develop vulnerability functions for contents coverage associated with personal and commercial residential buildings.*

In the U.S. Hurricane Model, the contents vulnerability is a function of the building vulnerability, such that the resulting contents mean damage ratio is a function of the building mean damage ratio. The model has distinct content vulnerability relationships for both single-family residential structures and commercial residential structures. The damage ratio for single-family residential contents is typically lower than the corresponding building damage ratio, for a given wind speed, as building damage is usually required before contents damage typically occurs. For commercial residential structures, which tend to be larger in size and have a higher level of engineering attention, there can be significant damage to contents even for minor non-structural damage. Typically, these types of structures experience damage to cladding, windows and sliding doors, which drive the potential for significant contents damage.

4. *Describe the number of contents vulnerability functions and whether different contents vulnerability relationships are used for personal residential, commercial residential, mobile home, condo unit owners, apartment renter unit location, and other similar building classes for wind related damage.*

The contents vulnerability is a function of the building vulnerability. There are separate basic content vulnerability functions for residential and commercial residential structures. Since the content vulnerability function is a function of the building vulnerability function, the resulting content vulnerability as a function of the hazard is unique for each construction/occupancy type described in V-1.

5. *Provide a flow chart documenting the process by which the time element vulnerability functions are derived and implemented.*

The process for deriving and implementing the time element vulnerability functions in the AIR model is the same as that used for developing and implementing the building vulnerability functions, as outlined in Disclosure V-1.2.

6. *Describe the data and methods used to develop vulnerability functions for time element coverage associated with personal and commercial residential buildings. State whether the model considers both direct and indirect loss to the insured property. For example, direct loss could be for expenses paid to house policyholders in an apartment while their home is being repaired. Indirect loss could be for expenses incurred for loss of power (e.g., food spoilage).*

The basic time element vulnerability functions for personal and commercial residential structures are based on the mean building damage, the time it takes to repair/reconstruct the damaged building and the estimated cost for the time element per time period. At lower wind speeds, the damage to the building is minimal and the time to repair is minimal. However, when higher wind speeds result in significant building damage the time it takes to repair/reconstruct can be very long. The time element vulnerability model losses resulting from expenses incurred while the building is being repaired/reconstructed. The vulnerability functions also account for other direct and indirect losses to the extent that they are in the validation data.

7. *State the minimum threshold at which time element loss is calculated (e.g., loss is estimated for building damage greater than 20% or only for category 3, 4, 5 events). Provide documentation of validation test results to verify the approach used.*

Time element loss is a function of mean building damage ratio, which is non-zero beginning at a wind speed of 40 mph. Validation comparing actual time element loss information provided through insurance claims and simulated damages for time element losses, across several company and storm combinations, is provided in Disclosure V-2.14.

8. *Describe how modeled time element loss costs take into consideration the damage (including damage due to storm surge, flood, and wind) to local and regional infrastructure.*

Time element loss costs are calculated independently for the wind and storm surge perils in the AIR model. Model users can choose to include, exclude, or include a portion of the losses from surge in the reported time element loss estimates. No storm surge losses for time element coverage are included in the submitted loss costs. The AIR hurricane model does not explicitly estimate losses from precipitation induced flood damage.

AIR does not explicitly model damage to local and regional infrastructure. Validation data for time element coverage reflects actual losses paid by insurance companies. To the extent this data includes losses from damage to infrastructure, losses are then implicitly accounted for by AIR vulnerability functions within the development, calibration, and validation. Thus, modeled time element losses implicitly take into consideration damage to local and regional infrastructure.

9. *Describe the relationship between building structure and contents vulnerability functions.*

The contents vulnerability functions for residential and commercial residential construction are a function of the mean building damage. These relationships are developed using claims data, published engineering studies and expert engineering judgment. The AIR model calculates contents damage separately from building damage, since some policies cover contents only and some building policies provide no contents coverage.

10. *Describe the relationship between building structure and time element vulnerability functions.*

Time element damageability for residential and commercial residential construction is a function of the mean building damage and the time it takes to repair or reconstruct the damaged building. Implicit in the time needed to make repairs is damage to the impacted infrastructure, as well as costs for temporarily relocating or other needs. Published building construction/restoration data and expert engineering judgment have been used to establish the functional relationship between building damage and loss of use.

11. *Describe the assumptions, data, methods, and processes used to develop contents and time element vulnerability functions for unknown residential construction types.*

The contents and time element vulnerability functions are a function of the building vulnerability function, and there are separate basic content and time element functions for residential and commercial exposures. The development of an unknown residential construction vulnerability function is described in Disclosure V-1.11. Thus, an unknown residential content or time element damage function will be the basic residential content or time element vulnerability function as a function of an unknown residential building damage function. The model does not contain an independently derived content or time element vulnerability function for unknown residential construction.

12. *Describe the assumptions, data, methods, and processes used to develop contents and time element vulnerability functions when some of the primary characteristics are unknown.*

The contents and time element vulnerability functions are a function of the building vulnerability function, and there are separate basic content and time element functions for residential and commercial exposure. The development of building vulnerability functions when some of the primary characteristics are unknown is described in Disclosure V-1.12. Thus, a residential content or time element damage function with unknown primary characteristics will be the basic residential content or time element vulnerability function as a function of a residential building damage function with unknown primary characteristics. The model does not contain an independently derived content or time element vulnerability function for residential construction with unknown primary characteristics.

13. *Describe any assumptions, data, methods, and processes used to develop and validate contents and time element vulnerability functions concerning insurance company claims.*

AIR validates the model's content and time element vulnerability functions at many levels, from an aggregate industry level loss perspective down to claims at individual policies or locations. When the client provides exposure information related to contents or time element coverage, AIR will supply the provided information to the model, including policy characteristics and terms. The subsequent claims data corresponding to the exposure may or may not include loss information which contains the application of policy characteristics and terms. AIR will compare the claims data, based on the knowledge of whether the values provided include policy conditions, with modeled output that contains both loss information before the application of policy conditions (ground-up) and after the application of policy terms (gross). This process is used for contents and time element loss validation in the same way that is used for building vulnerability validation.

Figure 43 shows a comparison between the modeled contents (Coverage C) losses and the actual loss data provided by client companies for the same exposure. Figure 44 shows the same comparison for time element (Coverage D) losses. These results indicate that the modeled results validate well with actual claims and loss data.

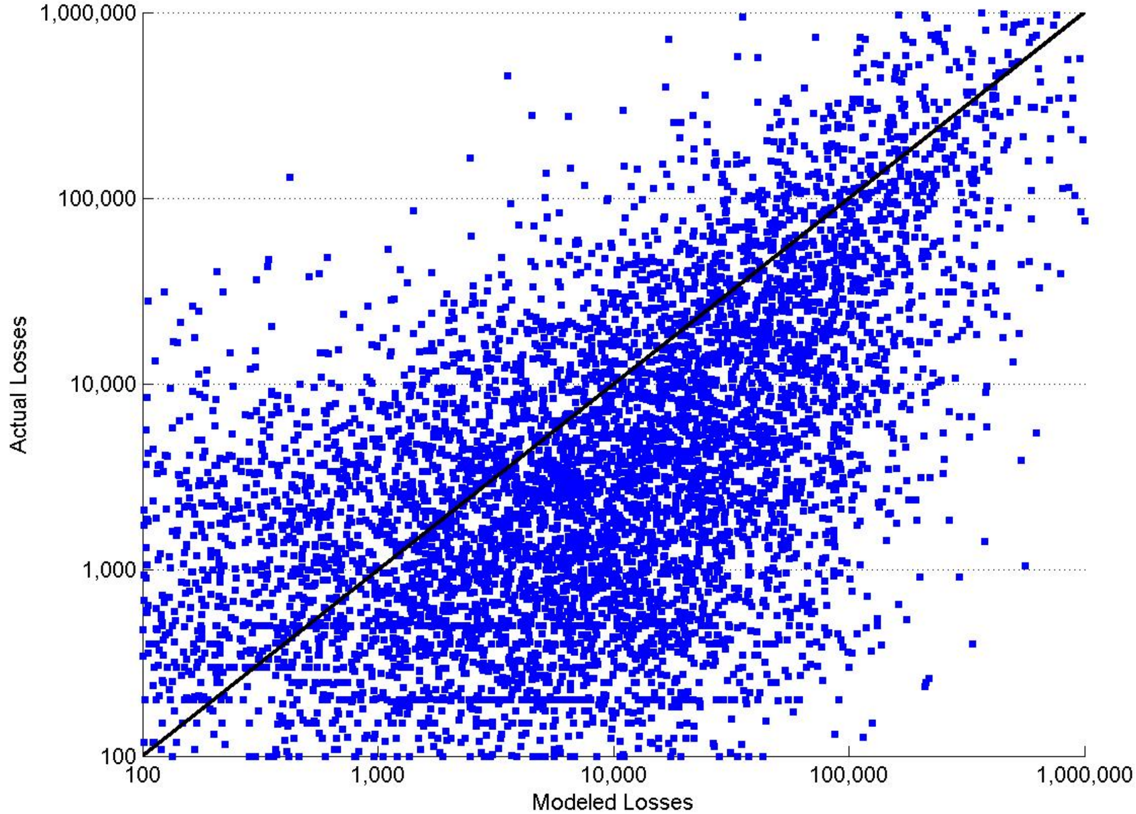


Figure 43. Actual and Modeled Content (Coverage C) Losses

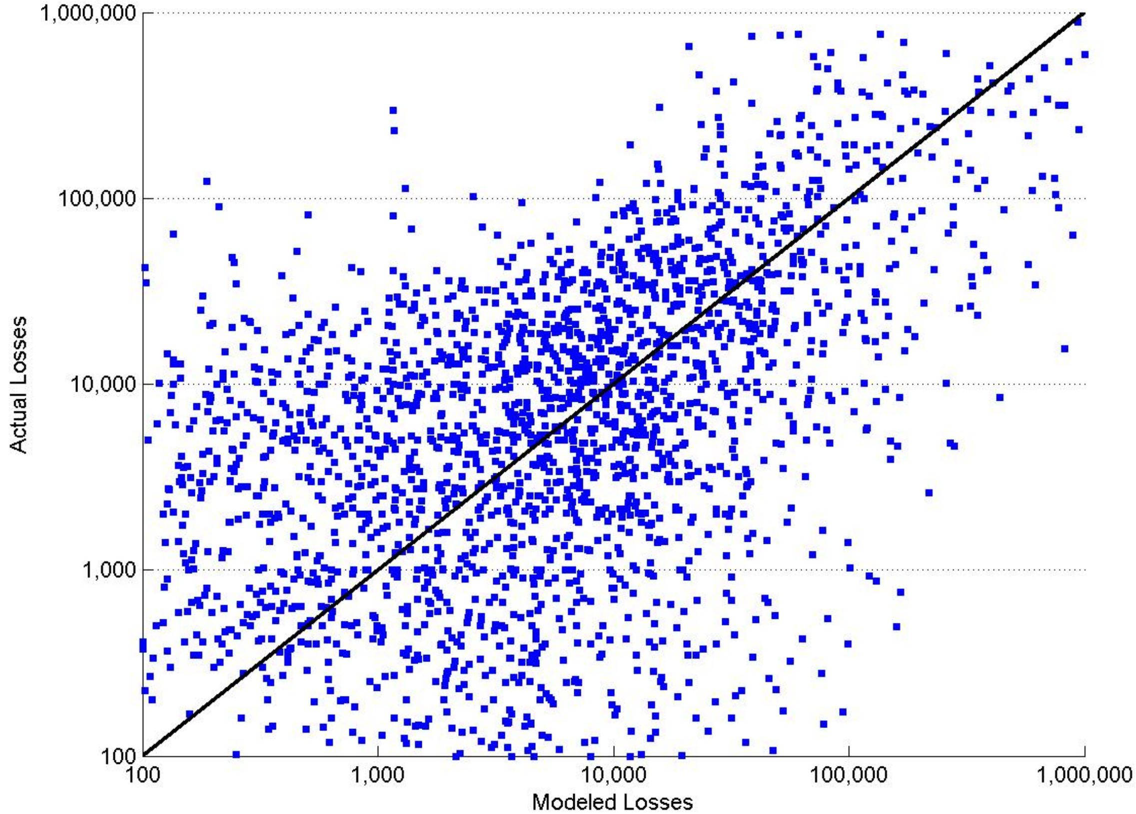


Figure 44. Actual and Modeled Time Element (Coverage D) Losses

14. *Demonstrate that contents and time element vulnerability function relationships are consistent with insurance claims data.*

Figure 45 shows actual content damage ratios, based on claims data provided from clients, compared with modeled content damage ratios for the same exposure. The data provided was compared across multiple company data sets and for various storms.

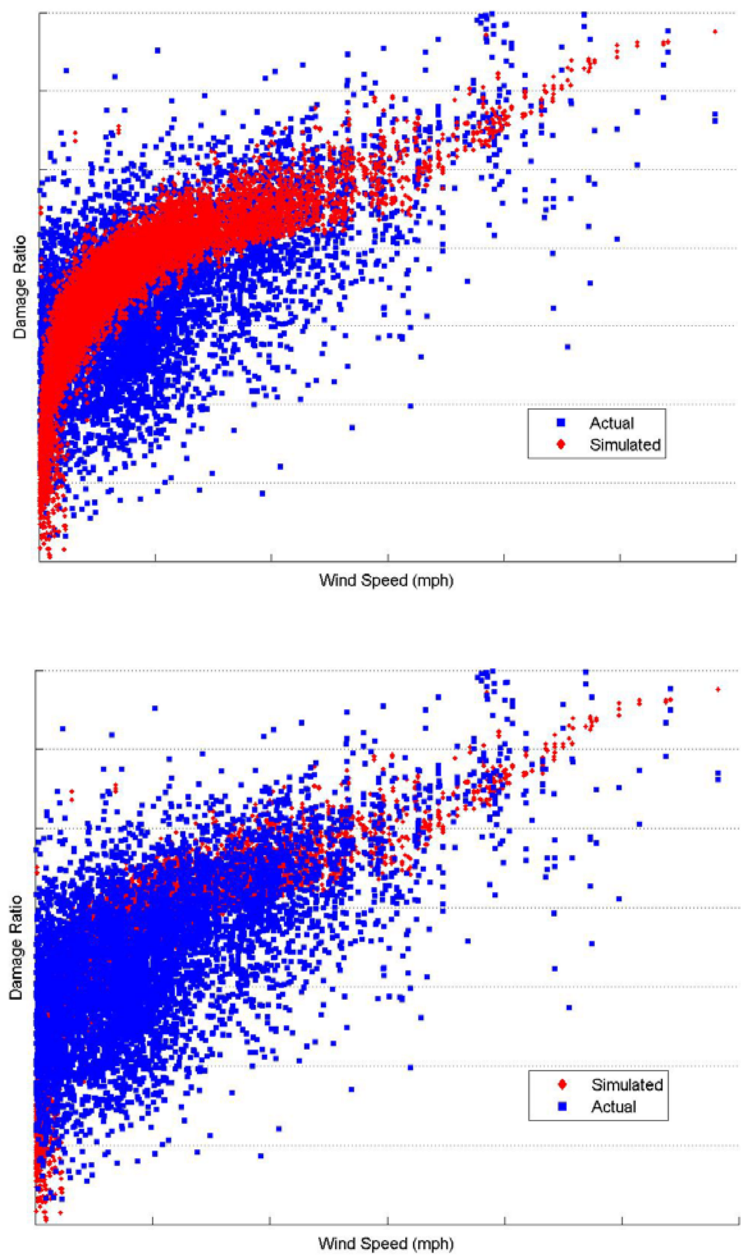


Figure 45. Actual and Modeled Damage Ratios vs Wind Speed, Contents

The time element losses represent the costs incurred in the process of repairing/reconstructing a damaged building. Figure 46 shows the actual and simulated damage ratios for time element losses, based on claims data provided from various companies across various historical storms.

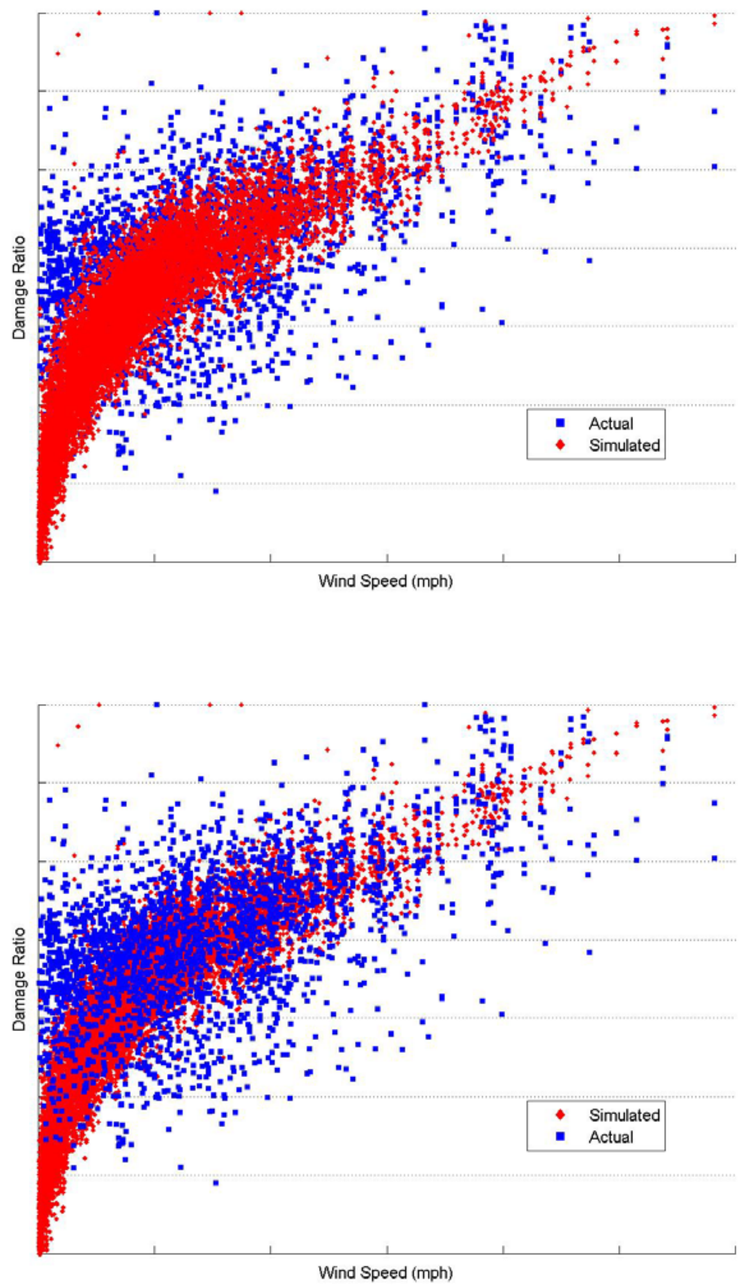


Figure 46. Actual and Modeled Damage Ratios vs Wind Speed, Time Element

V-3 Mitigation Measures

(Significant Revision)

Relevant Forms: G-4, Vulnerability Standards Expert Certification
V-2, Mitigation Measures – Range of Changes in Damage
V-3, Mitigation Measures – Mean Damage Ratios and Loss Costs (Trade Secret item)
A-6, Logical Relationship to Risk (Trade Secret item)

A. Modeling of mitigation measures to improve a building's wind resistance and the corresponding effects on vulnerability shall be theoretically sound and consistent with fundamental engineering principles. These measures shall include fixtures or construction techniques that enhance the performance of the building and its contents and shall consider:

- ***Roof strength***
- ***Roof covering performance***
- ***Roof-to-wall strength***
- ***Wall-to-floor-to-foundation strength***
- ***Opening protection***
- ***Window, door, and skylight strength.***

The secondary risk characteristics, a part of the Individual Risk Model documented in Appendix 9, account for the effects of mitigation measures, and were developed using a knowledge-based expert system in a structured approach. Based on structural engineering expertise and building damage observations made in the aftermath of historical hurricanes, key building features have been identified as having a significant impact on building losses. These features include fixtures or construction techniques that enhance roof strength; roof-covering performance; roof-to-wall strength; wall-to-floor-to-foundation strength; opening protection; and window, door, and skylight strength. Options for each feature are identified based on construction practice. Algorithms for modifying the vulnerability functions, for both structural and nonstructural components, are developed based on engineering principles and building performance observations.

The module supports any combination of multiple building features impact on the overall building damage and produces a modification function to the vulnerability function. The modification function captures the changes to building vulnerability that result when certain building features are present and when information on such building features is known. The modification function varies with the wind intensity to reflect the relative effectiveness of a building feature when subject to different wind speeds.

The building vulnerability component of the AIR model explicitly addresses construction built in accordance to the Florida Building Code, FBC2001. Methods for estimating the effects of mitigation measures, as described in Appendix 9, are theoretically sound.

B. Application of mitigation measures that enhance the performance of the building and its contents shall be justified as to the impact on reducing damage whether done individually or in combination.

The methods of applying mitigation measures are reasonable, both individually and in combination. The mitigation measures are applied using the Individual Risk Methodology, which follows a structured, logical approach that groups building characteristics according to their function. In this way the methodology reflects the contribution of each characteristic to the overall building performance. The result is a modified damage function that reflects the impact of one or more selected building characteristics appropriately.

Weightings are used to combine the effects of multiple features whose interaction is complex and not necessarily additive. For example, when considering the roof system, roof age, roof pitch, roof covering, roof decking and attachment, and roof geometry modify the performance of the roof as a whole and therefore the weight should be used as a multiplier. The weights are dependent on wind speed and construction class, and are appropriately selected to reflect the importance of a feature at certain levels of a building's damage state.

There exists limited detailed damage data with information about mitigation measures. The model has been validated using damage reports from previous hurricanes, engineering judgment and loss data whenever available.

The Individual Risk Methodology is described in further detail in Appendix 9.

Disclosures

1. *Describe any modifications to mitigation measures in the model since the previously accepted model.*

There have been no modifications to the wind mitigations measures, outlined in Appendix 9, used in the model since the previously accepted version. Additional mitigation measures and options have been added for use with the associated storm surge model in the U.S. Hurricane Model.

2. *Provide a completed Form V-2, Mitigation Measures – Range of Changes in Damage. Provide a link to the location of the form here.*

A completed Form V-2 is provided in Excel format, and is included on page 264. Note that AIR's Form V-2 includes more than the minimum mitigation measures required.

3. *Provide a description of the mitigation measures used by the model that are not listed in Form V-2, Mitigation Measures – Range of Changes in Damage.*

Table 18 includes all mitigation measures that are available in the AIR model. Please note that Table 50 provides the modification factor corresponding to these features, except for the seal of approval, which augments the impact of other relevant mitigation features.

Table 18. Mitigation Measures in the AIR Model

Mitigation Measures	Description
Building Condition	A general qualitative description of building condition from visual inspection
Tree Exposure	Describes the tree hazard around the building
Small Debris Source	Describes the potential of small debris in a radius of 200 feet
Large Missile Source	Describes the potential of large missiles in a radius of 100 feet
Roof Geometry	Describes the shape of the roof
Roof Pitch	Addresses the roof slope
Roof Covering	The nature of material used to cover the roof
Roof Deck	Material and construction type of the roof deck of building
Roof Cover Attachment	Nature of the connections used to secure the roof covering to the roof deck
Roof Deck Attachment	Nature of the connections used to secure the roof deck to the underlying roof support system
Roof Anchorage	Nature of connections used to secure the roof support systems to the walls
Wall Type	Materials used for external walls of the building
Wall Siding	Materials used for weathering protection of walls
Glass Type	Type of glass used in building
Glass Percent	The percent area of the walls covered by glass
Window Protection	Describes the nature of wind protection systems used
Exterior Doors	Describes the nature of the exterior doors in the building
Building Foundation Connection	Connection type between the structure and foundation
Roof Attached Structures	Description of the mechanical and other equipment on top of roofs
Wall Attached Structures	Components of a property that are not an integral part of the main building but are physically attached to it
Appurtenant Structures	Components of a property that are not an integral part of the main building and are not connected to it
Roof Built	The year the roof was put in place
Seal of Approval	Accounts for level of professional engineering attention given to the design of the structure

4. *Describe how mitigation is implemented in the model. Identify any assumptions.*

AIR's Individual Risk Model is integrated in the hurricane loss projection model to estimate the impact of mitigation features on building vulnerability. When any combination of the individual mitigation features listed in Table 18 is provided, the individual risk model calculates the corresponding credits and applies them to the base vulnerability functions to obtain refined vulnerability functions for buildings with mitigation features. AIR's Individual Risk Model has been developed using a structured, knowledge-based expert system that applies structural engineering expertise and building damage observations made in the aftermath of actual hurricanes, including the 2004-05 events (See Appendix 9 for details). Options for each feature are identified based on general construction practices.

Algorithms for modifying the vulnerability functions for both structural and nonstructural components are developed based on engineering principles and observations of building performance. The module supports the effects of any combination of building features on building damage, and produces a modification function to the vulnerability function. The modification function captures the changes to building vulnerability that result when certain building features are present and when information on such building features is known. The modification function varies with the wind intensity to reflect the relative effectiveness of a building feature when subjected to different wind speeds.

There are two primary metrics in the model—rates and weights—for evaluating the impact of a mitigation feature on overall building performance. The rate is a weighted value assigned to the various options for building or environmental features. The rate for any given option of a particular feature reflects the relative prevalence of use among the available options, and is independent of other features. That is, the value is designed such that the most commonly used option is assigned a value close to 1.0. The implication is that a building with this option is expected to perform very similarly to the average, or “typical” building represented by the base damage functions. If no information is available on the option, the default value is 1.00, which means that the base damage function is used without modification.

The second metric, the weight, is a value of one of two types. The first weight type is used to develop simple weighted averages which are used to evaluate the loss contribution of several features that together constitute a system, such as roof. They are dependent on wind speed; that is, the contribution of each feature varies with wind speed. For example, a roof may consist of three features: roof covering, roof deck and roof attachment. The loss contribution to the roof system from these three features is expected to be different at different wind speeds. At low wind speeds, the roof covering drives the damage since it is at relatively low wind speeds that damage to roof covering occurs. As wind speeds increase, the roof deck becomes vulnerable. In this case, roof deck failure will result in loss of roof covering regardless of the type (or option) of roof covering present. Therefore, as wind speed increases, the weight for roof deck increases. In contrast, at higher wind speeds, the weight for roof covering decreases because it is already lost. The sum of the weights for a system should add up to 1.0.

The second type of weight metric is used to combine the effects of features whose interaction is complex and not necessarily additive. These are introduced to evaluate features that modify the performance of the system. If we consider roof system as an example, the age, pitch and geometry of the roof all modify the performance of the system as a whole. The weight, therefore, should be used as a multiplier. These weights are appropriately selected to reflect the importance of a feature at certain levels of a building’s damage state.

5. *Describe the process used to ensure that multiple mitigation factors are correctly combined in the model.*

Disclosure V.3.4 describes in detail the process of combining the effect of different mitigations. The impact of different features is combined in a logical way that is based on the engineering principles and damage observations. As with the building, content, and time element vulnerability models, the functionality of the modeled mitigation factors is compared against historical insurance loss data for validation. This comparison ensures that the modeled assumptions are combined/handled properly.

Florida Commission on Hurricane Loss Projection Methodology

2013 Actuarial Standards

A-1 Modeling Input Data

Relevant Form: G-5, Actuarial Standards Expert Certification

A. When used in the modeling process or for verification purposes, adjustments, edits, inclusions, or deletions to insurance company input data used by the modeling organization shall be based upon accepted actuarial, underwriting, and statistical procedures.

Any adjustments, edits, inclusions or deletions made to client company input data are based upon accepted actuarial, underwriting and statistical procedures.

B. All modifications, adjustments, assumptions, inputs and input file identification, and defaults necessary to use the model shall be actuarially sound and shall be included with the model output report. Treatment of missing values for user inputs required to run the model shall be actuarially sound and described with the model output report.

Assumptions that relate to a client's input data are identified on the analysis options form, which is reported along with output of AIR's Touchstone detailed modeling software. Client analyses are also backed by a PIAF, as included in Appendix 6. Assumptions related to any missing values are detailed in the PIAF. The PIAF is given to clients and requires approval prior to the hurricane analysis. It is also included with the final report. For the most part clients conduct their own analysis in-house. In such cases, a PIAF will not be produced by AIR, however clients should document all modifications, adjustments, assumptions, inputs and defaults used in the analyses.

Insurance to Value

To calculate losses, the model requires replacement value and insured limit by coverage. Damages are calculated based on replacement value and are capped at the policy limit. Clients may determine replacement value from insured limit and insurance-to-value assumptions. This calculated value could then be input as replacement value. If AIR makes assumptions regarding property replacement value at a client's request, such assumptions are included in the PIAF.

Demographic Assumptions

AIR defaults assume averages for items such as structural characteristics, maintenance and state of repair.

Appurtenant Structures

The model requires replacement value and insured limit by coverage. Clients provide actual replacement value and insured limit for appurtenant structures. If AIR makes assumptions regarding appurtenant structures at a client's request, such assumptions are included in the PIAF.

Contents

The model requires replacement values and insured limits by coverage. Damages are calculated based on the replacement value for the contents (which may be higher or lower than the limit) and are capped at the contents policy limit. The model uses client-provided replacement values. Clients may determine replacement value from insured limit and insurance-to-value assumptions. This calculated value could then be input as replacement value. If AIR makes assumptions regarding contents value at a client's request, such assumptions are included in the PIAF.

Additional Living Expenses

The AIR model does not use the additional living expense limits to calculate damages. Losses due to Additional Living Expense (ALE or Time Element) coverage are estimated using the mean building damage, the time estimated to make repairs or to reconstruct the damaged building and the estimated cost of ALE per time period. ALE losses are then capped using the limits. Therefore, changing the ALE limits will not affect the loss calculation unless the ALE damage is above the limit.

Deductibles

The AIR model allows users to apply various types of deductibles (e.g. Annual Deductibles, as specified by Florida Statues), reflecting the underlying policy conditions of their risks. For residential occupancies the deductible is applied to the limited losses. See Standard A-4 for a more detailed discussion of deductible application.

Exposures by ZIP Code

Exposure data is checked for valid ZIP Codes before running the hurricane model. ZIP Codes are checked for validity by comparing client-supplied ZIP Codes with AIR's most recent ZIP Code database. If a ZIP Code cannot be matched to the current ZIP Code database, AIR's database of *historical* ZIP Codes will be searched. This database includes ZIP Codes that were valid in previous years but later changed. ZIP Codes which are matched to a valid ZIP Code in a prior year are reassigned to the appropriate currently valid ZIP Code. A list of all ZIP Codes present in the FHCF input data provided by the FCHLPM that are remapped in AIR's software is shown in Appendix 10.

The model produces a list of ZIP Codes that do not appear in AIR's master database of valid ZIP Codes. Exposure in any invalid ZIP Code is not modeled. The client may choose to allocate or map these exposures back into the exposure data set, outside the model. If AIR makes assumptions regarding allocation or remapping at a client's request, such assumptions are included in the PIAF.

Disclosures

1. *Identify depreciation assumptions and describe the methods and assumptions used to reduce insured losses on account of depreciation. Provide a sample calculation for determining the amount of depreciation and the actual cash value (ACV) losses.*

To calculate losses, the model requires replacement value and insured limit by coverage. The model makes no depreciation assumptions. Insurers may make specific assumptions for any depreciation adjustments that reduce replacement value to actual cash value. In such cases, the actual cash value (ACV) is entered for the replacement value and the damage ratio is applied to the actual cash value or depreciated replacement value. Loss amounts are then capped at insured limit by coverage. If AIR makes assumptions at the client's request regarding depreciation and ACV, such assumptions are included in the PIAF.

Table 19. Sample Calculation for Determining Depreciation and ACV Losses

	Actual	Input
Coverage A limit	$100,000	$100,000
Coverage C limit	$50,000	$50,000
ACV (Coverage C)	$25,000	
Replacement Value C		$25,000
Contents Damage Ratio		1%
Contents Losses		$250

2. *Identify insurance-to-value assumptions and describe the methods and assumptions used to determine the true property value and associated losses. Provide a sample calculation for determining the property value and guaranteed replacement cost losses.*

To calculate losses, the model requires replacement value and insured limit by coverage. Damages are calculated based on replacement value and are capped at the policy limit. Insurers may determine replacement value from insured limit and insurance-to-value assumptions. If AIR makes assumptions regarding insurance-to-value at a client's request, such assumptions are included in the PIAF.

If the replacement value is greater than the policy limit and a guaranteed replacement cost factor (GRC) applies, the model can calculate guaranteed replacement cost losses by inputting Policy Limit × GRC for Policy Limit. Note that modeled losses cannot be greater than the specified replacement value.

Table 20. Sample Calculation for Determining Property Value and Guaranteed Replacement Cost Losses

	Actual	Input
Replacement Value	$120,000	$120,000
Policy Limit	$100,000	$120,000
GRC Factor	1.2	

	Scenario A*	Scenario B*
Damage Ratio	.75	.90
Modeled Loss	$90,000	$108,000
Insured Loss (with GRC)	$90,000	$108,000

** ignoring application of deductible*

3. *Describe the methods used to distinguish among policy form types (e.g., homeowners, dwelling property, mobile home, tenants, condo unit owners).*

The AIR U.S. Hurricane Model can distinguish all policy form types. The way the model distinguishes policy form types is through exposure coding. Exposures are distinguished based on vulnerability characteristics, such as construction type and occupancy. Policy form (i.e. dwelling property) can also be carried as a reporting field, but it is not explicitly modeled. For all policy forms, losses are estimated separately based on vulnerability characteristics coded on the exposure and by coverage for coverage A, B, C and D or any combination. The model can produce loss costs for defined groups of policies if vulnerability characteristics are known. Such characteristics are described in Standard V-1.

4. *Disclose, in a model output report, the specific type of input that is required to use the model or model output in a residential property insurance rate filing. Such input includes, but is not limited to, optional features of the model, type of data to be supplied by the model user and needed to derive loss projections from the model, and any variables that a model user is authorized to set in using the model. Include the model name and version identification on the model output report. All items included in the output form submitted to the Commission shall be clearly labeled and defined.*

There is no single required input form for exposure data being imported into the software. It is flexible enough to handle many types of input formats. A common input format is the UNICEDE/px format. The UNICEDE/px Preparer's Guide describes the data format used to transfer detailed exposure information to the Touchstone software, and the data elements necessary for deriving loss estimates from the model. A copy of the Preparer's Guide will be available to the Professional Team during its on-site visit.

The Touchstone guide *Getting Started with Touchstone* describes the analysis options that may be selected for generating loss results, including variables that a user may set in implementing the model. The analysis options selected by the user for each loss analysis may be exported as a text file. An example of an Analysis Log is included in Appendix 6. The model name and version identification are always shown in the Analysis Log.

5. *Provide a copy of the input form(s) used in the model with options chosen to reflect the Florida hurricane model under review. Describe the process followed by the user to generate the model output produced from the input form. Include the model name and version identification on the input form. All items included in the input form submitted to the Commission shall be clearly labeled and defined.*

Input to Model

If the client has contracted with AIR on a service basis rather than licensing the software, all modifications, adjustments or assumptions are noted on the PIAF. This form is presented to the client for approval before modeling begins and a copy is also included with the final report. The PIAF (see Appendix 6), relates directly to model input requirements and output to be produced. It includes the model name and version number.

If the client runs the software in-house, as is generally the case, documentation of data input will be generated by the user. Actuaries using Touchstone to prepare loss costs or PMLs for use in a Florida rate filing (or contracting with AIR to provide this service) are responsible to know which analysis options are required by the FCHLPM and the Florida Office of Insurance Regulation (OIR).

Model Options

As a user initiates an analysis in Touchstone, they must customize their analysis options. Analysis options govern which settings are turned on and off for a particular analysis. Certain analysis options affect the resulting loss estimates in Florida, while others do not. AIR has identified the following analysis options as required for rate making in Florida. Table 21 is divided into three parts: required, optional and non-applicable analysis settings. Required settings must be used; non-applicable settings do not have any effect as they are not applicable for the U.S. Hurricane Model; while optional settings may be customized by the user depending on their portfolio and reporting needs.

Table 21. Catastrophe Peril Analysis Options Applicable for Florida Rate Making

Analysis Option	Setting	Notes
Required Settings		
Event Set	*50K US AP (2015) - Standard*	The event sets that are included in the list depend on the countries and perils licensed. The 50k or 100k Standard event set must be used.
Peril	Only check *Tropical Cyclone - Wind*	Losses from wind are covered by residential policies. Storm surge losses must be excluded. Storm surge is an abnormal rise in sea level accompanying a hurricane or other storm. Users can include an estimate of the separately modeled storm surge losses when calculating losses for tropical cyclone events. When the storm surge peril box is unchecked, the modeled loss result will exclude storm surge losses.
Demand Surge	*On*	The demand surge analysis option inflates loss results to reflect the increased cost of labor and materials following a major catastrophe. As the industry loss rises, so will the cost to repair and replace properties damaged in the event; the greater the industry loss for an event, the greater the Demand Surge factor used in the calculations. Touchstone comes with a standard demand surge curve for the U.S.
Correlation	*Off*	The correlation analysis option allows users to choose to apply correlation factors between loss distributions during an analysis. This option generally applies in the case of multi-contract or multi-location commercial policies.
Apply Location Terms for Residential Contracts	*AIR Default Behavior*	The AIR default behavior for application of location terms for residential contracts applies the policy limit before the deductible. See response to Standard A-4.A.
Flexibility Option (a.k.a. Loss Modification Factor)	*None (displayed in Analysis Log as "Not Available")*	Touchstone allows users to apply a loss modification factor directly to ground-up losses that AIR models produce. This function enables users to perform sensitivity analyses on potential portfolio losses. Selecting None will produce only the AIR default loss perspective, therefore this is the required setting for any Florida rate filing analyses.

Analysis Option	Setting	Notes
Event Set Filter	*Do Not Apply*	Applying an event set filter enables a user to run a standard loss analysis for a user-defined subset of events in the selected event set. For rate filing in Florida, no event set filters should be applied
Optional Settings		
Average Properties	*Automatic, On* or *Off*	The Average Properties option enables a user to specify how Touchstone applies average physical properties, such as soil type and land use/land cover data, at a region-specific geographic resolution, during a loss analysis. Turn On if exposures are geocoded to the ZIP Code centroid level. The user should choose Off when they have detailed address information. When Automatic is selected, Touchstone automatically assigns the properties based on the geocode match level.
Invalid Construction/Occupancy Pairs	*Use System Default* or *Ignore*	A location that has an invalid construction/occupancy combination (e.g. Mobile Home construction with an occupancy of automotive manufacturing) will be included or excluded in a loss analysis depending on the user's selection. If the Use System Default option is chosen, the software will convert the invalid codes into an unknown construction and general commercial occupancy. If the Ignore option is chosen, the location will not be analyzed.
Non-Applicable Settings		
Disaggregation	Off	Disaggregation feature is not currently applicable to the United States.

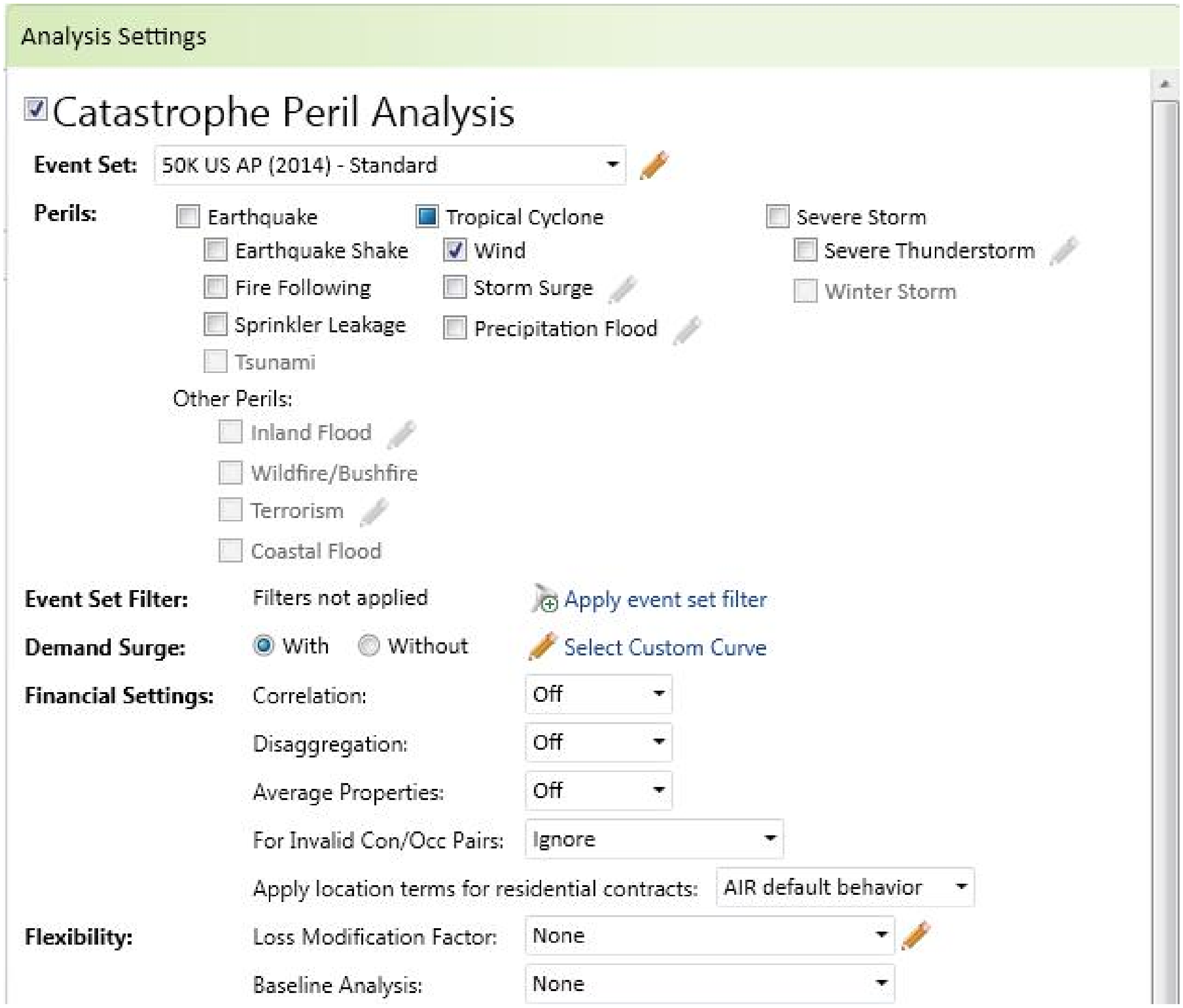


Figure 47. Catastrophe Peril Analysis Dialog Box Displayed in the Touchstone User Interface

Figure 47 above shows the catastrophe peril analysis dialog box in Touchstone.

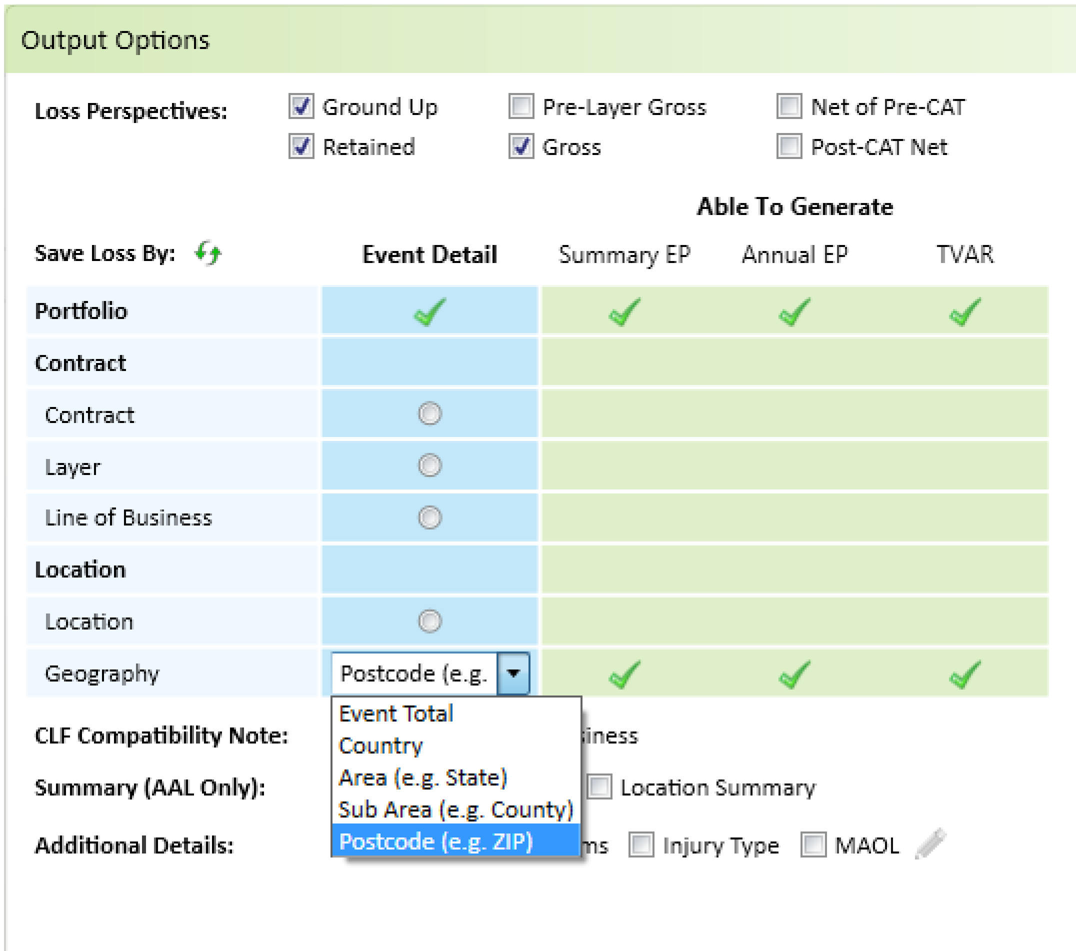


Figure 48. Output Options Dialog Box Displayed in the Touchstone User Interface

Figure 48 above shows the options available to the user for output detail. These settings can be customized depending on the user's needs. The output options do not change the loss estimates, just the perspective and detail at which the estimates are reported from the software.

Process to Generate Model Output

The process followed by the user to generate the modeled output consists of several steps. The process begins by importing the input file into Touchstone. The user geocodes the exposure if the exposure does not include latitude and longitude information. The geocoding process assigns at latitude and longitude based on the resolution of the geographic input data. Import and geocode logs are generated by Touchstone (see Appendix 6). Once the input data is imported and geocoded the user selects the appropriate analysis options.

After selecting the analysis options the user then starts the analysis. Upon conclusion, the summary exceedance probability curve is displayed in the user interface.

Summary EP Table

Agg/Occ	Perspective	AAL(EV)	SD	5%	2%	1%	0.4%	0.2%	0.1%
AGG	Ground Up	81,726,333	256,034,611	412,797,949	816,599,676	1,222,607,887	1,889,446,227	2,349,222,038	3,002,496,640
	Gross	75,382,499	224,045,996	385,917,853	746,488,385	1,093,038,760	1,638,653,637	2,013,751,095	2,524,127,513
OCC	Ground Up	74,946,936	241,832,130	371,607,040	760,552,809	1,132,419,661	1,788,839,758	2,259,619,221	2,933,845,281
	Gross	69,063,500	210,834,329	348,648,800	699,582,646	1,016,634,595	1,554,498,395	1,930,308,911	2,455,120,040

Figure 49. Exceedance Probability Curve Information Displayed in the Touchstone User Interface

To generate model output for use in a rate filing, the user has the option to extract results based upon different criteria, as shown in Figure 50 below. They can also use SQL to query the relation database underlying Touchstone directly.

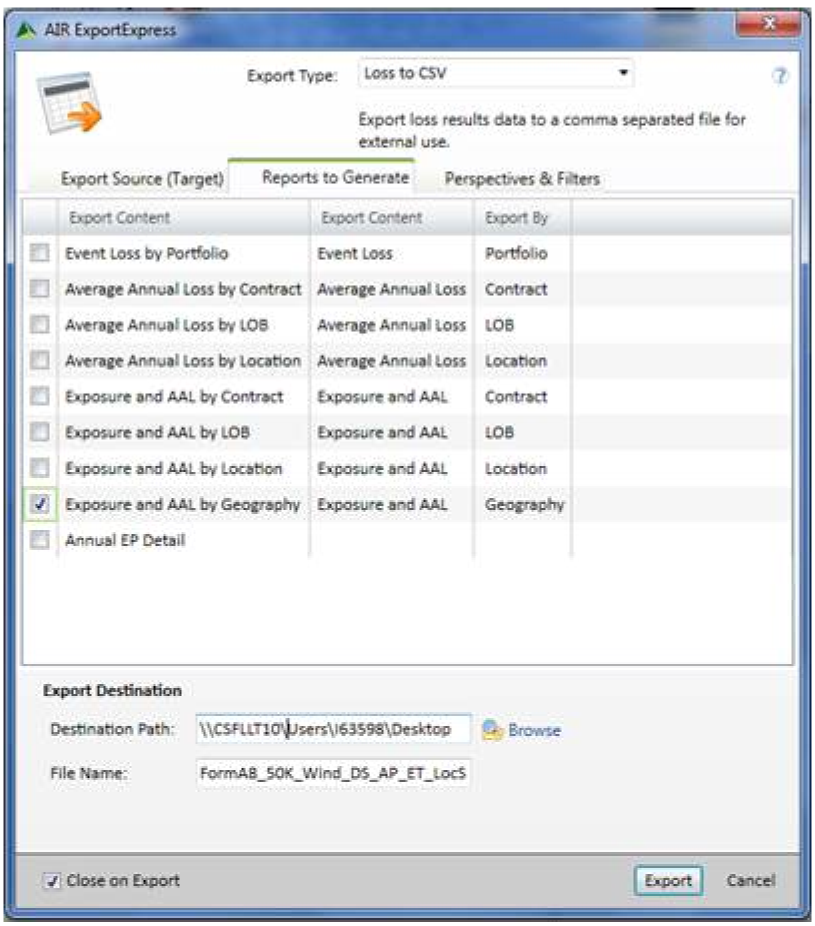


Figure 50. Output Options Dialog Box Displayed in the Touchstone User Interface

For the purpose of this submission, all items included in the input and output forms are clearly labeled and defined.

6. *Describe actions performed to ensure the validity of insurer data used for model inputs or validation/verification.*

If the client has contracted with AIR on a service basis rather than licensing the software, insurer data, whether used as the exposure input to a loss analysis or for model validation, undergoes a set of structured processing procedures as detailed in the flow chart given in Figure 51 below. These include checks to determine the quality and completeness of the data, its reasonability and the existence of any unique conditions or special reporting features. If data is excluded or adjusted, this is noted in the PIAF (see Appendix 6). Insurer approval of the form is required prior to analysis.

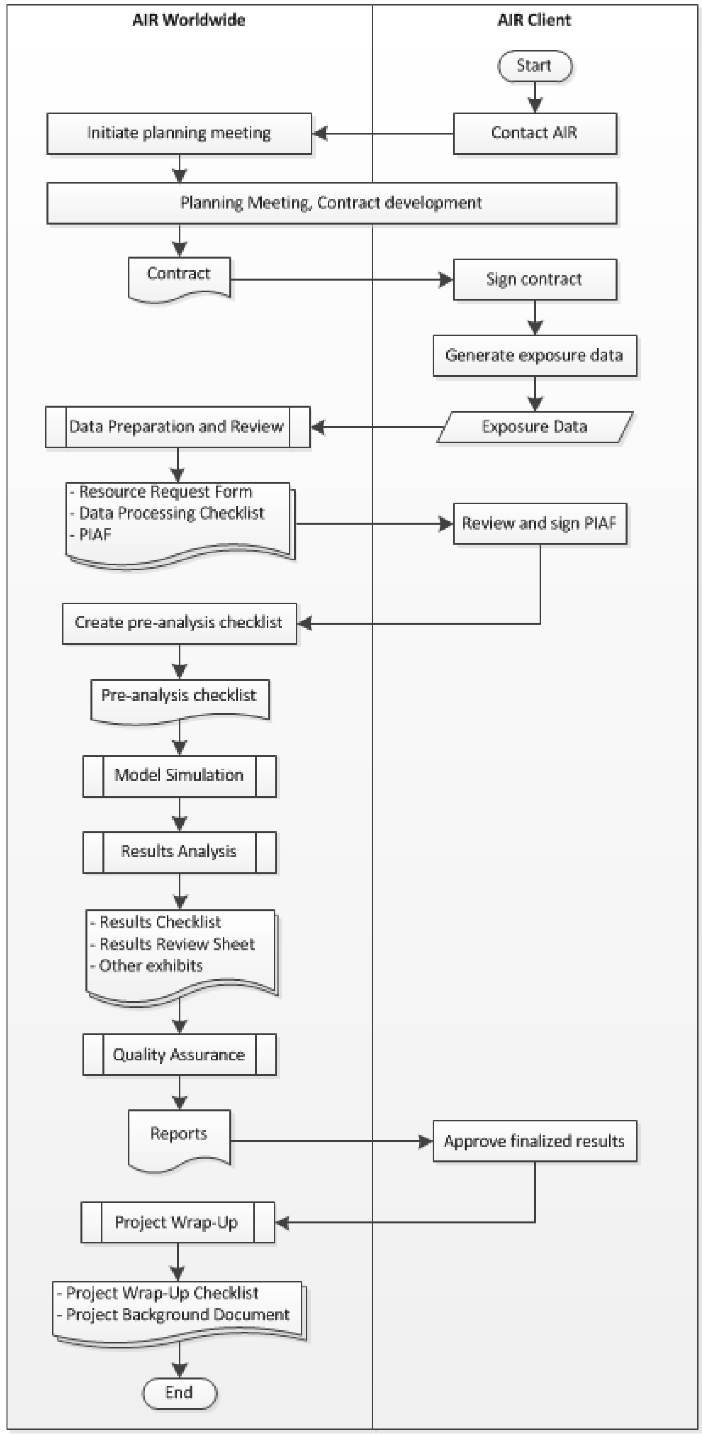


Figure 51. Processing Procedures for Insurer Data in Touchstone

If the client runs the software in-house, as is generally the case, documentation of actions performed to ensure the validity of data used for model inputs or validation/verification will be completed by the client.

A-2 Event Definition

Relevant Forms: G-5, Actuarial Standards Expert Certification
A-2, Base Hurricane Storm Set Statewide Losses

A. Modeled loss costs and probable maximum loss levels shall reflect all insured wind related damages from storms that reach hurricane strength and produce minimum damaging windspeeds or greater on land in Florida.

Modeled loss costs and probable maximum loss levels reflect all insured wind related damages from storms that reach hurricane strength and produce minimum damaging windspeeds or greater on land in Florida.

B. Time element loss costs shall reflect losses due to infrastructure damage caused by a hurricane.

Additional Living Expense (ALE or Time Element) loss costs reflect losses due to infrastructure damage caused by a hurricane. Losses due to Time Element coverage are estimated using the mean building damage, the time estimated to make repairs or to reconstruct the damaged building and the estimated cost of ALE per time period.

Disclosures

1. *Describe how damage from model generated storms (landfalling and by-passing) is excluded or included in the calculation of loss costs and probable maximum loss levels for the state of Florida.*

The calculation of loss costs and probable maximum losses includes the losses from all hurricanes that make landfall in Florida or are Florida bypassers. Damage is included in the calculation of loss costs and probable maximum losses from the time the hurricane first causes damaging wind speeds on land in Florida.

2. *Describe how damage resulting from concurrent or preceding flood or hurricane storm surge is treated in the calculation of loss costs and probable maximum loss levels for the state of Florida.*

Wind and surge losses are calculated independently in the AIR model. For a given location, the model separately calculates the losses from wind and surge perils. Model users have the option to include, exclude or include only a percentage of the surge losses along with wind losses in the reported loss estimates. For purposes of this submission, surge losses were completely excluded from the reported results.

A-3 Coverages

(Significant Revision)

Relevant Form: G-5, Actuarial Standards Expert Certification

A. The methods used in the development of building loss costs shall be actuarially sound.

The AIR U.S. Hurricane Model represents losses to building coverage separately from contents, and appurtenant structures and time element. The methods used in the development of building coverage loss costs are actuarially sound.

B. The methods used in the development of appurtenant structure loss costs shall be actuarially sound.

The AIR U.S. Hurricane Model represents losses to appurtenant structure coverage separately from building, contents, and time element. The methods used in the development of appurtenant structure coverage loss costs are actuarially sound.

C. The methods used in the development of contents loss costs shall be actuarially sound.

The AIR U.S. Hurricane Model represents damages to contents separately from buildings and appurtenant structures since some policies cover contents only and others provide no contents coverage. The methods used in the development of contents loss costs are actuarially sound.

D. The methods used in the development of time element coverage loss costs shall be actuarially sound.

The AIR U.S. Hurricane Model represents losses to time element (also referred to as Additional Living Expense, or "ALE") coverage separately from building, contents and appurtenant structures. The methods used in the development of time element coverage loss costs are actuarially sound.

Disclosures

1. *Describe the methods used in the model to calculate loss costs for building coverage associated with personal and commercial residential properties.*

The model uses a catalog of simulated events to estimate hurricane losses for each exposure location that is input. For a given location, each event produces a range of wind speeds over the duration of the event. AIR applies a vulnerability analysis to each location and, given the intensity of each simulated event, a probability distribution of damage is developed for the property at the policy coverage level (buildings, other structures, contents, and time element). The model has distinct relationships for single-family home and commercial residential structures.

AIR's stochastic event catalogs are designed to produce a complete and stable range of potential annual experience of catastrophe activity. Once complete, a catastrophe loss analysis yields estimated hurricane losses for building coverage. Loss costs are calculated by the user outside the software by summing the estimated hurricane building coverage losses over all stochastic events, dividing by the number of years in the simulation, and also dividing by the insured exposure.

2. *Describe the methods used in the model to calculate loss costs for appurtenant structure coverage associated with personal and commercial residential properties.*

The model estimates hurricane losses for appurtenant structure coverage associated with personal and commercial residential properties using the method described in Disclosure 1. The model has distinct appurtenant structures relationships for single-family home and commercial residential structures. Loss costs are calculated by the user outside the software by summing the estimated hurricane appurtenant structure coverage losses over all stochastic events, dividing by the number of years in the simulation, and also dividing by the insured exposure.

3. *Describe the methods used in the model to calculate loss costs for contents coverage associated with personal and commercial residential properties.*

The model estimates hurricane losses for contents coverage associated with personal and commercial residential properties using the method described in Disclosure 1. The model has distinct contents coverage relationships for single-family home and commercial residential structures. Loss costs are calculated by the user outside the software by summing the estimated hurricane contents coverage losses over all stochastic events, dividing by the number of years in the simulation, and also dividing by the insured exposure.

4. *Describe the methods used in the model to calculate loss costs for time element coverage associated with personal and commercial residential properties.*

The model estimates hurricane losses for time element coverage associated with personal and commercial residential properties using the method described in Disclosure 1. The model has distinct time elements coverage relationships for single-family home and commercial residential structures. Loss costs are calculated by the user outside the software by summing the estimated hurricane time element coverage losses over all stochastic events, dividing by the number of years in the simulation, and also dividing by the insured exposure.

A-4 Modeled Loss Cost and Probable Maximum Loss Considerations

Relevant Form: G-5, Actuarial Standards Expert Certification

A. Loss cost projections and probable maximum loss levels shall not include expenses, risk load, investment income, premium reserves, taxes, assessments, or profit margin.

AIR's U.S. Hurricane Model produces pure loss estimates. Modeled loss costs and probable maximum loss levels do not include expenses, risk load, investment income, premium reserves, taxes, assessments or profit margins.

B. Loss cost projections and probable maximum loss levels shall not make a prospective provision for economic inflation.

The model does not make a prospective provision for economic inflation. Clients' in-force exposures, projected exposures or hypothetical exposures are input to the model.

C. Loss cost projections and probable maximum loss levels shall not include any explicit provision for direct hurricane storm surge losses.

Model users have the option to include, exclude or include only a percentage of the surge losses along with wind losses in the reported loss estimates. For this submission, modeled loss costs and probable maximum loss levels do not include any explicit provision for direct hurricane storm surge losses.

D. Loss cost projections and probable maximum loss levels shall be capable of being calculated from exposures at a geocode (latitude-longitude) level of resolution.

Loss cost projections and probable maximum loss levels are capable of being calculated from exposures at a geocoded (latitude-longitude) level of resolution.

E. Demand surge shall be included in the model's calculation of loss costs and probable maximum loss levels using relevant data.

All model results in AIR's submission reflect use of a function to account for the effects of temporary cost inflation resulting from increased demand for materials and services to repair and rebuild damaged property after a major catastrophe event ("demand surge").

F. The methods, data, and assumptions used in the estimation of demand surge shall be actuarially sound.

The methods, data and assumptions used in the estimation of demand surge are actuarially sound. The demand surge function is derived by analyzing component-level building damage and economic data reflecting component repair costs for historical events. However, the demand surge function is estimated based on very few historical data points and is therefore subject to significant uncertainty. AIR's white paper, *AIR Demand Surge Function*, documents the methods, data, and assumptions used in the estimation of demand surge in the model.

Disclosures

1. *Describe the method or methods used to estimate annual loss costs and probable maximum loss levels. Identify any source documents used and research performed.*

For a given set of exposures (i.e. replacement values) by coverage, by ZIP Code or other geographical grouping and by construction type, losses are estimated and aggregated over storms in our catalog, which comprises thousands of simulated years. Average annual losses by location are calculated by dividing the total losses for all simulated storms by the number of simulated years. Losses can be stated on a 'ground-up,' a 'gross' basis net of only direct policy conditions such as limits and deductibles, or a 'net' basis net of reinsurance recoveries. For this submission, losses are stated on a ground-up or gross basis as requested in the Forms.

Loss costs for a given ZIP Code or county are calculated by dividing the average annual losses for all locations within a geographical area by the corresponding insured exposure.

Probable maximum losses (PMLs) are calculated by ranking the largest loss (or aggregation of annual loss) within each simulated year to the provided exposure data set from highest to lowest, then identifying the event loss whose rank matches the "exceedance probability" (EP) requested under the relative frequency interpretation of probability. A PML is meaningless without an associated "return period", and a return period associated with a PML is the reciprocal of the exceedance probability.

For example, among the largest simulated events in each year, the event whose loss ranks 1,000th highest among all events would have an exceedance probability of 1,000/50,000
or 2%. The corresponding return period for this probable maximum loss would be 1/(2%), or 50 years.

It follows that probable maximum losses vary according to the loss perspective (ground-up, gross or net) requested, as the event loss rankings may differ net of policy or reinsurance conditions.

2. *Identify the highest level of resolution for which loss costs and probable maximum loss levels can be provided. Identify all possible resolutions available for the reported output ranges.*

Loss costs can be provided at any geographic level desired: state, county, ZIP Code, rating territory, grid square or specific location (described by a latitude-longitude pair). The reported output ranges use 5-digit ZIP Code resolution. Probable maximum loss levels can also be provided at any geographic level desired. The process for developing probable maximum losses is the same regardless of the starting data (i.e. event losses for Florida or event losses for a specific ZIP Code). It follows that probable maximum losses vary according to the geographic level (i.e. statewide losses or losses for a single Florida ZIP Code) requested, as the event loss rankings may differ.

3. *Describe how the model incorporates demand surge in the calculation of loss costs and probable maximum loss levels.*

Evidence from major catastrophic events in past years suggests that after a major event, increased demand for materials and services to repair and rebuild damaged property can put pressure on prices, resulting in temporary inflation. This phenomenon is often referred to as demand surge and it results in increased losses to insurers.

Key Factors Leading to Demand Surge

Sudden increase in demand: A catastrophic event causes widespread damage to property, which leads to a sharp increase in the need for building materials and services. Demand for resources such as labor, transportation, equipment and storage also increases sharply in the affected area. Resource availability in any regional economy is typically sufficient to accommodate normal demand, even taking into account some buffer. However, an unexpected increase in demand can lead to shortages and price increases.

Time element losses: When there is widespread damage to property, low regional capacity to meet the increased demand can result in longer than normal repair times. This, in turn, results in greater business interruption losses and additional living expenses. Infrastructure damage, delayed building permit processes and a shortage of available building inspectors are also factors in increasing time element loss.

How the Model Incorporates Demand Surge

AIR has related the amount of demand surge in a particular event to the amount of total industry-wide insurable losses from the event. The factor is dependent on coverage. A table incorporated into the software contains the corresponding demand surge factors, by coverage, for industry-wide losses.

For a given event, the demand surge factors by coverage are applied to the corresponding ground-up losses, based on the industry-wide loss for that event. Policy conditions are then applied probabilistically. The sum of these losses by coverage yields the total event loss with demand surge included.

Very few data points exist to create and validate a demand surge curve, resulting in significant uncertainty about the level of demand surge following an event. This uncertainty is illustrated by examining the sensitivity of the demand surge curve. Increasing the demand surge factors uniformly by 10%, for example, results in average annual losses increasing by approximately 6.2%.

4. *Provide citations to published papers, if any, that were used to develop how the model estimates demand surge.*

No published papers on demand surge were used to develop how the model estimates demand surge.

A-5 Policy Conditions

Relevant Form: G-5, Actuarial Standards Expert Certification

A. The methods used in the development of mathematical distributions to reflect the effects of deductibles and policy limits shall be actuarially sound.

The methods used in the development of mathematical distributions to reflect the effects of deductibles and policy limits are actuarially sound. The AIR damageability functions generate a mean damage ratio for a given wind speed. For any estimated mean damage ratio, there is a mixed probability distribution, $f_{\bar{D}}$, that includes finite probabilities of damage at zero and 100 percent. This representation of the damage ratio fits well with observed data. A sample distribution is shown in Figure 52.

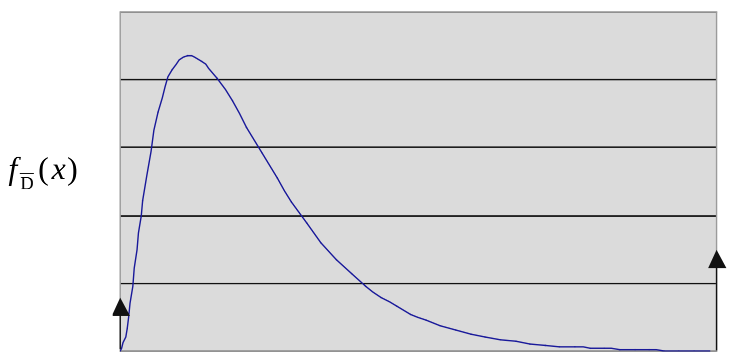


Figure 52. Probability Distribution Around the Mean Damage Ratio

Thus, the effects of deductibles, coinsurance and other policy conditions can be properly calculated, as this sample insured loss calculation illustrates:

$$\text{Expected Insured Loss} = \int_{x=0}^{1} f_{\bar{D}}(x)\,\max\{0,\ \text{Coins\%} * [\min(\text{x} * \text{RV}, \text{PL}) - \text{DED}]\}\,dx$$

where	Coins%	=	Coinsurance Percentage
	RV	=	Replacement Value
	PL	=	Policy Limit
	DED	=	Deductible
	x	=	Random Variable for Damage Ratio

In application, $f_{\bar{D}}(x)$ is discretized and numerical integration is used to estimate the expected insured loss.

B. The relationship among the modeled deductible loss costs shall be reasonable.

The relationship among the modeled deductible loss costs is reasonable. Loss costs do decrease as deductibles increase, other factors held constant.

C. Deductible loss costs shall be calculated in accordance with s. 627.701(5)(a), F.S.

The AIR model explicitly enables the application of seasonal deductibles in accordance with s. 627.701(5)(a), F.S. The statute requires the application of the hurricane deductible to the first event, and the greater of the remaining deductible and the all other perils deductible to losses from subsequent events in the same calendar year.

Disclosures

1. *Describe the methods used in the model to treat deductibles (both flat and percentage), policy limits, replacement costs, and insurance-to-value when projecting loss costs.*

For any estimated mean damage, there is a probability distribution around that mean. Thus, expected damages above different deductible levels can be readily calculated. Flat dollar deductibles are applied directly while deductibles that are a percentage of coverage amount are converted to the flat dollar equivalent (i.e. ded % * insured value) and applied. The model calculates losses to replacement costs and caps losses at policy limits. Insurance-to-value is addressed by the user and identified in the PIAF (see Appendix 6), as applicable.

2. *Provide an example of how insurer loss (loss net of deductibles) is calculated. Discuss data or documentation used to confirm or validate the method used by the model.*
   Example:

(A)		(B)	(C)	(D)=(A)*(C)	(E)=(D)-(B)
Building Value	Policy Limit	Deductible	Damage Ratio	Zero Deductible Loss	Loss Net of Deductible
100,000	90,000	500	2%	2,000	1,500

The following are examples of how insurer losses (net of deductibles) are calculated.

Table 22. Calculating Losses Net of Deductibles

(A) Structure Value	Policy Limit	(B) Deductible	(C) Mean Damage Ratio	(D)=(A)*(C) Zero Deductible Loss	(E) Loss Net of Deductible*
100,000	90,000	500	2%	2,000	1,688
100,000	90,000	500	5%	5,000	4,573

*The calculation of the Loss Net of Deductible reflects the model's use of a full probability distribution of damage and is based on actuarial theory of deductibles and limits as illustrated in the Expected Insured Loss equation. The literature source is Hogg, R.V. and Klugman, S. A., *Loss Distributions*, John Wiley and Sons, 1984.

The probability distributions of damage are validated using engineering studies and actual loss data.

3. Describe how the model calculates annual deductibles.

Annual frequency of event occurrence is a key model parameter. Each simulated year may have zero, one or multiple events. This approach for generating the event catalog makes it straightforward to determine the probability and losses of multiple-event seasons.

The functionality to calculate losses net of an annual deductible was enabled during 2005 in the software. Prior to this, the user would have performed the calculations outside the software. The deductible is applied in Touchstone as follows: for the first hurricane event in a year, apply the hurricane deductible to the loss distribution. Calculate the "applicable deductible" for this event (see definition below), and then calculate the "remaining deductible" as (hurricane deductible - applicable deductible). The deductible that will apply to the next event is the higher of the "remaining deductible" and the all other perils deductible. The remaining deductible is recalculated and stored after each event per location.

> Applicable Deductible = Σ min(loss, deductible)*probability_j,
>
> where the summation covers from $j = 1$ to the number of points in the damage ratio distribution and probability_j is the probability of loss at the jth point in the distribution.
>
> *Example*: User enters $10,000 as the hurricane deductible (DED1) and $500 as the all other perils deductible (DED2). A first event occurs with a loss of $7,000, and the applicable deductible is calculated as $7,000, with a remaining deductible of $3,000. For the next event in the same year, the deductible will be max ($3,000, $500), or $3,000. A second event occurs, and the applicable deductible is calculated as $2,700. From this point on, the $500 all other perils deductible would apply to each subsequent event in the year (note that the remaining deductible concept only applies to multiple events within a year—the full hurricane deductible of $10,000 will apply if there is only a single event in a given year).

A-6 Loss Output

(Significant Revision)

Relevant Forms: G-5, Actuarial Standards Expert Certification
A-1, Zero Deductible Personal Residential Loss Costs by ZIP Code
A-2, Base Hurricane Storm Set Statewide Losses
A-3A, 2004 Hurricane Season Losses (2007 FHCF Exposure Data)
A-3B, 2004 Hurricane Season Losses (2012 FHCF Exposure Data)
A-4A,Output Ranges (2007 FHCF Exposure Data)
A-4B, Output Ranges (2012 FHCF Exposure Data)
A-5, Percentage Change in Output Ranges (2007 FHCF Exposure Data)
A-6, Logical Relationship to Risk (Trade Secret item)
A-7, Percentage Change in Logical Relationship to Risk
A-8, Probable Maximum Loss for Florida
S-2A, Examples of Loss Exceedance Estimates (2007 FHCF Exposure Data)
S-2B, Examples of Loss Exceedance Estimates (2012 FHCF Exposure Data)
S-5, Average Annual Zero Deductible Statewide Loss Costs – Historical versus Modeled

A. The methods, data, and assumptions used in the estimation of probable maximum loss levels shall be actuarially sound.

The AIR model uses actuarially sound methods, data and assumptions in the estimation of probable maximum loss levels.

B. Loss costs shall not exhibit an illogical relation to risk, nor shall loss costs exhibit a significant change when the underlying risk does not change significantly.

The AIR model produces loss costs that are logical in relation to risk and do not exhibit a significant change when the underlying risk does not significantly change.

C. Loss costs produced by the model shall be positive and non-zero for all valid Florida ZIP Codes.

The loss costs are positive and non-zero for all ZIP Codes. Loss cost maps by ZIP Code are provided in Form A-1.

D. Loss costs cannot increase as the quality of construction type, materials and workmanship increases, all other factors held constant.

Loss costs do not increase as the quality of construction, material or workmanship increases, all else being equal. Loss cost maps for wood frame, masonry and mobile home construction types are provided in Form A-1.

E. Loss costs cannot increase as the presence of fixtures or construction techniques designed for hazard mitigation increases, all other factors held constant.

Loss costs do not increase as the presence of mitigation devices or techniques increases, all else being equal.

F. Loss costs cannot increase as the quality of building codes and enforcement increases, all other factors held constant.

Loss costs do not increase as the quality of building codes and enforcement increases, all else being equal.

G. Loss costs shall decrease as deductibles increase, all other factors held constant.

Loss costs do decrease as deductibles increase, all else being equal.

H. The relationship of loss costs for individual coverages, (e.g., buildings and appurtenant structures, contents, and time element) shall be consistent with the coverages provided.

The relationship of losses for building, appurtenant structures, contents and additional living expense to the total loss as produced by the model is reasonable, as demonstrated by comparing the relationships between actual and modeled losses for historical events.

Table 23. Comparison Between Actual and Modeled Losses for Different Coverages

	Cov. A	Cov. B	Cov. C	Cov. D	Total
Actual	0.757	0.076	0.131	0.036	1.000
Modeled	0.754	0.075	0.129	0.042	1.000

I. Output ranges shall be logical for the type of risk being modeled and deviations supported.

Output Ranges are logical. There are no deviations other than those inherent to the underlying data in the calculation of average loss costs. These are explained in Disclosure 14 below.

J. All other factors held constant, output ranges produced by the model shall in general reflect lower loss costs for:

1. masonry construction versus frame construction,

Output ranges produced by the model reflect lower loss costs for masonry construction versus frame construction.

2. personal residential risk exposure versus mobile home risk exposure,

Output ranges produced by the model reflect lower loss costs for personal residential versus mobile home construction risk exposure.

3. inland counties versus coastal counties, and

Output ranges produced by the model reflect lower loss costs, in general, for inland counties versus coastal counties.

4. northern counties versus southern counties.

Output ranges produced by the model reflect lower loss costs, in general, for northern counties versus southern counties.

K. For loss cost and probable maximum loss level estimates derived from or validated with historical insured hurricane losses, the assumptions in the derivations concerning (1) construction characteristics, (2) policy provisions, (3) coinsurance, (4) contractual provisions, and (5) relevant underwriting practices underlying those losses, as well as any actuarial modifications, shall be appropriate based on the type of risk being modeled.

AIR uses historical insured hurricane losses received from clients for validation purposes. This loss data typically includes both exposure and loss details including construction characteristics and policy provisions such as coverage and deductible. The flow chart below in Figure 53 demonstrates the work flow associated with receiving, validating and using client data.

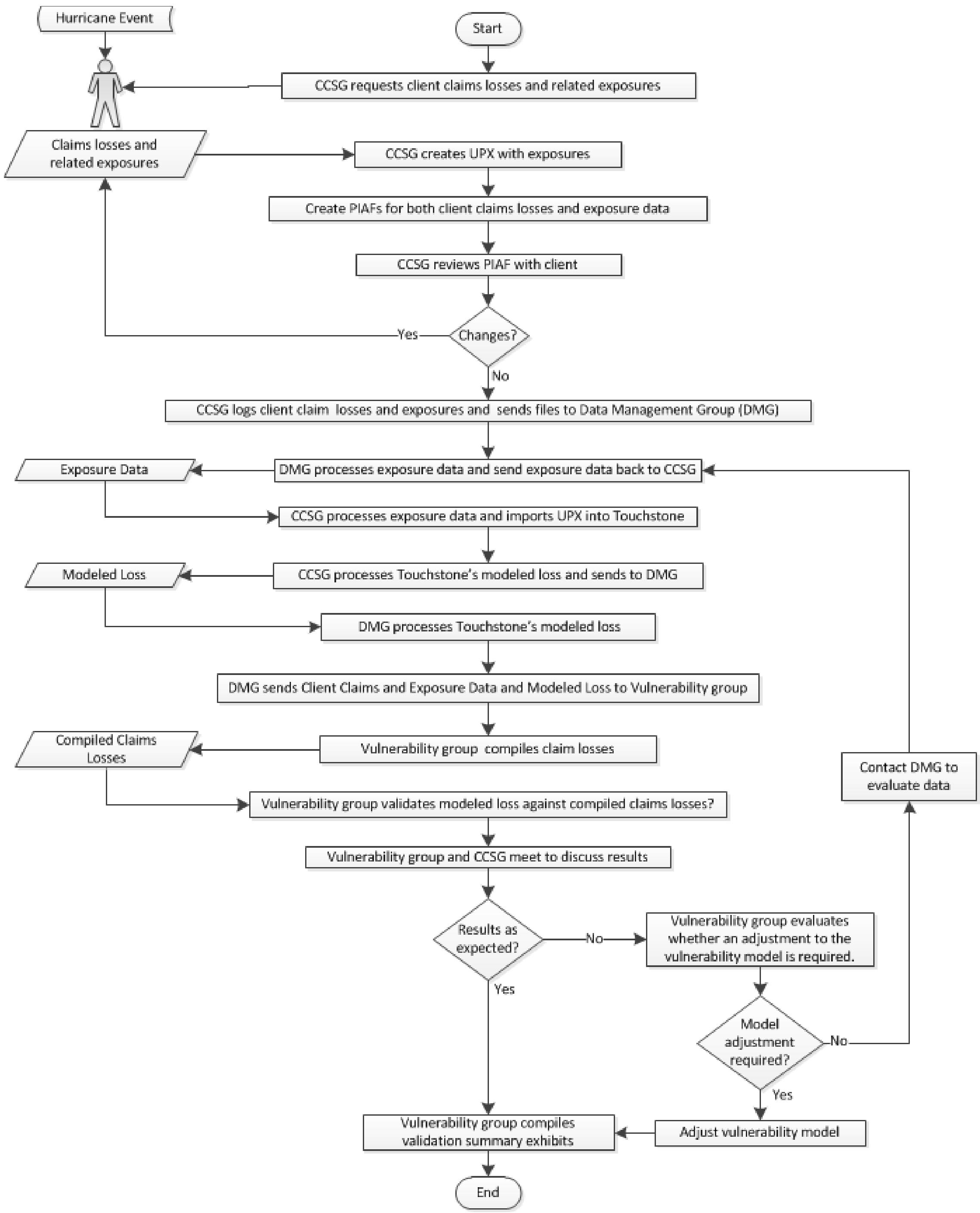


Figure 53. Historical Claims Data Workflow

AIR communicates with clients and sends out a letter requesting information on claim payment practices, coinsurance, contractual provisions and relevant underwriting practices underlying those losses.

All assumptions underlying any adjustments are discussed with our clients and documented in a Project Information and Assumptions Form (PIAF), a sample of which is included in Appendix 6 of this submission.

All assumptions as well as any actuarial modifications made are appropriate.

Disclosures

1. *Provide a completed Form A-1, Zero Deductible Personal Residential Loss Costs by ZIP Code. Provide a link to the location of the form here.*

A completed Form A-1 is provided on page 274.

2. *Provide a completed Form A-2, Base Hurricane Storm Set Statewide Losses. Provide a link to the location of the form here.*

A completed Form A-2 is provided on page 278.

3. *Provide a completed Form A-3A, 2004 Hurricane Season Losses, using the 2007 Florida Hurricane Catastrophe Fund aggregate personal and commercial residential exposure data. Provide a link to the location of the form here.*

A completed Form A-3A is provided on page 310.

4. *Provide a completed Form A-3B, 2004 Hurricane Season Losses, using the 2012 Florida Hurricane Catastrophe Fund aggregate personal and commercial residential exposure data. Provide a link to the location of the form here.*

A completed Form A-3B is provided on page 342.

5. *Provide a completed Form A-4A, Output Ranges, using the 2007 Florida Hurricane Catastrophe Fund aggregate personal and commercial residential exposure data. Provide a link to the location of the form here.*

A completed Form A-4A is provided on page 343.

6. *Provide a completed Form A-4B, Output Ranges, using the 2012 Florida Hurricane Catastrophe Fund aggregate personal and commercial residential exposure data. Provide a link to the location of the form here.*

A completed Form A-4B is provided on page 365.

7. *Provide a completed Form A-5, Percentage Change in Output Ranges, using the 2007 Florida Hurricane Catastrophe Fund aggregate personal and commercial residential exposure data. Provide a link to the location of the form here.*

A completed Form A-5 is provided on page 384.

8. *A completed Form A-6, Logical Relationship to Risk (Trade Secret item) shall be provided during the closed meeting portion of the Commission meeting to review the model for acceptability.*

A completed Form A-6, Logical Relationship to Risk (Trade Secret item) will be provided during the closed portion of the Commission meeting.

9. *Provide a completed Form A-7, Percentage Change in Logical Relationship to Risk. Provide a link to the location of the form here.*

A completed Form A-7 is provided on page 394.

10. *Provide a completed Form A-8, Probable Maximum Loss for Florida. Provide a link to the location of the form here.*

A completed Form A-8 is provided on page 405

11. *Describe how the model produces probable maximum loss levels.*

AIR simulates individual events within individual years. The stochastic hurricane catalog comprises a set number of simulated years—in this submission, 50,000. Each year may produce zero, one or multiple events. Probable maximum losses (PMLs) may be readily calculated on either an event, annual occurrence (largest event within a year) or an annual aggregate (all events within a year) basis. PMLs will differ depending on the loss perspective—ground-up, gross or net of reinsurance. PMLs may also be calculated over any specific geographical area or peril. In this submission and Form A-8 the subject area is solely the state of Florida and the peril is solely hurricane wind. Form A-8 is provided with PMLs on an annual occurrence basis.

Probable maximum losses are calculated on an annual occurrence basis by ranking the largest loss to the provided exposure data set within each simulated year from highest to lowest, then identifying the event loss whose rank matches the “exceedance probability” (EP) requested under the relative frequency interpretation of probability. A PML is meaningless without an associated “return period”, and a return period associated with a PML is just the reciprocal of the exceedance probability.

For example, the simulated event whose loss ranks 1,000th highest among all events would have an exceedance probability of 1,000/50,000 or 2%. The corresponding return period for this probable maximum loss would be 1/(2%), or 50 years.

It follows that probable maximum losses vary according to the loss perspective (ground-up, gross or net) requested, as the event loss rankings may differ net of policy or reinsurance conditions.

12. *Provide citations to published papers, if any, that were used to estimate probable maximum loss levels.*

No published papers were used to estimate probable maximum loss levels. Standard probability theory supports AIR’s event-ranking methodology for assembling PMLs.

13. *Describe how the probable maximum loss levels produced by the model include the effects of personal and commercial residential insurance coverage.*

The probable maximum loss levels produced by the model incorporate the process described in Disclosure 11. The calculation of the probable maximum loss is consistent across all exposure types whether they be personal or commercial residential insurance coverage.

14. *Explain any difference between the values provided on Form A-8 (Probable Maximum Loss for Florida) and those provided on Form S-2B (Examples of Loss Exceedance Estimates, 2012 FHCF Exposure Data).*

There are no differences between the values provided on Form A-8 and those provided on Form S-2.

15. *Provide an explanation for all anomalies in the loss costs that are not consistent with the requirements of this standard.*

Loss costs for frame construction are greater than for masonry in nearly every ZIP Code. However, the county weighted average loss costs can depart from this when there is more exposure in high loss cost ZIP Codes for masonry construction than for frame. The following example illustrates how the county weighted average loss cost can be greater for masonry than for frame.

Table 24. County Weighted Average Loss Costs for Masonry and Frame

ZIP Code	Construction	Exposure	Loss Cost per 1,000
A	Masonry	10,000	4.0
A	Frame	1,000	5.0
B	Masonry	1,000	1.0
B	Frame	10,000	2.0
County Avg	Construction		
	Masonry		3.73
	Frame		2.27

Anomalies of this type have been background-shaded in orange in Form A-4.

16. *Provide an explanation of the differences in output ranges between the previously accepted submission and the current submission.*

Since the previous submission, the following several refinements were made to the model:. These changes produce the differences seen in the output ranges between the previously accepted and current submission:

Event Generation Component (i.e. Catalog): For this model release, AIR's historical storm set has been updated, incorporating track information from the August 15, 2013 version of HURDAT2. The probability distributions used for annual landfall frequency and landfall location in the stochastic catalog have been updated accordingly and a new stochastic catalog has been generated.

Building Vulnerability Updates: Several updates to the wind vulnerability functions are made, including mobile home vulnerability, adjustments to structural wind vulnerability based on square footage, and factors which adjust the base vulnerability accordingly when the user provides no year built information.

Hazard Updates: The hazard component of the model, comprising both the wind and the storm surge hazard models, of the U.S. Hurricane Model has been updated since the release of the previously accepted model.

Geographical or Other Updates: The ZIP Code and Industry Exposure databases are updated each year.

The overall change in the statewide industry residential average loss costs is +5.4%. The isolated impact of each of these changes is shown in Table 25.

Table 25. Statewide Impact of Model Updates on Weighted Average Loss Costs

Model Component	Percent Change
Event Generation	-0.74%
Hazard	+0.8%
Building Vulnerability	+5.2%
Geographical or Other Data	+0.2%
Total Difference in Output Range	+5.4%

17. *Identify the assumptions used to account for the effects of coinsurance on commercial residential loss costs.*

The model captures the effects of coinsurance through the use of the location level participation field. This field reflects the percentage of the risk covered by the insurer. Insurers may make specific assumptions to allow for any coinsurance adjustments. If AIR makes assumptions at the client's request regarding coinsurance, such assumptions are included in the PIAF.

18. *Describe how loss adjustment expenses are considered within the loss cost and probable maximum loss level estimates.*

The modeled losses include losses to the primary structure, the appurtenant structures, contents and additional living expenses. No explicit consideration is made for loss adjustment expenses. Actual loss data from client companies used for validation purposes does not include loss adjustment expenses. If provided, these expenses are identified separately and are not used in the validation.

Florida Commission on Hurricane Loss Projection Methodology

2013 Computer Standards

C-1 Documentation

Relevant Form: G-6, Computer Standards Expert Certification

A. Model functionality and technical descriptions shall be documented formally in an archival format separate from the use of letters, slides, and unformatted text files.

AIR Worldwide maintains an expansive collection of both client-facing and internal documentation, which is presented using defined documentation templates, style sheets, and content structure. The documentation makes apparent the application name, version number, as well as revision history detail. This documentation is formally developed independently from letters, slides, and unformatted text files.

The internal and client-based documentation shall be available for review by the Professional Team.

B. The modeling organization shall maintain a primary document repository, containing or referencing a complete set of documentation specifying the model structure, detailed software description, and functionality. Development of the documentation shall be indicative of accepted software engineering practices.

AIR Worldwide creates and maintains its internal and client-based documentation using accepted software engineering practices. All documentation is maintained within source control and carefully managed throughout the development process.

Access to documentation maintained within the AIR Intranet (AIRPort) by internal uses is validated by Windows®-authenticated user name and password. The client-based documentation, available via the Client Portal and Developer's Zone sites on the AIR public website, is accessed using a registered user name/password combination.

The client-based documentation includes:

- MS Office suite-based documentation. Documentation types include, but are not limited to, user manuals and how-to guides, white papers, technical documentation, and marketing material. This documentation is available to clients from the Client Portal site of the AIR public website.
- MSDN-style API documentation, which is presented as an HTML web-based documentation set. This documentation set is available to clients from the Developer's Zone site of the AIR public website. This documentation is also available in PDF format.
- MSDN-style Database documentation, which is presented as an HTML, web-based documentation set. This documentation set is available to clients from the Developer's Zone site of the AIR public website. This documentation is also available in PDF format.
- Topic-based User Help system, which is available to the user via the software application.

The internal documentation, which is available to AIR employees via AIRPort, includes:

- MS Office suite-based documentation. Documentation types include, but are not limited to, requirements, design documents, architecture documents, test plans, and project schedules.
- FCHLPM-specific documentation set, which includes:

- HTML web-based User Help system, which is designed to present model and software topics as specified by the FCHLPM.
- MS Office suite-based documentation that provides detailed discussion regarding the development of the model and software. This documentation is hyperlinked directly from the FCHLPM User Help system, and is also available independently from a designated FCHLPM documentation repository on AIRPort.
- MSDN-style Database documentation, which is presented as an HTML web-based documentation set. This documentation is hyperlinked directly from the FCHLPM User Help system. This documentation differs from the client-based documentation set in that it defines databases that are not released to the client (i.e. ZIPAll).

The internal and client-based documentation, as well as the sites from which they are available, shall be available for review by the Professional Team.

C. All computer software (i.e., user interface, scientific, engineering, actuarial, data preparation, and validation) relevant to the submission shall be consistently documented and dated.

All components as defined by the Requirements are fully documented and dated, and such documentation shall be available for review by the Professional Team.

D. The modeling organization shall maintain (1) a table of all changes in the model from the previously accepted submission to the initial submission this year and (2) a table of all substantive changes since this year's initial submission.

The document *Enhancements and Florida Commission Documentation Mapping* identifies the updates specific to the AIR Atlantic Tropical Cyclone Model version 15.0.1 and Touchstone application version 3.0.0 as required to satisfy General Standard G-1, Disclosure item 5-A, as well as the changes from the previously accepted submission.

E. Documentation shall be created separately from the source code.

U.S. Hurricane Model and Touchstone software documentation is developed and maintained independently from the source code. Both the formal documentation and detailed in-line comments within the source code shall be available for review by the Professional Team.

C-2 Requirements

Relevant Form: G-6, Computer Standards Expert Certification

The modeling organization shall maintain a complete set of requirements for each software component as well as for each database or data file accessed by a component. Requirements shall be updated whenever changes are made to the model.

All requirements for the AIR Atlantic Tropical Cyclone Model and Touchstone are documented and reviewed; each version release contains a unique set of requirements documentation. These requirements are used extensively to develop design documentation and test plans.

The requirement documents, which are available via AIRPort, include the following information:

- Purpose/Objective
- Business Requirement – Specification/Impact
- Model Updates – Specification/Impact
- Software Updates – Specification/Impact

The workflow in Figure 54 illustrates the Requirements development and review process.

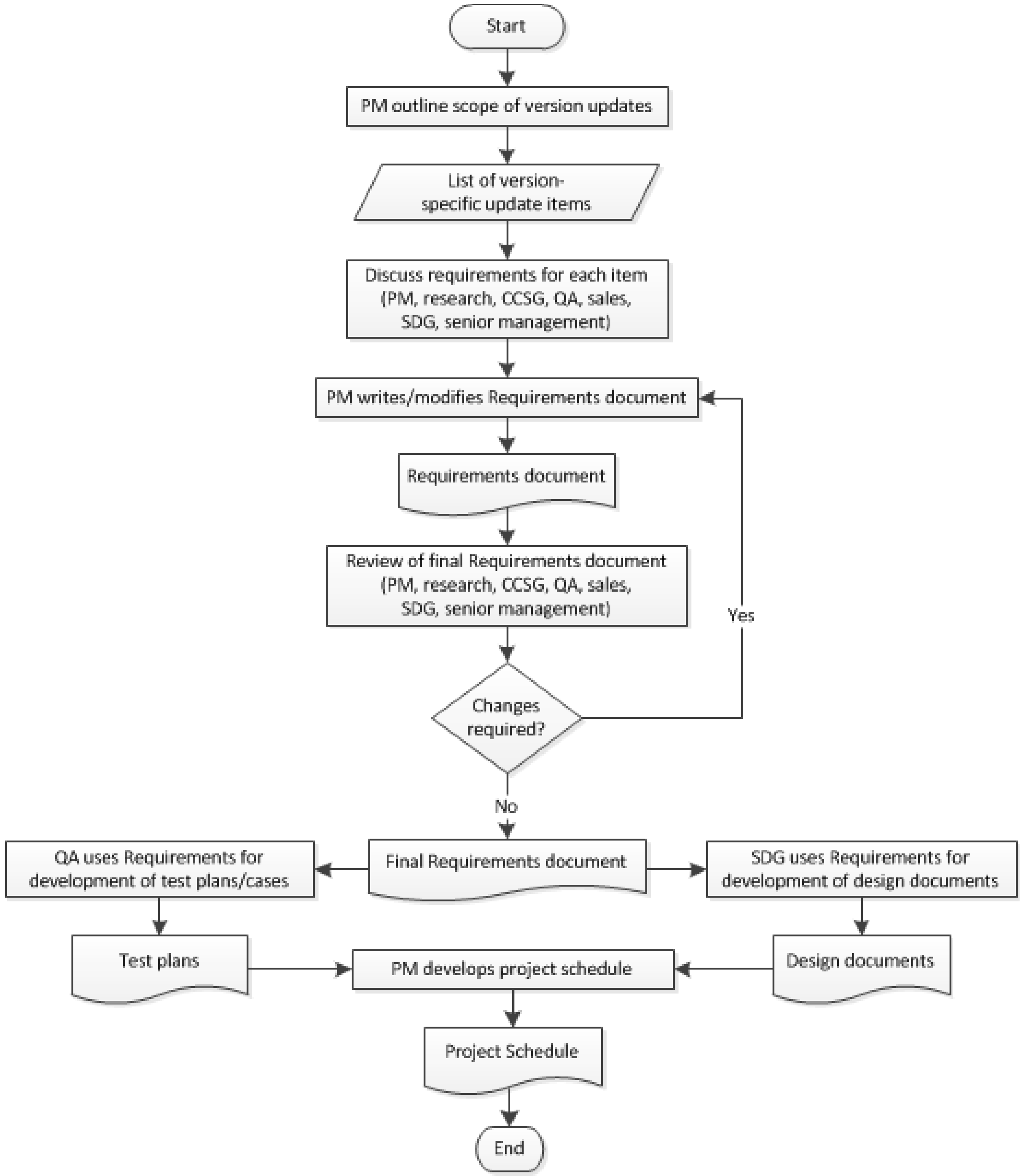


Figure 54. The Requirements Development and Review Process

Documentation specifying model and software requirements shall be available for verification by the Professional Team.

Disclosure

1. Provide a description of the documentation for interface, human factors, functionality, documentation, data, human and material resources, security, and quality assurance.

The Touchstone interface, human factors, and functionality are documented in the Touchstone User Help system, which is accessed through the software application. AIR also provides various "How-To" guides, which are designed to aid the user in regards to specific Touchstone functionality (i.e. *Getting Started with Touchstone or Using Loss Analysis in Touchstone*). These documents are available to clients via the Client Portal site on the AIR public website.

The U.S. Hurricane Model data files are discussed within the component-specific documents.

The MSDN-style Touchstone database documentation defines the schemas, tables, and columns for the Touchstone databases. It is presented as an HTML web-based documentation set available to clients from the Developer's Zone site of the AIR public website. This documentation is also available in PDF format.

AIR maintains a User Help system that specifically addresses the topics relevant to the FCHLPM Computer Standards; the topics presented in the FCHLPM User Help system include:

- Touchstone Lifecycle Overview, which includes detailed discussion of version change management, model and software application development, testing, packaging and release, and client support. Additional support documentation is hyperlinked from within this Help system, such as model component data files and test plans.
- Touchstone architecture, including hyperlinks to detailed architecture documentation.
- AIR Worldwide FCHLPM Process Overview, which includes discussion of responsibilities, communication, and the Report of Activities. Additional FCHLMP process-specific support documentation that is hyperlinked from this Help system includes Line Counts, Version Change History, Output Range Reports, Probable and Maximum Loss.

C-3 Model Architecture and Component Design

(Significant Revision)

Relevant Form: G-6, Computer Standards Expert Certification

The modeling organization shall maintain and document (1) detailed control and data flow diagrams and interface specifications for each software component, (2) schema definitions for each database and data file, and (3) diagrams illustrating model-related flow of information and its processing by modeling organization personnel or team. Documentation shall be to the level of components that make significant contributions to the model output.

Component-specific documents contain detailed control and data flow diagrams, class diagrams, and interface specifications that illustrate the design and architecture of the U.S. Hurricane Model and Touchstone, including its components and sub-components. These documents shall be available to the Professional Team.

The MSDN-style Database documentation defines the schemas, tables, and columns for the Touchstone databases. This documentation is hyperlinked directly from the FCHLPM User Help system. This documentation differs from the client-based documentation set in that it defines databases that are not released to the client, such as the ZIPAll database.

The FCHLPM User Help system presents detailed process workflows for all aspects of the design, development, implementation, and testing of the U.S. Hurricane Model and Touchstone software; these workflows shall be available for review by the Professional Team.

The workflows in Figure 55 to

Figure 61 illustrate the model and software design, development, implementation and testing process. Model and software development custodians shall be available to explain the functional behavior of any model or software component and to respond to questions concerning changes in code, documentation or data for that component.

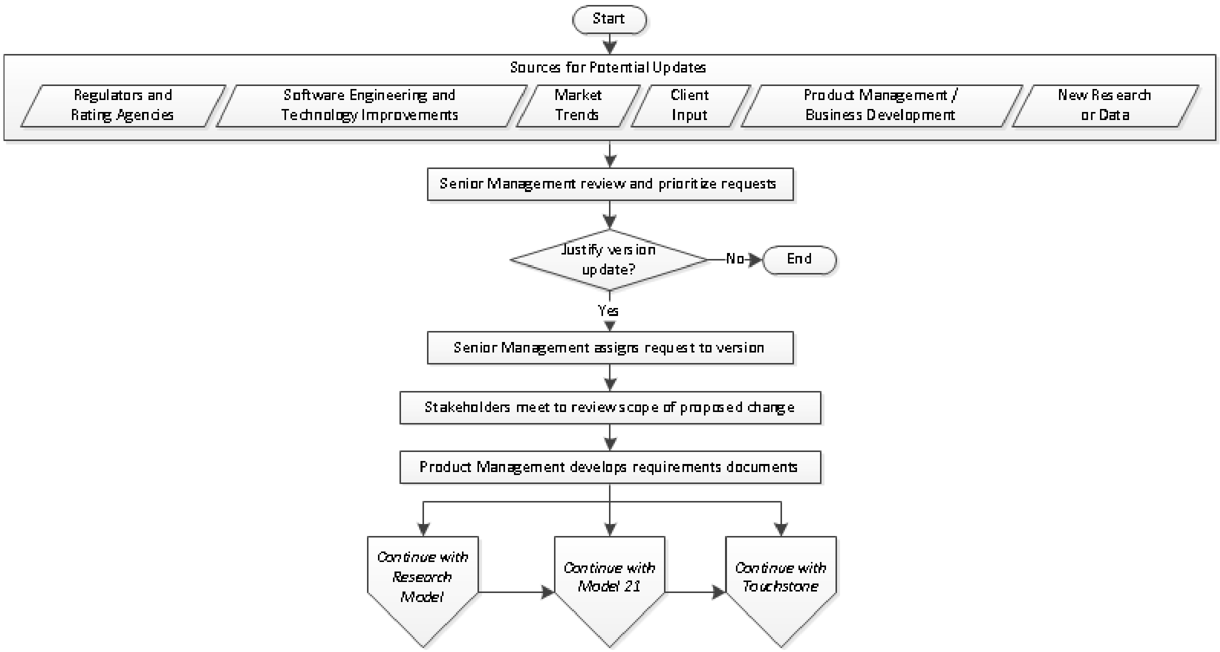
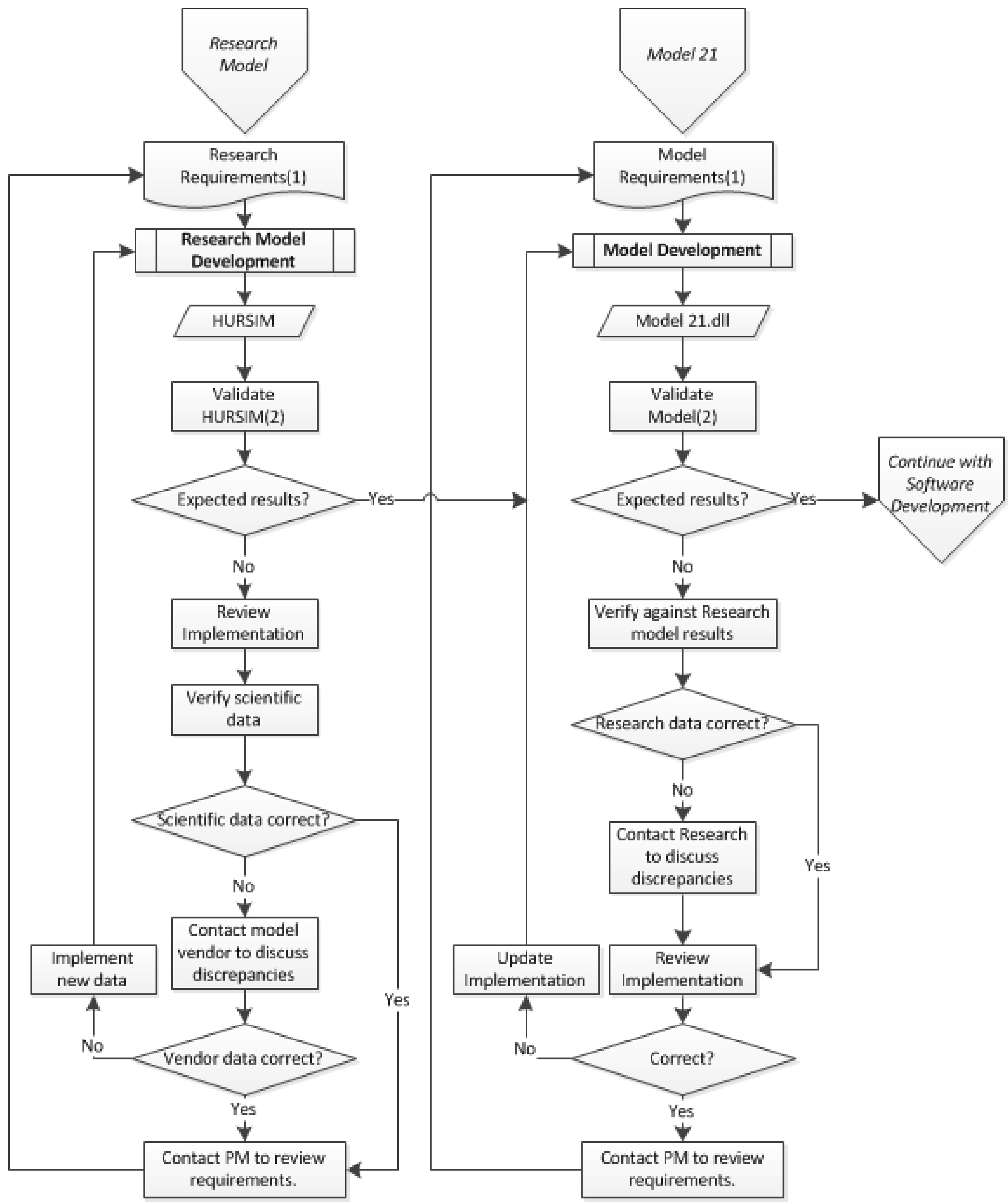


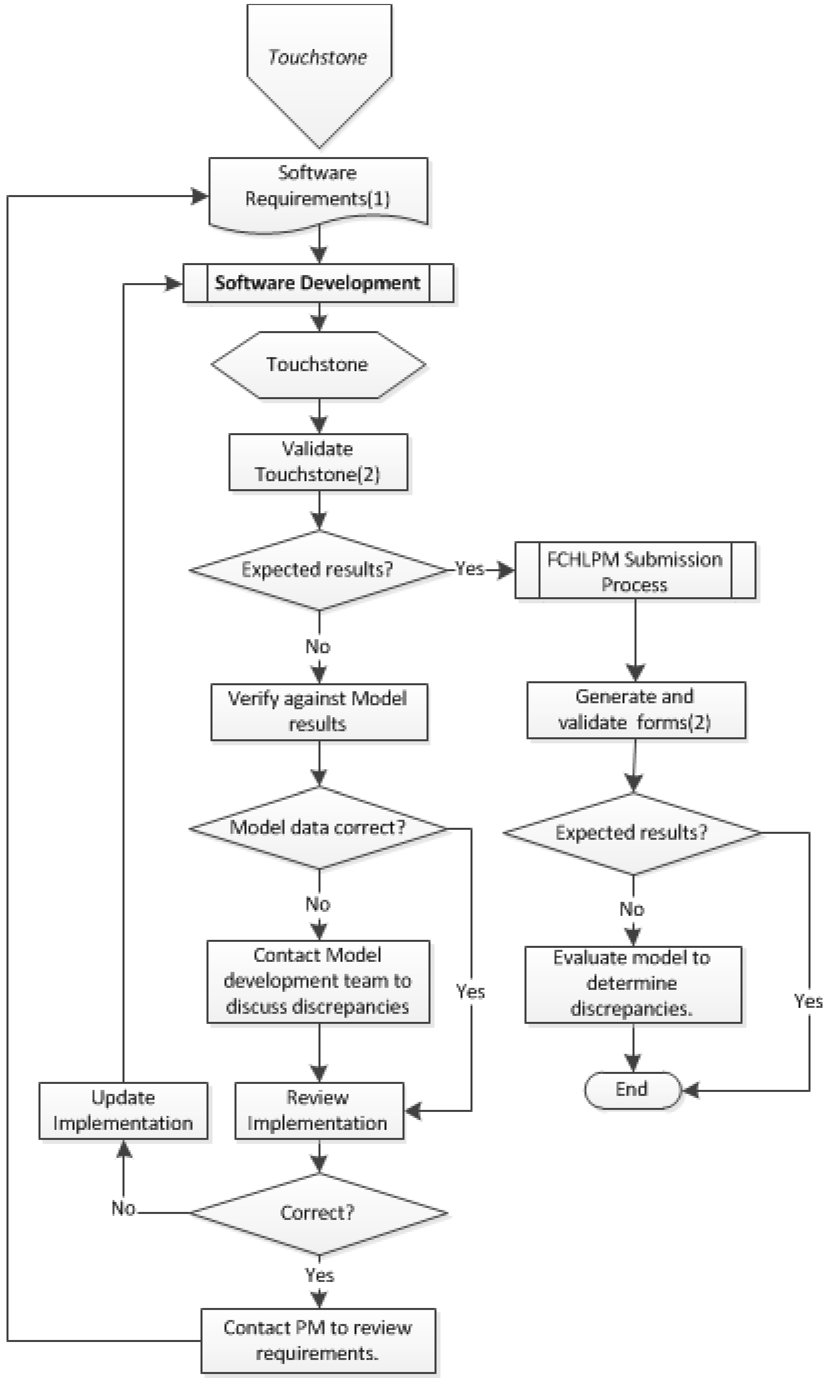
Figure 55.a. Development and Implementation High Level Overview



1) Requirements documentation is the foundation for the development of the design, testing, and other support documentation. Development of these documents is integrated into the Research Model, Model, and Software Development processes.

2) Validation includes: run test cases and analyze results, verify loss results, and review documentation.

Figure 55.b. Development and Implementation Overview Continued



1) Requirements documentation is the foundation for the development of the design, testing, and other support documentation. Development of these documents is integrated into the Research Model, Model, and Software Development processes.

2) Validation includes: run test cases and analyze results, verify loss results, and review documentation.

Figure 55.c. Development and Implementation Overview Continued

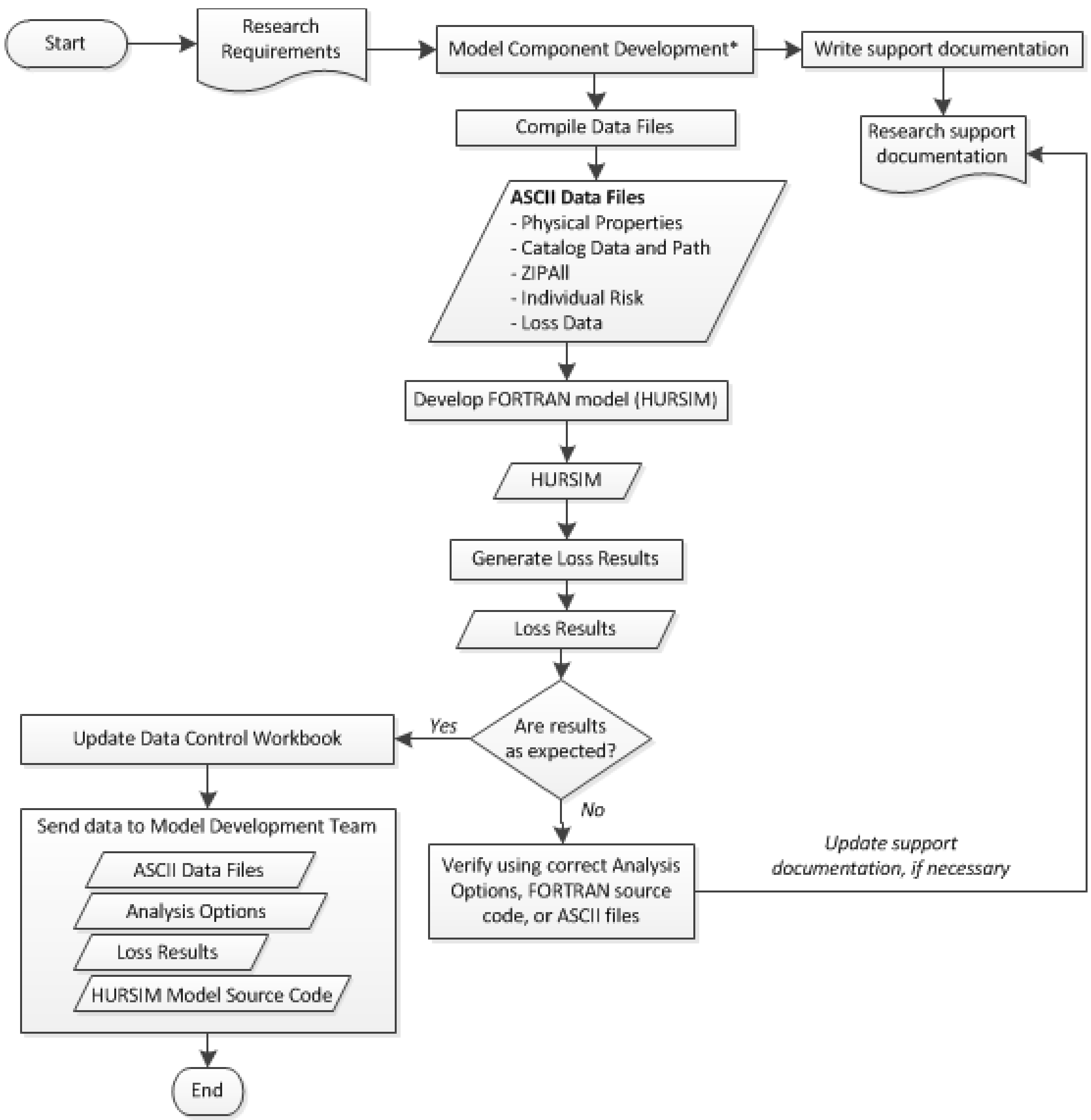


Figure 56. Model Development—Research Group

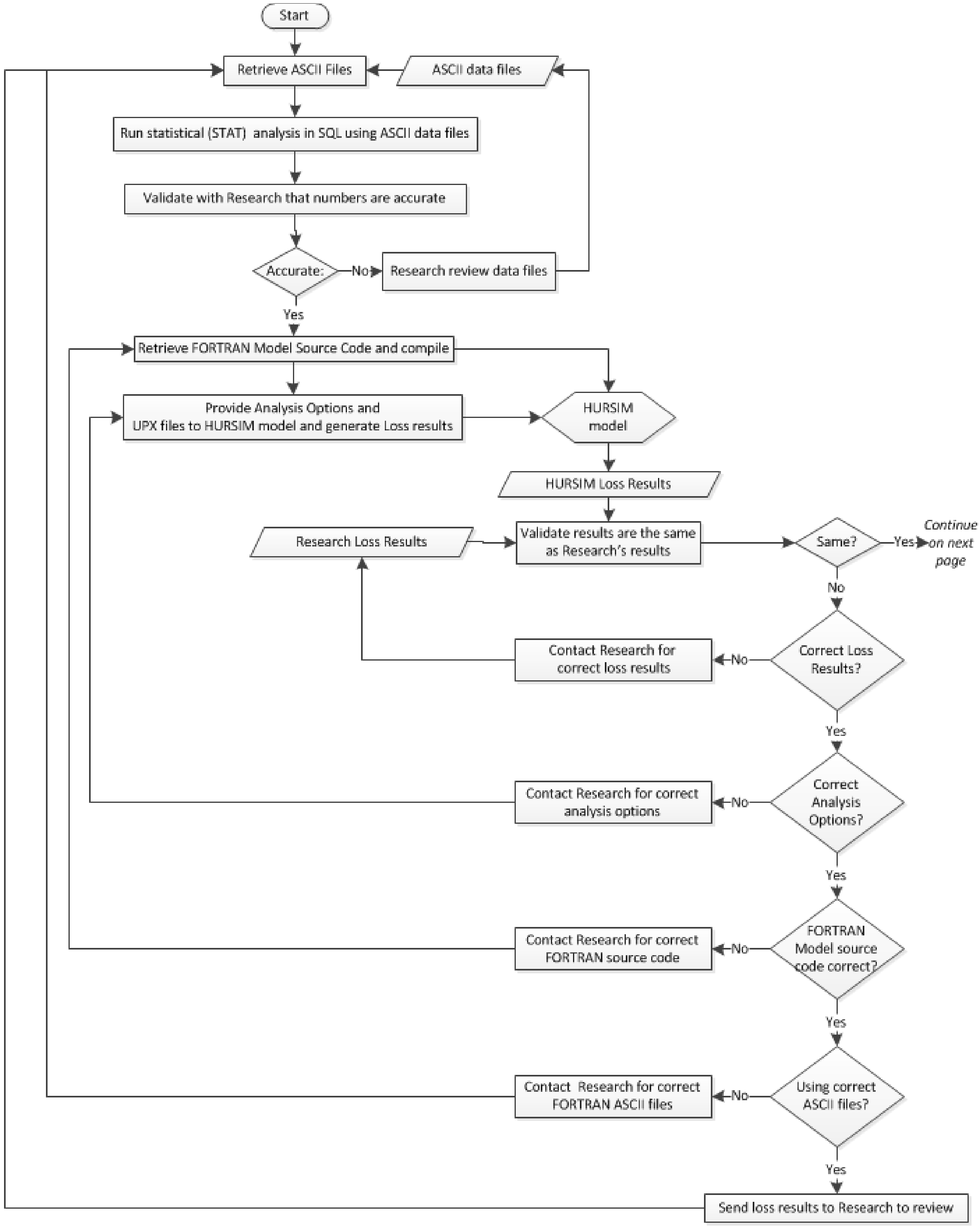


Figure 57. Model Porting and Implementation of Model 21.dll into Touchstone

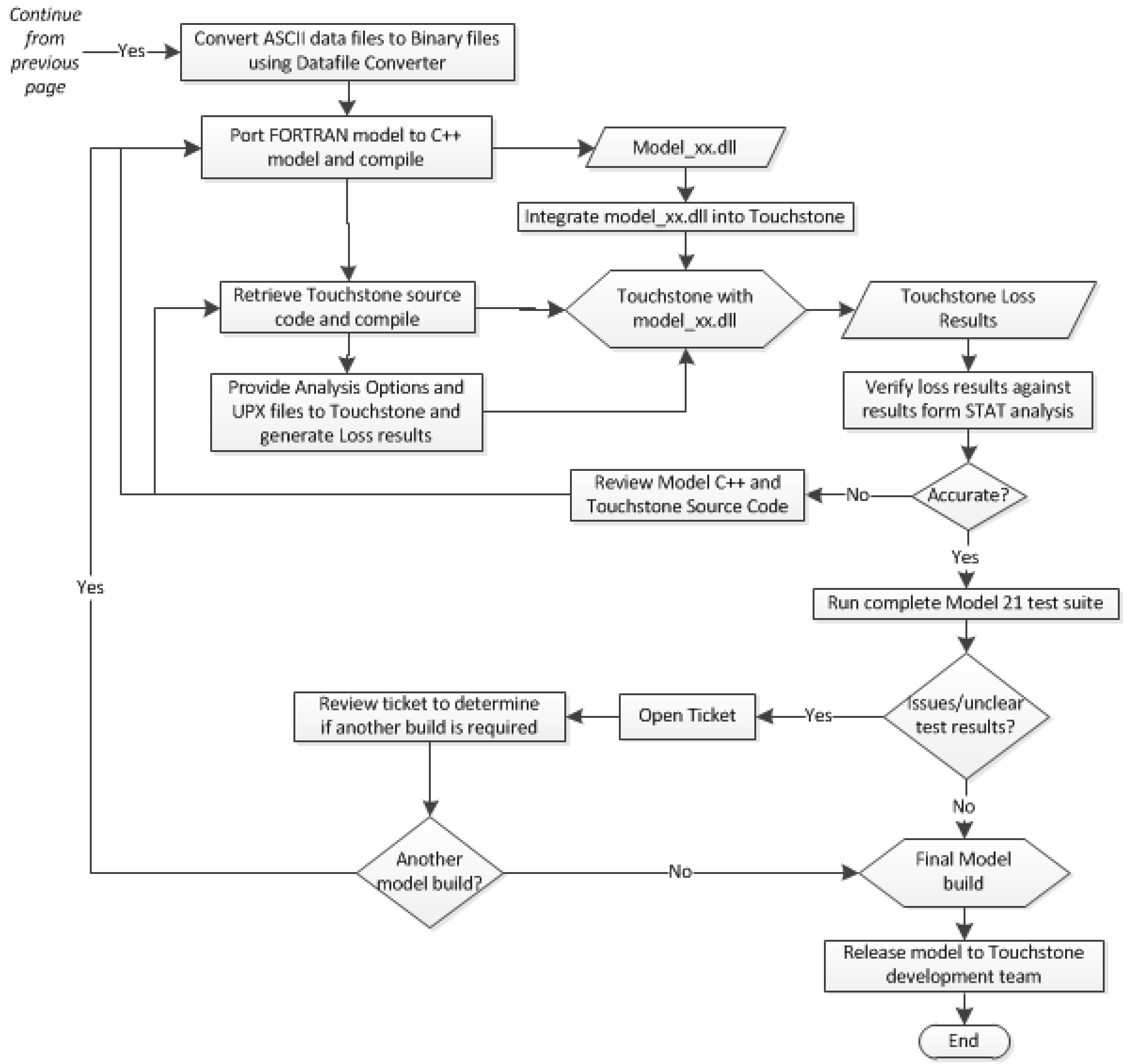


Figure 58. Model Porting and Implementation of Model 21.dll into Touchstone (continued)

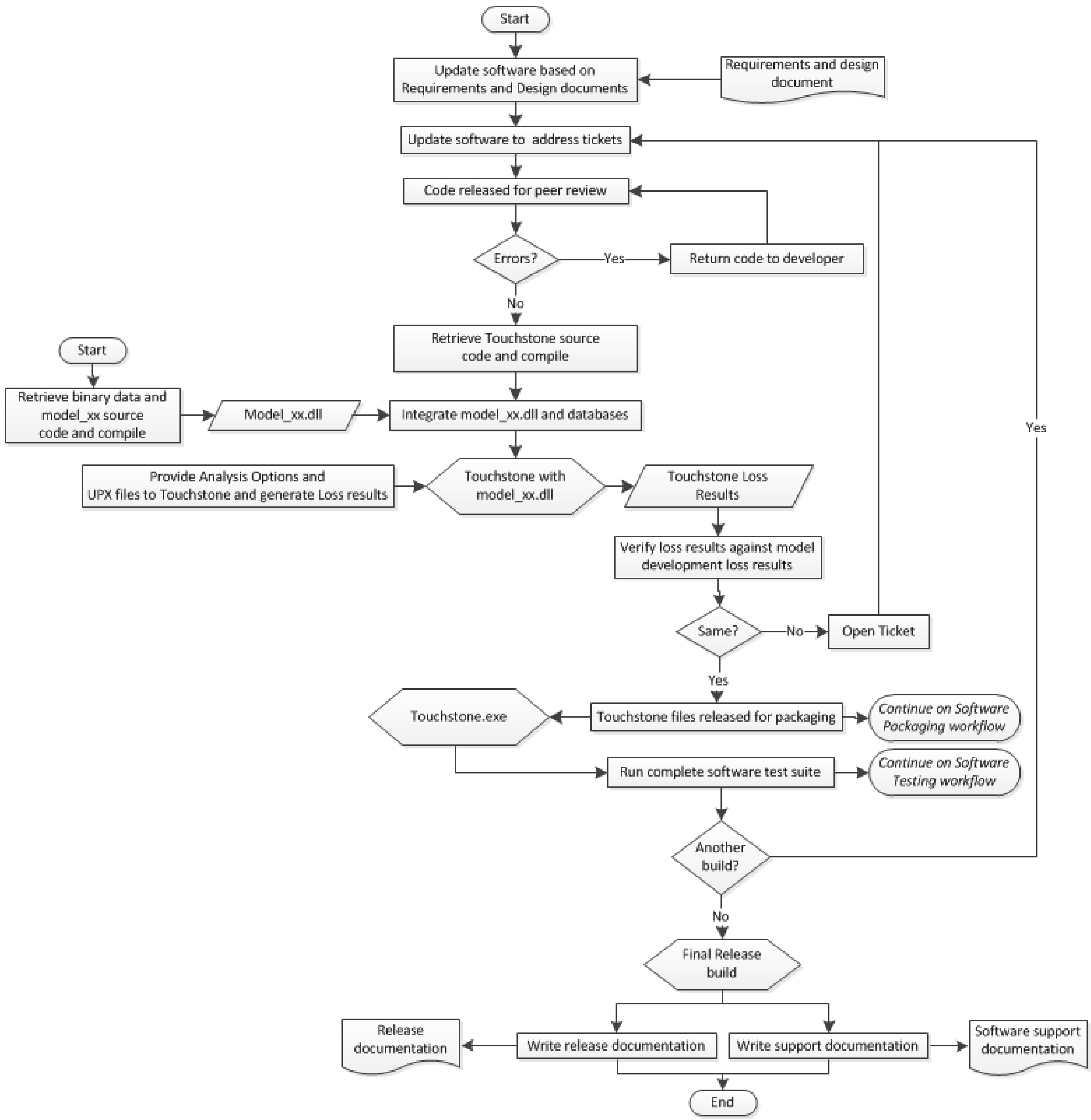


Figure 59. Touchstone Development

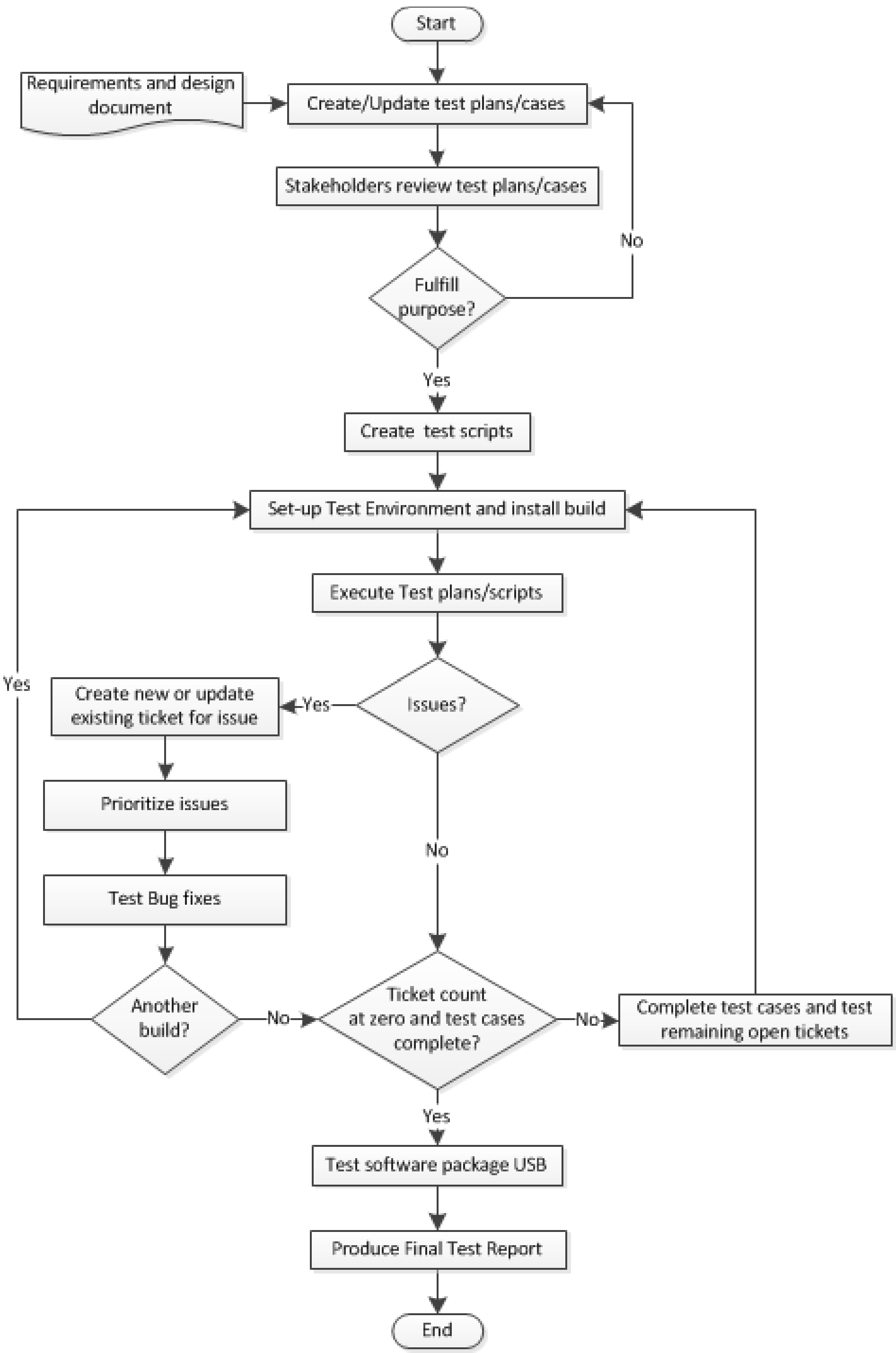


Figure 60. Touchstone Testing

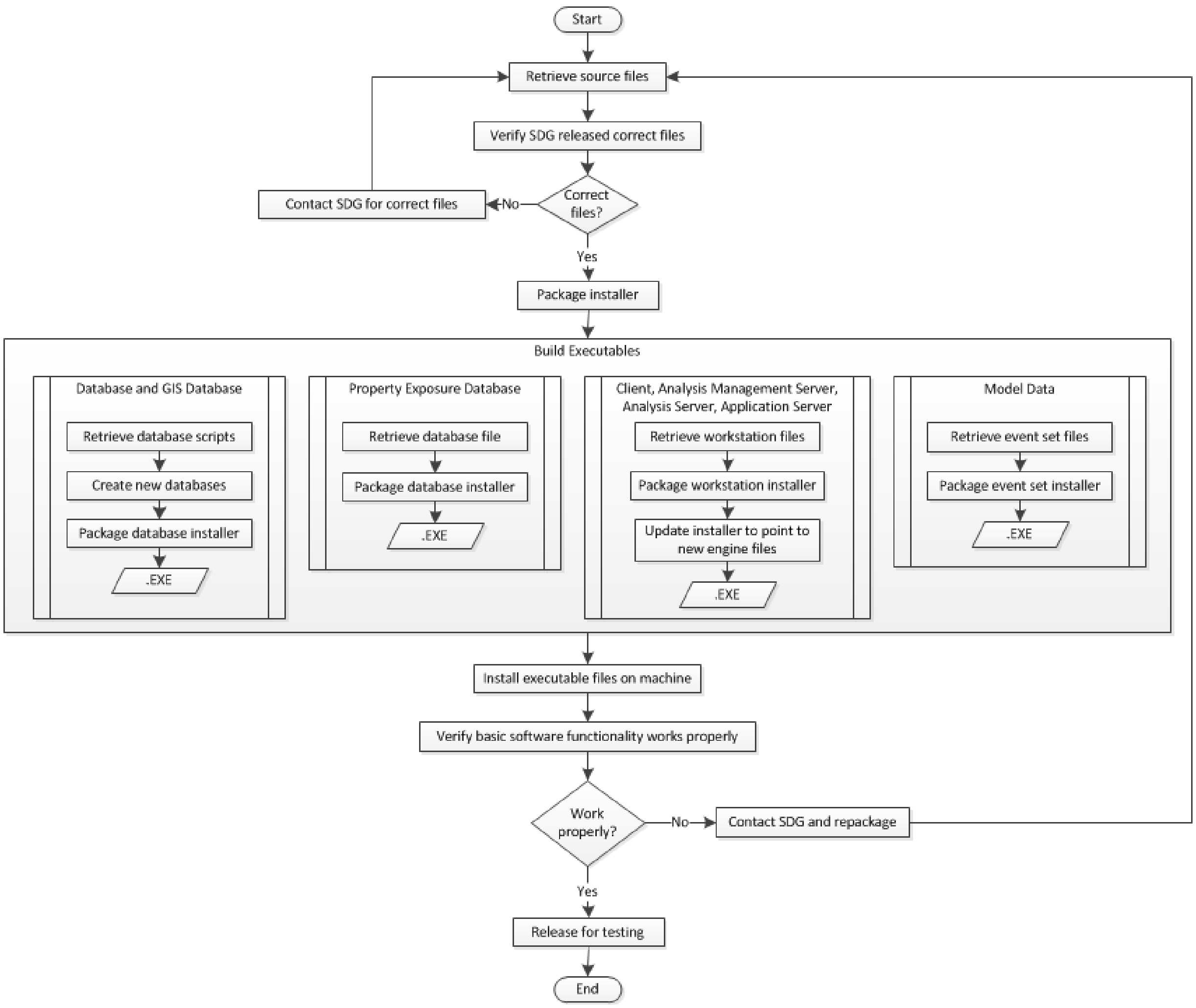


Figure 61. Touchstone Packaging and Release

C-4 Implementation

Relevant Form: G-6, Computer Standards Expert Certification

A. The modeling organization shall maintain a complete procedure of coding guidelines consistent with accepted software engineering practices.

AIR maintains a complete set of software engineering practices and coding guidelines that are followed by the software developers, including FORTRAN, C++/COM, C#/.Net, Java and SQL. These guidelines are documented in the FCHLPM User Help system.

B. The modeling organization shall maintain a complete procedure used in creating, deriving, or procuring and verifying databases or data files accessed by components.

The FCHLPM User Help system discusses the development of the model components. AIR maintains separate support material for these components, which provides detailed discussion regarding the procurement and verification of the data; these documents are hyperlinked directly from the FCHLPM User Help system and are available for review by the Professional Team.

The FCHLPM User Help system also describes the database development and integration process, specifically for those databases that require modification as part of the U.S. Hurricane Model revision cycle; these databases include the ZIPAll, AIRGeography, and AIRAddressServer. Topics discussed include: updating the ZIPAll database, updating the ZIP Codes within AIRGeography and AIRAddressServer databases, and validating the ZIP data.

Model component and database development custodians shall be available to discuss the data procurement, implementation, and verification processes.

C. All components shall be traceable, through explicit component identification in the flow diagrams, down to the code level.

AIR has developed documentation that provides component identification from documentation diagrams which are fully traceable down to the code level. Model and software development custodians shall be available to demonstrate traceability using items from the document *Enhancements and Florida Commission Documentation Mapping*.

D. The modeling organization shall maintain a table of all software components affecting loss costs, with the following table columns: (1) Component name, (2) Number of lines of code, minus blank and comment lines; and (3) Number of explanatory comment lines.

AIR maintains tables that identify each of the component names, the number of lines of code, comments and blank lines. This documentation is hyperlinked from the FCHLPM User Help system and is available for review by the Professional Team.

E. Each component shall be sufficiently and consistently commented so that a software engineer unfamiliar with the code shall be able to comprehend the component logic at a reasonable level of abstraction.

AIR documentation can be used by new software engineers to gain an understanding of the software being reviewed. AIR coding procedures ensure that software code is clearly commented for easy comprehension of content. Model and software development custodians shall be available to demonstrate commenting within the code.

F. The modeling organization shall maintain the following documentation for all components or data modified by items identified in Standard G-1 (Scope of the Computer Model and Its Implementation), Disclosure 5:

1. A list of all equations and formulas used in documentation of the model with definitions of all terms and variables.

The *Model 21 Equations/Formulas, Variable Mapping, and Crosschecking* document discusses the implementation of equations.

2. A cross-referenced list of implementation source code terms and variable names corresponding to items within F.1.

The *Model 21 Equations/Formulas, Variable Mapping, and Crosschecking* document discusses the implementation of the equation used to calculate wind speed, including the FORTRAN subroutines, mapping to C++ functions, and crosscheck verification.

Model and software development custodians shall be available to illustrate the implementation of the equation and crosscheck verification.

Disclosure

1. Specify the hardware, operating system, other software, and all computer languages required to use the model.

The following requirements are specified for the Touchstone software application. AIR's Technical Software group works directly with clients to ensure successful installation.

Supported Platforms

The following platforms are supported.

Operating Systems (U.S. English only)

- All operating systems are 64-bit
- Windows 7 and 8.1 on client machine only (UI)
- Windows Server 2012 R2

Microsoft SQL Servers

- SQL Server 2012 SP2+
- SQL Server 2014

SQL Server Collation

- Set SQL Server to the following collation setting: SQL_Latin1_General_CP1_CI_AS. This is the default installation for U.S. English SQL Server.

Microsoft HPC Services

- HPC Pack 2012 R2 w/ KB2956330 for head node

Processor

- AIR builds, tests, and deploys all AIR software on machines with Intel-based processors. AIR does not recommend or support non-Intel processors.

Minimum Resource Requirements

Table 26 defines the minimum core, RAM, and disk space requirements for the Touchstone components.

Table 26. Minimum Resource Requirements

Touchstone Component	Cores	RAM	Disk Space	Scalability/Redundancy
Databases	8	32 GB	1 TB	▪ Exposure and Results databases can be proliferated. ▪ Multiple SQL server instances are allowed.
GIS Databases	8	32 GB	1 TB	▪ Single node. ▪ Optionally, can scale up with licenses at additional cost.
Property Exposure DB's	8	32 GB	1 TB	▪ Can install on the same SQL server as the Touchstone database.
Analysis Management	4	8 GB	250 GB	▪ Single node. ▪ Failover is supported by Windows Server 2012 R2 HPC Enterprise.
Analysis Server	4	16 GB	250 GB[1]	▪ 1/None ▪ Optionally, can be scaled out and load-balanced with HPC Scheduler.
Application Server	4	8 GB	250 GB	▪ 1/None ▪ Optionally, can be scaled out and load-balanced with network appliance.
Client Machine	2	4 GB	50 GB	▪ 1/None
Model Data[2]	4	8 GB	1.5 TB[3]	▪ Currently catalogs are installed on the compute node.

[1] The Model Data can also reside on the Analysis Server component, increasing data fetch speeds, but the Model Data disk requirements need to be added to the existing 250 GB requirement.

[2] Starting with Version 2.0, AIR now supports a centralized model data share.

[3] This value of 1.5TB is an estimate, and may increase as Catalogs and Hazard Data footprint grows.

Physical Memory Limits by OS Version

Table 27 defines the physical memory limits as defined by the OS version.

Table 27. Physical Memory Limits

Operating System	Max Supported Memory
Windows 7	192 GB
Windows Server 2008 R2 Standard	32 GB
Windows Server 2008 R2 Enterprise	2 TB
Windows 8 / 8.1	128 GB
Windows 8 Pro/8.1 Pro	512 GB
Windows Server 2012 R2	4 TB

Certified Platforms & Configuration

Table 28 below identifies the platforms certified by AIR.

Table 28. Certified Platforms

Touchstone V2.0.0	Operating System			SQL Server		HPC Pack
	Win 7	Win 8.1	Win Server 2012 R2	SQL Server 2012 SP2	SQL Server 2014	HPC 2012 R2 KB
Databases			✓	✓	✓	
GIS Databases			✓	✓	✓	
Analysis Management			✓			✓
Analysis Server			✓			✓
Application Server			✓			✓
Client Machine	✓	✓	✓			

Important ⚠ The HPC Pack 2012 R2 KB2956330 is required for the components indicated in the table.

Table 29 defines the certified OS or software that is required for the components.

Table 29. Certified Configuration

Component	Certified Configuration
Database Servers	▪ Windows Server 2012 R2, Standard/Enterprise Editions ▪ SQL Server 2012 SP2+ or SQL Server 2014, Standard/Enterprise Editions
GIS Server	▪ Windows Server 2012 R2, Standard/Enterprise Editions ▪ SQL Server 2012 SP2+ or SQL Server 2014, Standard/Enterprise Editions
Analysis Management Servers (HN)	▪ Windows Server 2012 R2, Standard/Enterprise Editions ▪ HPC Pack 2012 R2 KB2956330 (Head Node Components)
Analysis Servers (CN)	▪ Windows Server 2012 R2, Standard/Enterprise Editions ▪ HPC Pack 2012 R2 (Compute Node Components)
Application Server (IIS)	▪ Windows Server 2012 R2, Standard/Enterprise Editions ▪ HPC Pack 2012 R2 (Client Utilities)
Client machines (UI)	▪ Windows Server 2012 R2, Standard/Enterprise Editions ▪ Windows 8.1 Enterprise Edition, Windows 7

Upgrade Paths

For clients with Touchstone Version 2.0, who want the **least amount of environment reconfiguration**, use the upgrade guidelines summarized in Table 30 below. Note that *this path will not ensure complete future Touchstone compatibility*.

Table 30. Least Impact Upgrade Path

Touchstone Component	Operating System Version	HPC Pack Version	SQL Server Version
Databases	Windows Server 2012 R2	N/A	SQL Server 2012 SP2+ or SQL Server 2014
GIS Databases	Windows Server 2012 R2	N/A	SQL Server 2012 SP2+ or SQL Server 2014
Analysis Management	Windows Server 2012 R2	HPC Pack 2012 R2 KB2956330 Head Node	N/A
Analysis Server	Windows Server 2012 R2	HPC Pack 2012 R2 Compute Node	N/A
Application Server	Windows Server 2012R2	HPC Pack 2012 R2 Client Utilities	N/A
Client	Windows 7/ 8.1/2012 R2	N/A	N/A

For new clients without a pre-existing Touchstone installation, and for clients who wish to **ensure maximum future compatibility with Touchstone**, use the upgrade guidelines summarized in Table 31 below.

Table 31. Maximum Impact Upgrade Path

Touchstone Component	Operating System Version	HPC Pack Version	SQL Server Version
Databases	Windows Server 2012 R2	N/A	SQL Server 2012 SP2+ or SQL Server 2014
GIS Databases	Windows Server 2012 R2	N/A	SQL Server 2012 SP2+ or SQL Server 2014
Analysis Management	Windows Server 2012 R2	HPC Pack 2012 R2 KB2956330 Head Node	N/A
Analysis Server	Windows Server 2012 R2	HPC Pack 2012 R2 Compute Node	N/A
Application Server	Windows Server 2012 R2	HPC Pack 2012 R2 Client Utilities	N/A
Client	Windows 7/8.1 / 2012 R2	N/A	N/A

Migration to New Servers

Clients who are upgrading from an earlier version of Touchstone will most likely need to: migrate the existing Touchstone database to new servers, restore the AIR logins, and perform an in-place upgrade, to accommodate the transition to SQL 2012 and Windows 2012. This will not apply to new installations of Touchstone V3.0.

HPC Pack Breakdown

Table 32 below is a simple guide to which HPC component is required and what operating systemis supported.

Table 32. HPC Pack Breakdown

Touchstone Component	Operating System	HPC Pack Component
Analysis Management Server	Windows Server 2012 R2	HPC Headnode 2012 KB2956330
Analysis Server	Windows Server 2012 R2	HPC Compute Node 2012
Application Server	Windows Server 2012 R2	HPC Client Utilities 2012
Analysis Management and Application Server	Windows Server 2012 R2	HPC Headnode 2012 KB2956330

Important HPC 2012 R2 can only be installed to SQL Server 2012 instances, seven express; the type of instance that can be installed through the HPC installer.

Model Data Disk Space Requirements

Touchstone offers model data in two packages:

- 10K/50k/500k/Hazard Package
- 100K Package

Disk space requirements for these two packages are summarized in Table 33 below.

Table 33. Model Data Disk Space Requirements

Region of Data/Peril	Disk Space Required	
	10K/50K/500K (GB)	**100K (GB)**
Required files	44.96	0
Asia Pacific	327.52	539.59
Earthquake	30.2	285.02
Bushfire	0.75	-
Tropical Cyclone + Typhoon	296.57	254.57
Typhoon + Storm Surge	-	24.35
Central America	0.18	-
Earthquake	0.18	-
Europe	8.03	-
Earthquake	0.41	-
Extratropical Cyclone	0.21	-
Flood	3.47	-
Inland Flood	3.94	-
Hazard	44.26	-
North America	356.5	125.25
Earthquake	15.9	1.61
Flood	157.9	-
Hurricane + Tropical Cyclone	94.2	-
Hurricane	-	23.21
Severe Thunderstorm	102.52	100.44
Terrorism	0.08	-
Wildfire	1.52	-
Winter Storm	5.5	-
South America	15.26	-
Earthquake	15.26	-
Sum	**752.45**	**664.83**
Total Sum	**1187.07**	

Development Tools and Dependencies

Table 34 defines the Touchstone development tools and dependencies.

Table 34. Touchstone Development Tools and Dependencies

Category	Item	Description	Version
Third Party	Industry Tool	Infragistics	14.1.0
Third Party	Industry Tool	ESRI	2.3.0774
Third Party	Industry Tool	HPC	2012 R2 (4.2.440)
Third Party	Industry Tool	IIS	2008(7.5.7600)/2012(8.5.9600)
Third Party	Industry Tool	MDAC	2.8 SP1
Third Party	Industry Tool	Microsoft XML parser	3.0, 4.0
Third Party	Industry Tool	VB Runtime	6.0,SP6
Third Party	Industry Tool	VC++ Runtime	2010
Third Party	Industry Tool	Microsoft SQL Server (Workgroup; Standard; Enterprise)	2008 R2+ and 2014
Third Party	Industry Tool	Borland SilkTest	15.5
Third Party	Industry Tool	MathWorks, Inc MATLAB	2014a
Third Party	Industry Tool	Scooter Software Beyond Compare	3.5
Third Party	Industry Tool	IBM Rational Performance Tester	8.2
Third Party	Industry Tool	IBM Rational ClearQuest	8.0.1.4
Third Party	Industry Tool	Microsoft Visual SourceSafe	2005
Third Party	Industry Tool	Flexera Software InstallShield	2013
Third Party	Industry Tool	Microsoft Visual Studio	2010
Third Party	Industry Tool	Windows Server	Windows 7/8.1/2012
Third Party	Industry Tool	MSBuild	4
Third Party	Industry Tool	Red Gate SmartAssembly	6
Third Party	Industry Tool	MSDN ServiceModel Metadata Utility Tool (SvcUtil.exe)	for .NET Framework 4.0
Third Party	Industry Tool	VSoft Technologies Final Builder	7.0.0.898
Third Party	Industry Tool	Red Gate Sql Compare	10
Third Party	Industry Tool	Microsoft .NET Framework	4
Third Party	Industry Tool	CodePlex Trx2Html	0.7
Third Party	Industry Tool	ERSI ArcGIS for Desktop Basic	10.2.2
Third Party	Industry Tool	MathWorks, Inc MATLAB	2014a
Third Party	Industry Tool	SharpGIS Shape2SQL	13
Third Party	Industry Tool	Eclipse	4.4

Category	Item	Description	Version
Third Party	Industry Tool	Microsoft Team Foundation Server	2007
Third Party	Industry Tool	Symantec Endpoint Protection Version	12.1.1101.401
Third Party	Industry Tool	Checkpoint Pointsec Full Disk Encryption	7.4.8
Third Party	Industry Tool	Websense Email Security	7.7
Third Party	Industry Tool	Shavlick Protect	9.1
Third Party	Industry Tool	EMC2 Avamar	7
Third Party	Industry Tool	Adobe Robohelp	10
Third Party	Industry Tool	Microsoft Word	2010
Third Party	Industry Tool	Microsoft Excel	2010
Third Party	Industry Tool	Microsoft Visio	2010
Third Party	Industry Tool	Microsoft Project	2010
Third Party	Industry Tool	Adobe Acrobat X Pro	10.1.10
Third Party	Industry Tool	Innovasys Document! X	2014.1.36.0
Third Party	Industry Tool	Production Ektron	8.5
Third Party	Industry Tool	TechSmith Snagit	11.2.1
Third Party	Industry Tool	Beyond Compare	3
Third Party	Industry Tool	SalesForce Enterprise	N/A
AIR-developed Tool	AIR Tool	ARMS—Scheduler	1.0.0
AIR-developed Tool	AIR Tool	ARMS—Website	1.0.0
AIR-developed Tool	AIR Tool	ARMS—Workerhost	1.0.0
AIR-developed Tool	AIR Tool	ARMS—Continuous Integration Agent	1.0.0
AIR-developed Tool	AIR Tool	Datafile Converter	15
Touchstone component	COM_Component	CATools Components	14.0.0.0
Touchstone component	COM_Component	Loss Engine	3.0.0
Touchstone component	COM_Component	CAT Engine	3.0.0
Touchstone component	COM_Component	Model_01: AIR Terrorism Loss Estimation Model	3.0.0
Touchstone component	COM_Component	Model_02: AIR US Workers Comp	1.1.0
Touchstone component	COM_Component	Model_03: AIR Japan Personal Accident	1.0.1
Touchstone component	COM_Component	Model_05: AIR Wildfire Model for California	2.2.0
Touchstone component	COM_Component	Model_06: Australia Bushfire	2.1.0
Touchstone component	COM_Component	Model_08: AIR US Flood	1.0.0
Touchstone component	COM_Component	AIR Earthquake Model for the U.S.	9.0.0
Touchstone component	COM_Component	Model_12: AIR Earthquake Model for the U.S and Canada	3.0.0

Category	Item	Description	Version
Touchstone component	COM_Component	Model_13: AIR Earthquake Model for Hawaii	2.0.0
Touchstone component	COM_Component	Model_14: AIR Earthquake Model for Alaska	1.8.0
Touchstone component	COM_Component	Model_15: AIR Earthquake Model for the Caribbean	2.0.0
Touchstone component	COM_Component	Model_20: AIR Severe Thunderstorm Model for the U.S. and Canada	1.0.0
Touchstone component	COM_Component	Model_21: AIR Atlantic Tropical Cyclone Model	15.0.1
Touchstone component	COM_Component	Model_22: AIR Severe Thunderstorm Model for the U.S.	7.0.0
Touchstone component	COM_Component	Model_23: AIR Hurricane Model for Hawaii	3.9.0
Touchstone component	COM_Component	Model_24: AIR U.S. Hurricane Model for Offshore Assets	1.9.0
Touchstone component	COM_Component	Model_25: AIR Tropical Cyclone Model for the Caribbean	9.0.0
Touchstone component	COM_Component	Model_26: AIR Severe Thunderstorm Model for Canada	3.0.0
Touchstone component	COM_Component	Model_27: AIR North Atlantic Basinwide Hurricane Model	Null
Touchstone component	COM_Component	Model_28: AIR Winter Storm Model for the U.S.	1.4.0
Touchstone component	COM_Component	Model_29: AIR Tropical Cyclone Model for Mexico	1.0.0
Touchstone component	COM_Component	Model_30: AIR Tropical Cyclone Model for Canada	1.0.0
Touchstone component	COM_Component	Model_31: AIR Earthquake Model for the Pan-European Region	3.0.0
Touchstone component	COM_Component	Model_41: AIR Extratropical Cyclone Model for Europe	5.0.0
Touchstone component	COM_Component	Model_42: AIR Winter Storm Model for Canada	1.0.0
Touchstone component	COM_Component	Model_51: AIR Earthquake Model for Australia	3.0.0
Touchstone component	COM_Component	Model_52: AIR Earthquake Model for Japan	6.3.0
Touchstone component	COM_Component	Model_53: AIR Earthquake Model for New Zealand	3.0.0
Touchstone component	COM_Component	Model_54: AIR Earthquake Model for Southeast Asia	3.0.0
Touchstone component	COM_Component	Model_55: AIR Earthquake Model for China	1.3.0
Touchstone component	COM_Component	Model_60: AIR Northwest Pacific Basinwide Typhoon Model	Null
Touchstone component	COM_Component	Model_61: AIR Cyclone Model for Australia	2.1.0

Category	Item	Description	Version
Touchstone component	COM_Component	Model_62: AIR Typhoon Model for Japan	4.0.0
Touchstone component	COM_Component	Model_64: AIR Typhoon Model for Southeast Asia	2.1.0
Touchstone component	COM_Component	Model_65: AIR Typhoon Model for China	12.5.0
Touchstone component	COM_Component	Model_66: AIR Typhoon Model for South Korea	2.1.0
Touchstone component	COM_Component	Model_67: AIR Tropical Cyclone Model for Central America	2.1.0
Touchstone component	COM_Component	Model_68: AIR India Tropical Cyclone	2.1.0
Touchstone component	COM_Component	Model_70: AIR Earthquake Model for South America	1.0.0
Touchstone component	COM_Component	Model_71: AIR Earthquake Model for Colombia	2.0.0
Touchstone component	COM_Component	Model_72: AIR Earthquake Model for Mexico	2.0.0
Touchstone component	COM_Component	Model_73: AIR Earthquake Model for Chile	2.0.0
Touchstone component	COM_Component	Model_74: AIR Earthquake Model for Venezuela	2.0.0
Touchstone component	COM_Component	Model_75: AIR Earthquake Model for Peru	1.0.0
Touchstone component	COM_Component	Model_76: AIR Earthquake Model for Central America	1.0.0
Touchstone component	COM_Component	Model _90: AIR Inland Flood Model for Central Europe	1.0.0
Touchstone component	COM_Component	Model_91: AIR Flood Model for Great Britain	1.0.0
Touchstone component	COM_Component	Model_92: AIR Inland Flood Model for the UK	1.0.0
Touchstone component	COM_Component	Model_93: AIR Inland Flood Model for Germany	1.0.0
Touchstone component	COM_Component	Model_95: AIR Inland Flood Model for Austria, Czechoslovakia, and Switzerland	1.0.0
Touchstone component	COM_Component	Model _230: ERN Earthquake model for Mexico	1.0.0
Touchstone component	COM_Component	Model_231: ERN Tropical Cyclone Model for Mexico	1.0.0
Touchstone component	Touchstone Component	Touchstone User Interface	3.0.0
Touchstone component	Touchstone Component	Bulk Geocoding Service	3.0.0
Touchstone component	Touchstone Component	Bulk Data Service	3.0.0
Touchstone component	Touchstone Component	Address Service	7.2.0
Touchstone component	Touchstone Component	Loss Application Service	3.0.0
Touchstone component	Touchstone Component	Bulk Loss Analysis Service	3.0.0
Touchstone component	Touchstone Component	AIRDBAdmin database	3.0.0
Touchstone component	Touchstone Component	AIRDQIndustry database	3.0.0

Category	Item	Description	Version
Touchstone component	Touchstone Component	AIRExposure database	3.0.0
Touchstone component	Touchstone Component	AIRExposureSummary database	3.0.0
Touchstone component	Touchstone Component	AIRGeography database	3.0.0
Touchstone component	Touchstone Component	AIRIndustry database	3.0.0
Touchstone component	Touchstone Component	AIRLossCost database	3.0.0
Touchstone component	Touchstone Component	AIRMap database	3.0.0
Touchstone component	Touchstone Component	AIRMapBoundary database	3.0.0
Touchstone component	Touchstone Component	AIRProject database	3.0.0
Touchstone component	Touchstone Component	AIRReference database	3.0.0
Touchstone component	Touchstone Component	AIRReinsurance database	3.0.0
Touchstone component	Touchstone Component	AIRResult database	3.0.0
Touchstone component	Touchstone Component	AIRSecurity database	3.0.0
Touchstone component	Touchstone Component	AIRSpatial database	3.0.0
Touchstone component	Touchstone Component	AIRSpatialWork database	3.0.0
Touchstone component	Touchstone Component	AIRUserMap database	3.0.0
Touchstone component	Touchstone Component	AIRUserSetting database	3.0.0
Touchstone component	Touchstone Component	AIRUserSpatial database	3.0.0
Touchstone component	Touchstone Component	AIRUserSpatialWork database	3.0.0
Touchstone component	Touchstone Component	AIRWork database	3.0.0

Computer Languages

The computer languages employed at AIR include:

- FORTRAN
- C++
- Microsoft C#
- Visual Basic
- Java
- SQL

C-5 Verification

(Significant Revision)

Relevant Form: G-6, Computer Standards Expert Certification215

A. General

For each component, the modeling organization shall maintain procedures for verification, such as code inspections, reviews, calculation crosschecks, and walkthroughs, sufficient to demonstrate code correctness. Verification procedures shall include tests performed by modeling organization personnel other than the original component developers.

AIR software engineers employ a variety of verification procedures to check code correctness. These procedures include code-level debugging, component-level unit testing, verifying newly developed code against a stable reference version, and running diagnostic software tools to detect runtime problems.

In addition, other verification mechanisms are used to test the correctness of key variables that might be subject to modification. These mechanisms include code tracing, intermediate output printing and error logging. Examples of these verification procedures, including code inspections, reviews, calculation crosschecks, walk-through and the use of logical assertions and exception-handling mechanisms in the code, are described within the documentation and shall be available to the Professional Team.

Verification processes for all model and software components are defined as part of the workflows in the FCHLPM User Help system. Additional detailed information regarding the verification/testing process for the model components is provided within each component-specific document.

Crosschecking procedures and results for verifying equations are discussed in the document *Model 21 Equations/Formulas, Variable Mapping and Crosschecking*. Model and software development custodians shall be available to illustrate the equation crosscheck verification.

B. Component Testing

1. ***The modeling organization shall use testing software to assist in documenting and analyzing all components.***
2. ***Unit tests shall be performed and documented for each component.***
3. ***Regression tests shall be performed and documented on incremental builds.***
4. ***Aggregation tests shall be performed and documented to ensure the correctness of all model components. Sufficient testing shall be performed to ensure that all components have been executed at least once.***

The Quality Assurance procedures employed at AIR are discussed in the FCHLPM User Help system. Test plans and status reports are available on the company intranet (AIRPort) and shall be available for review by the Professional Team.

Testing Teams

Formal testing of Touchstone and the U.S. Hurricane Model is the responsibility of the Software QA, Model QA and Core QA groups. Figure 62 below illustrates at a high level the testing interaction within the development process.

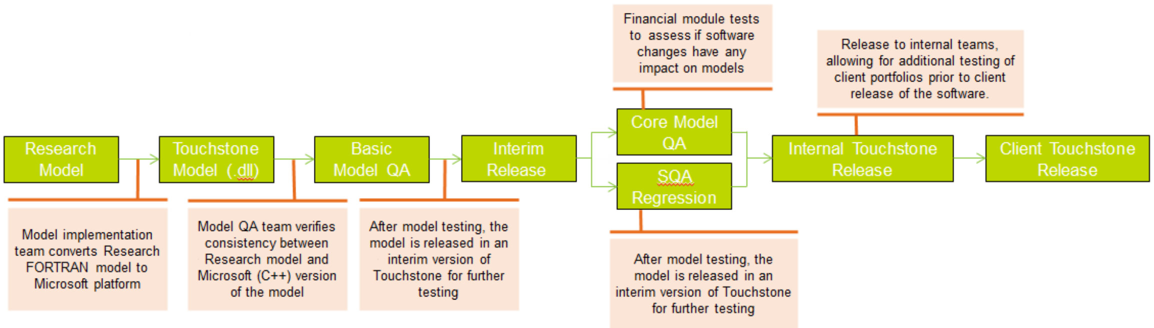


Figure 62. QA Team during the Development Process

The responsibility of each testing team is as follows:

- Software QA—Responsible for testing the implementation and functionality of Touchstone. This group is engaged with the entire software development process, including the review of requirements and design documents.
- Model QA—Responsible for the testing of the U.S. Hurricane Model. During the Model QA testing process, the Model QA team compares the loss results from the FORTRAN model against those from Touchstone and determines if the loss results agree from both platforms. In addition, they also verify the consistency of data between software builds. Any discrepancies are investigated. Client Consulting team generates the output range reports and probable maximum loss results and compares them against the results from the previous release version. The group has weekly meetings to review ClearQuest tickets and work progress. To ensure the consistency of the results, the Model QA team develops and executes test cases and use Excel and SQL Server during the verification process. All test plans and test results are peer review primarily by the Research group. Bugs found in the QA process are resolved by the Model Development and Research groups.
- Core QA—Responsible for model validation, including
  - Building summary statistical tables on the physical event parameters from the 50K Standard and Full Historical Catalog and compares them to summary stats tables prepared by Research and Modeling team. The purpose of this test is to validate the physical peril change expectations. The test cases and results are peer reviewed and approved.
  - Prepares industry loss change management data set of exhibits for Florida, including 1) full model domain and 2) detailed-level. These exhibits include analysis permutations of event catalogs, analysis options and peril options, as well as comparison of state, county and ZIP Code of summary EP curves. The final analytics are summarized into an internal document, which is distributed among and reviewed by stakeholders.

Test Plan Development

The following steps outline the process for developing test plans.

Step	Description
Gathering Requirements	Understand the objective and details of the assignment. This is accomplished by gathering the requirements from requirement documents, product management, and the appropriate subject matter experts.
Create Test Plan	Plan the testing to be performed. The plan includes the goal of the testing, what testing is required for the project/issue, as well as the regression and test types that will be employed.
Review Test plan	Cross-functional review and acceptance of the plan; changes are incorporated as appropriate. Test plans are reviewed by various stakeholders, including Product Management, Software Development, Research, and Technical Services, and Client Consulting.
Generate Test Cases/Scripts	Document the steps required for testing. Include enough detail to make the test repeatable and document the expected results. Create test automation (scripts) as appropriate.
Execute Tests	Execute tests.
Review Results and Manage Issues	Review the test results and, when applicable, enter all issues into the tracking system and verify completed issues. Test results are reviewed by various stakeholders, including Product Management, Software Development, Research, Technical Services, and Client Consulting,
Report Results	Document the test results. Detail all the activities performed, archive data with the results, and announce completion.

Test Types

The types of tests conducted at AIR include the following. In addition, to evaluate the testing progress for each build of the software, the QA team maintains an overall SQA Status spreadsheet that enables them to evaluate the status of test plans in real-time:

Unit Testing: Unit testing focuses on the critical functions that are involved with calculating hurricane loss distributions. QA analyzes these functions for their proper minimum and maximum input values. The software code makes these functions accessible to the unit-testing program and, when the unit-testing flag is turned on, the functions log the output data. When running the unit-test program, the testing engineer may specify the following types of test inputs for each function:

- Custom—The engineer specifies a specific input data set for testing the function.
- Random—The unit-test program generates a random data set for testing the function. As part of the data generation, the program generates out-of-bound data to determine if the function handles erroneous inputs correctly.
- Linear—The unit-test program generates a data set by varying each input parameter by a fixed increment within the range of [90% of the minimum, 110% of the maximum] and records all possible combination of input parameter values. The test result is intended for trend analysis and boundary checking analysis.

For each test, the input and output data for each function is recorded in a file and the test data is analyzed for proper behavior.

Integration Testing: The mechanisms for unit testing are easily adopted for integration testing. After verifying that functions at a certain level behave correctly, QA verifies the correctness of other functions that invoke only the validated functions.

Aggregate Testing: To ensure broad coverage in software testing, for example, tests may include:

- Average loss for a house of certain construction type and value for all ZIP Codes in the United States.
- Losses for a group of selected locations, building construction types, and four occupancy classes are computed and compared. Effects of deductibles are also computed and compared.

For certain aggregate tests, tests use both the new and previously released versions of the software. For each test, the results are compared between two software versions. If a discrepancy is detected between the two results, the testing group refers the case to the appropriate stakeholder, such as Research or Software Development, for further analysis.

User Interface Testing: AIR ensures that implementation of each version-specific update functions as expected on the Touchstone User Interface.

Performance Tests: AIR evaluates performance between the new and previously released version of the software. Any unexpected performance issues are investigated further.

Test Tools

Tools used during the testing process include:

- SilkTest: Build and execute automated test cases.
- IBM Rational Performance Tester: Execute UI Load Testing Performance Tests
- Beyond Compare: Compare output and validate test results.
- ClearQuest: Bug tracking and management.
- Microsoft Excel: Perform basic calculations of model losses and model parameters, such as comparisons between model versions, loss ratios, loss cost ratios.

C. Data Testing

1. The modeling organization shall use testing software to assist in documenting and analyzing all databases and data files accessed by components.

2. The modeling organization shall perform and document integrity, consistency, and correctness checks on all databases and data files accessed by the components.

AIR has a Verification Utility program, the Data File Converter, which checks the existence, consistency, and correctness of all data files. This program verifies that each data file matches a known version of the data file by performing checksum verification. Checksum is a count of the number of bits in a transmission unit so that the receiver can verify the number of bits received against the original number of bits. When the count matches, it is assumed that the complete transmission was received. For databases, AIR performs data validation on every step of the process and the entire process. This includes validating the source counts and ensuring that the changes are affected on the same number of records. Examples of the verification, including counts on the ZIP changed records, county change records, and ZIP centroid updates, are described within the documentation and shall be available to the Professional Team.

Disclosures

1. *State whether any two executions of the model with no changes in input data, parameters, code, and seeds of random number generators produce the same loss costs and probable maximum loss levels.*

All Model runs including random number generator codes are performed during the Model development process by our Research & Modeling Group. One of these iterations is selected and released in Touchstone as the event catalog. In this sense, the software as a separate application does not contain a random number generator component but, rather, it is contained within the event catalog (Model), which is an integrated part of the application.

AIR has multiple test cases that are run at every internal software build, and at least twice on the final release software build to ensure that Touchstone produces identical results, including loss costs and probable maximum loss levels.

These results are validated against past releases to ensure that there are no changes to the loss costs and probable maximum loss levels.

2. *Provide an overview of the component testing procedures.*

Model component testing procedures are divided into three broad sections. These include procedures to 1) ensure that the event generation, local intensity, and damage estimation modules are functioning correctly in each component and as a whole, 2) perform reasonability checks on the loss results, hazard pattern analysis, and document and quantify model changes, and 3) check various other model functionalities.

Verification processes for all model and software components are defined as part of the workflows in the FCHLPM User Help system. Addition detailed information regarding the verification/testing process for the model components is provided within each component-specific document.

3. *Provide a description of verification approaches used for externally acquired data, software, and models.*

AIR verifies all externally sourced data; it is an integral part of the development process, especially for those model components that rely heavily on scientific data. Explanation of the validation methods for these data sources is provided in the Table 35 below.

Table 35. Validation Methods Data Sources

Source Title	Description	Validation Methods
National Hurricane Center Tropical Cyclone Reports	Provides comprehensive information on each hurricane. Data for hurricanes that occurred between 1958 and 1994 are available at http://www.nhc.noaa.gov/archive/storm_wallets/atlantic/. Data for hurricanes that occurred between 1995 and 2010 are available at http://www.nhc.noaa.gov/pastall.shtml.	Downloaded data is compared to original versions. No additional validation is done.
HURDAT Chronological List of All Hurricanes which Affected the Continental United States: 1851-2013	Provides a chronological list of all hurricanes which affected the continental U.S. from 1851-2013. Revised in February 2014 to include the 2013 season and reflects official HURDAT reanalysis changes through 1945. Available online at http://www.aoml.noaa.gov/hrd/hurdat/All_U.S._Hurricanes.html	Downloaded data is compared to original versions. No additional validation is done.
The revised Atlantic hurricane database (HURDAT2)	Provides storm track data for all hurricanes from 1851 to 2013. Storm parameters are provided at 6-hour intervals for the life of the storm, including direction, speed, wind, pressure, and storm rating. Data are also provided at additional points of interest (such as time of landfall). Available online at http://www.aoml.noaa.gov/hrd/hurdat/hurdat2.html.	Downloaded data is compared to original versions. No additional validation is done.

Source Title	Description	Validation Methods
HURDAT Continental U.S. Hurricanes: 1851 to 1930	Provides historic data for hurricanes that occurred from 1851 to 1930. This data was revised in December 2010 to include updates for the U.S. hurricanes through 1930. Available online at http://www.aoml.noaa.gov/hrd/hurdat/usland1851-1930&1983-2010-Mar2011.html.	Downloaded data is compared to original versions. No additional validation is done.
Monthly Weather Review Articles from 1872-2008	Contains weather review articles for each hurricane season from 1872 to 2008. These articles are available online at the HURDAT website, http://www.aoml.noaa.gov/general/lib/lib1/nhclib/mwreviews/.	Downloaded data is compared to original versions. No additional validation is done.
National Hurricane Center Reconnaissance Data	Provides real-time hurricane data obtained from aircraft reconnaissance missions performed by the 53rd Weather Reconnaissance Squadron and the NOAA Aircraft Operations Center. Available online at http://www.nhc.noaa.gov/archive/recon/.	Downloaded data is compared to original versions. No additional validation is done.
USGS National Land Cover Database (NLCD)	Provides digital and satellite-derived land use/land cover data dating from 2001. This database encompasses all 50 states and includes land cover at 30m resolution, which was derived from Landsat Thematic Mapper satellite data imagery. This data is used to generate the physical properties component of Model 21. Available online at http://www.mrlc.gov/index.php.	USGS LULC data are overlaid over satellite imagery to ensure proper data projection has been applied. Additional checking is applied over bodies of water as identified by GIS boundary files. The U.S.G.S. incorrectly designates some of these areas as having land properties, and in these cases the data are corrected to water.
NIELSEN	Provides the population-weighted ZIP Code centroids that are used as part of the annual U.S. exposure update process. NIELSEN creates a population weighted centroid for each ZIP Code contained within the update files it provides. The process of creating these centroids relies upon mapping the centroids of census blocks to the ZIP Codes by allocating all Census Blocks whose centroid falls within the boundary of a given ZIP Code, to that ZIP Code. For each ZIP Code a population weighted centroid is calculated based on this mapping. The data received from NIELSEN is on average a year out of date.	The calculation of the population weighted centroids is checked by the Exposures group using the NIELSEN census block centroids and population. A secondary check is done using the block centroids and population from the most recent census. Centroid movements greater than .1 miles are plotted on maps and visually inspected. Any changes that can't be justified are referred to NIELSEN for further explanation.
Topologically Integrated Geographic Encoding and Referencing (TIGER) Database	Provides street information (name, address numbers, city, latitude and longitude coordinates for streets) that is used by the AIR Geocoder and Address Service to uniquely identify various geographic areas. Also provides various landmarks (parks, airports, etc.) data that is used by the Map Server. This data is from the Aug. 2014 US Census TIGER shape file release.	Implemented as part of the AIRAddressServer database. Various fields counts in the integrated database are compared to the prior year's integrated database. In addition, address service batch processes are ran to compare batch geocoding and address validation match results to the prior versions results.
United States Postal Service	Provides the official ZIP Codes, ZIP-9 codes, and related street segments for the U.S. This data, which is received monthly, is also included in the annual ZIPAll update by the Research group.	Implemented as part of the AIRAddressServer database. Various fields counts in the integrated database are compared to the prior year's integrated database. In addition, address service batch processes are run to compare batch geocoding and

Source Title	Description	Validation Methods
		address validation match results to the prior versions results.
Department of Energy (DOE) Exposure Data	Residential Energy Consumption Survey (RECS) http://www.eia.gov/consumption/residential/data/2009/	The distributions of risk counts in various regions were compared against distributions of risk counts across the same regions in the AIR Industry Exposure.
U.S. Census: American Community Survey	Data regarding housing age counts (year of construction) extracted from: http://www.census.gov/acs/www/data_documentation/data_main/. Downloaded May 29, 2014 (ACS_12_5YR_DP04_with_ann.csv)	The distributions of risks compared against the AIR Industry Exposure, and with previous releases of the ACS to ensure consistency.
ZIPLIst5Max by ZIPInfo	ZIPList5 Max is a 5-digit ZIP Code data file which includes latitude and longitude, MSA/PMSA, and market area. The file is available in comma-delimited ASCII format, as well as MS Access, dBase, and Paradox database formats. The file contains about 71,500 records (42,700 "preferred" records plus 28,800 "alias" records), covering all valid ZIP Codes to which the U.S. Postal Service delivers mail. Each ZIPList5 Max record contains the following data: 5-digit ZIP Code, City name (and abbreviation, if over 13 characters), State abbreviation, County name (for that ZIP code), County FIPS code, Area code, Time zone, Daylight Saving Time flag, Latitude and longitude in degrees, MSA/PMSA code, Market Area, Preferred name or alias name, lag (refers to city name), and ZIP Code type.	The GIS specialist in the product management group takes the latest commercial release from ZIPInfo, which matches the same timeline as the versions of the U.S. Postal Service ZIP+4 national and U.S. Census TIGER shapefile data releases, and conflate these separate data sources into the AIRAddressServer database. Various field counts in the integrated database are compared to the prior year's integrated database. In addition, address service batch processes are run to compare batch geocoding and address validation match results to the prior versions results. It is important to note that AIR receives receive quarterly update of the ZIPInfo data, however only the version that is closes to the U.S. Postal and U.S. census TIGER release dates is used. In some cases, the source release dates may differ by a month, but it is outside our control as to when a given sources release their data updates.
Rural-Urban Continuum Codes	The 2013 Rural-Urban Continuum Codes form a classification scheme that distinguishes metropolitan counties by the population size of their metro area, and nonmetropolitan counties by degree of urbanization and adjacency to a metro area. This scheme allows researchers to break county data into finer residential groups, beyond metro and nonmetro, particularly for the analysis of trends in nonmetro areas that are related to population density and metro influence.	This data/codes are used to identify which counties where "Rural" or "Urban" based on population density. Population counts were compared against exposure counts in the AIR Industry Exposure for validation.

Detailed discussion regarding the verification of the data is discussed in detail within each component-specific document. Model and Software development custodians shall be available to further explain the validation methods for each data source.

The Model QA, Core QA, and Software QA test plans are designed to 1) evaluate the functionality of the software to ensure that it behaves as intended and 2) to ensure that the results are as expected. As such, all Touchstone dependencies (i.e. model .dlls and databases) are inherently validated via the testing process. Any inappropriate behavior or deviation from the expected results are further investigated by the various stakeholders, including QA, Product Management, Research, Software Development, and Client Consulting. When appropriate, ClearQuest tickets are opened to ensure that the source of the error is corrected and re-tested.

C-6 Model Maintenance and Revision

(Significant Revision)

Relevant Form: G-6, Computer Standards Expert Certification

A. ***The modeling organization shall maintain a clearly written policy for model revision, including verification and validation of revised components, databases, and data files.***

AIR maintains a clearly documented policy for model revisions with respect to methodology and data. AIR employs a verification mechanism consisting of manual comparisons of its data files and databases used in the modeling process and a computer verification process that consists of comparing program, configuration, data file and database cryptographic service values against their known valid values.

B. ***A revision to any portion of the model that results in a change in any Florida residential hurricane loss cost or probable maximum loss level shall result in a new model version identification.***

AIR has a clearly documented policy for model revision with respect to methodology and data. Any enhancement to the model that results in a change in hurricane loss costs or probable maximum loss levels also results in a new model version number. At least once a year, the ZIP Code information is updated to take into account the most recent data. Specifically, the ZIP Code Centroids are updated, and using this new information, the ZIP Code site characteristics are updated. These characteristics include elevation, surface roughness, and distance from the coastline. The historical meteorological information is periodically updated to reflect new events (or lack thereof).

Other enhancements may be made to the model based on ongoing research undertaken by AIR scientists and engineers. For example, post disaster damage surveys and collected loss data from actual events may improve our understanding of the effectiveness of building codes in specific areas.

C. ***The modeling organization shall use tracking software to identify and describe all errors, as well as modifications to code, data, and documentation.***

AIR uses Salesforce CRM and ClearQuest to track issues/bugs, as well as modifications to code, data, and documentation. Revisions and versioning are managed using the build in versioning capability of Microsoft's Team Foundation Server via Microsoft Visual Studio, as well as Visual SourceSafe (VSS).AIR custodians shall be available to demonstrate issue management via Salesforce and ClearQuest.

Salesforce CRM

Client Services uses Salesforce CRM to track defects, bugs, enhancement and recommendations submitted by clients and customers. Salesforce CRM is an enterprise level customer relationship management (CRM) that allows AIR to manage client reported cases of technical support issues, including web-based reporting, tracking, documentation, management and resolution of all levels of client technical support.

Issues identified by Client Services using Salesforce CRM are escalated to ClearQuest tickets for further development when the case require extensive requirements gathering, analysis and/or technical, code or model changes.

ClearQuest Tickets

AIR uses ClearQuest to log and manage product enhancements, change requests, and issues management. Any issues/bugs/unexpected results that are identified via the testing process are also tracked using ClearQuest.

Issue/Bug Submission Process

Clients submit bugs or suspect model data errors using the Salesforce CRM. The Salesforce case is assigned to the appropriate group (i.e. Client Consulting, Research, Software Development), which reviews the circumstances and determines if a solution exists that does not require modifications to the application. If so, these solutions are documented in the Salesforce CRM system and provided to the client. When changes to Touchstone or the model are required to fix the issue, AIR follows the standard software development process.

Internal AIR users submit change requests electronically via ClearQuest. There are no restrictions to limit individuals who may submit a request. The workflows in Figure 63 and Figure 64 below illustrate the change management processes for the model and Touchstone software.

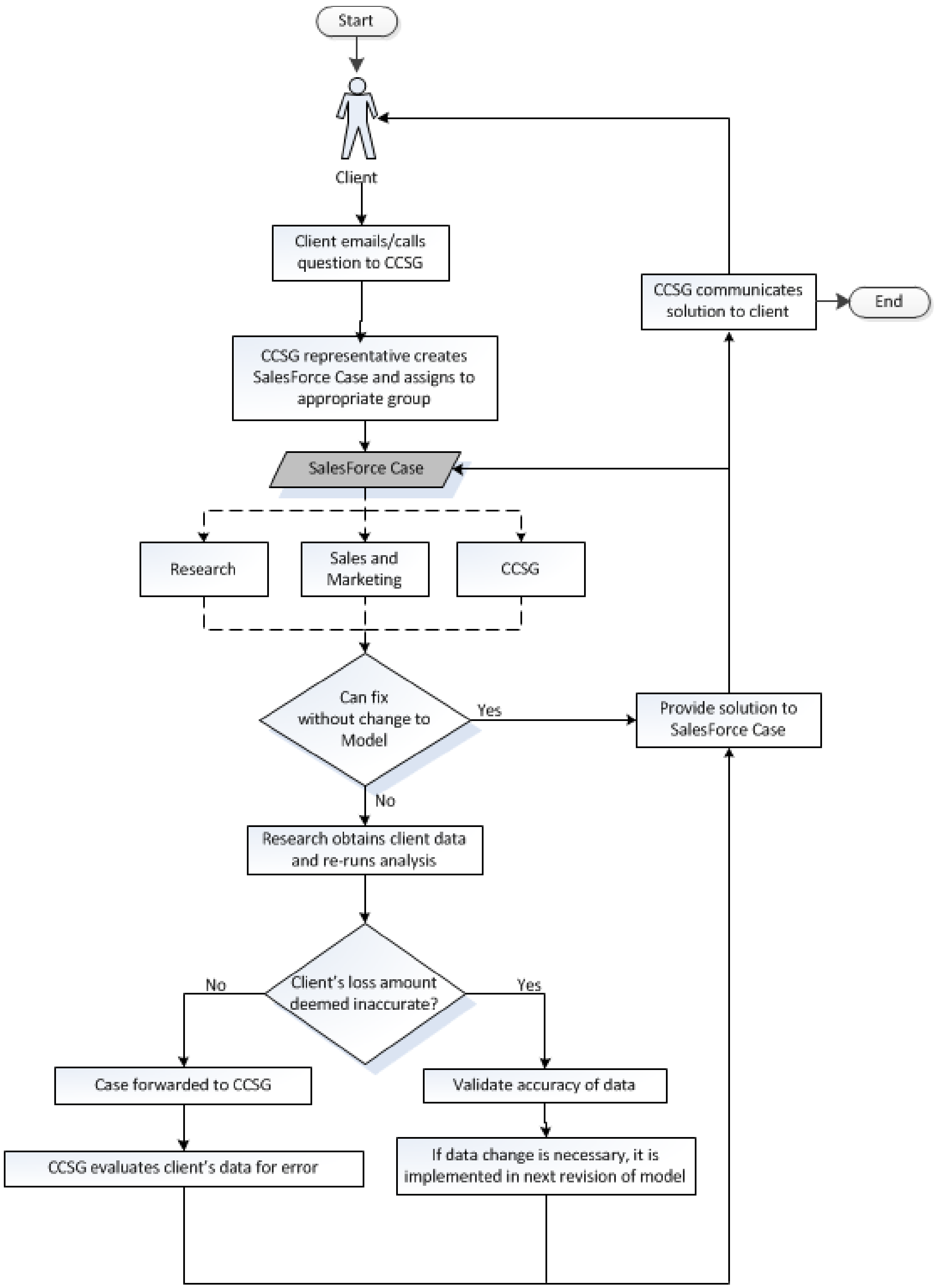


Figure 63. Model Change Management Process

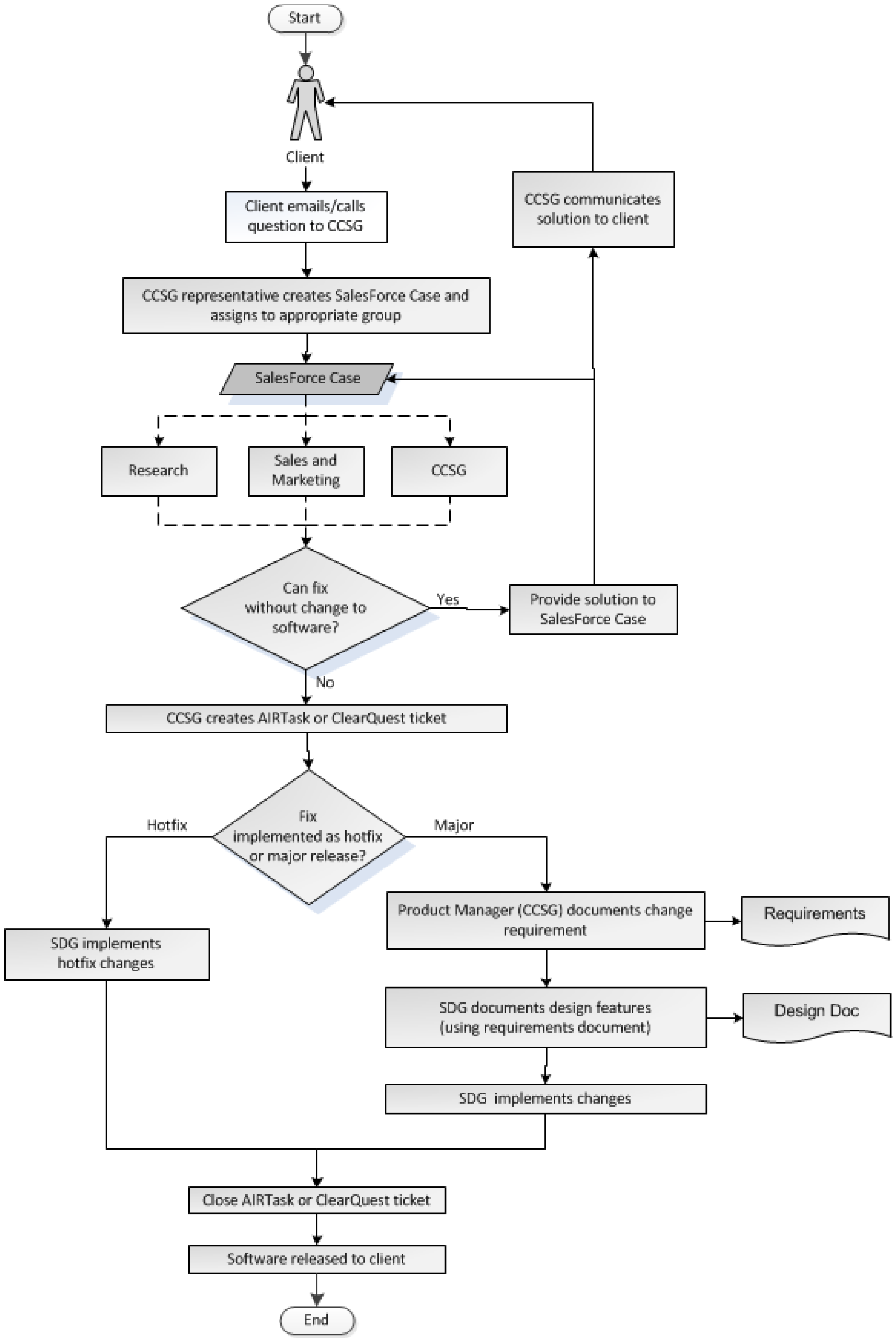


Figure 64. Software Change Management Process

D. ***The modeling organization shall maintain a list of all model versions since the initial submission for this year. Each model description shall have a unique version identification, and a list of additions, deletions, and changes that define that version.***

The document *Enhancements and Florida Commission Documentation Mapping* identifies the updates specific to the AIR Atlantic Tropical Cyclone Model version 15.0.1 and Touchstone application version 3.0.0. The document *Version Change History* defines the source code additions, deletions, and changes for the model components and software since the last submission. These documents shall be available to the Professional Team.

Disclosures

1. *Identify procedures used to maintain code, data, and documentation.*

AIR employs consistent and documented methods for data and documentation control for all software product development and test scripts. The current version number and date of most recent changes are documented for the individual components in the system decomposition.

AIR uses Microsoft Visual SourceSafe (VSS) for version control of the model components' source code. Due to the large size of the model's data files, they are not stored within VSS. They are stored on data servers, for which the AIR Data Control Workbook is used to log these model data that is ready for transfer from the Research and Model group to the Software Development team. This workbook tracking includes date, file name, data type, description, changes relative to previous year and the name of the person(s) who send and receive the data.

Version control for the Touchstone components' source code (including the C++ model code and databases) is maintained using Microsoft's Team Foundation Server (TFS) via Microsoft Visual Studio.

AIR uses Microsoft Office SharePoint Server (internally referred to as AIRPort) to manage project, archive and monitor requirements, store and share client-based or internal documentation or PDF files. Like VSS and TFS, AIRPort tracks installation date, date of most recent changes and version history.

2. *Describe the rules underlying the model and code revision identification systems.*

AIR maintains a clearly documented policy for model revision. The research models and the software applications have four components to the version number. For each new version a build date is assigned and the version numbers are tracked in source control. A detailed explanation of the revision number system is as follows.

The AIR Model version definitions are predefined and follow typical versioning methodology, including:

- **Major Version** (two digit)—Incremented when model components, such as the catalog, hazard, intensity, or vulnerability modules, are updated. A single major version increment is sufficient in cases when multiple components are updated during a release cycle.
- **Minor Version** (two digit)—Incremented when data files, such as the physical properties or industry exposures, are updated but the model components remain unchanged. If data files are changing simultaneously with a major version update, the minor version number does not need to be incremented.
- **Update to Minor Version** (one digit)—Incremented when data file or model component bugs have been identified *after* the release of our client software products.
- **Build Version** (two digit)—Incremented when bug fixes are required for data files or model components and these changes have been identified *prior* to a release of our client software.
- **Build Date** (six digit—yymmdd)—Incremented every time significant changes are made to the data files and a new version of the model is compiled. The build date changes most frequently. A new build date is introduced every time the version number changes.

The software version definitions are predefined and follow typical software versioning methodology, including:

- **Major Version** (two digit)—Incremented when new or revised models are implemented into the software application. Also introduces database, engine, and other significant changes to the software.
- **Minor Version** (two digit)—Incremented when new or revised models, functionality enhancements, and other various software upgrades are introduced. Most often, this service pack is released in the fall.
- **Update to Minor Version** (one digit)—Incremented in cases when bug fixes are necessary and have been identified *after* the release of our client software. The need to increment this version number is most often identified externally by a client and incrementing this digit indicates that a service pack or Hot Fix was released.
- **Build Version** (two digit)—Incremented in cases when bug fixes are necessary and these changes have been identified *prior* to a release of our client software.
- **Build Date** (Eight digit—yyyymmdd)—Incremented each time significant changes are made to the source code and the software is compiled. The build date will change most frequently. A new build date is introduced every time the version number changes.

C-7 Security

Relevant Form: G-6, Computer Standards Expert Certification

The modeling organization shall have implemented and fully documented security procedures for: (1) secure access to individual computers where the software components or data can be created or modified, (2) secure operation of the model by clients, if relevant, to ensure that the correct software operation cannot be compromised, (3) anti-virus software installation for all machines where all components and data are being accessed, and (4) secure access to documentation, software, and data in the event of a catastrophe.

AIR employs a number of physical and electronic security measures to protect all code, data and documentation against both internal and external potential sources of damage, and against deliberate and inadvertent, unauthorized changes.

Electronic Security

The AIR network is made up of shared Windows and Linux servers along with a variety of desktop workstations and laptops used by individual employees. Within each department there may also be some workstations that contain applications or resources that are shared within the department. These machines may also be used to execute long running jobs.

Microsoft Windows servers are the foundation of the network. There are file, print, and Exchange mail servers. The network is connected with 1000/10,000 Gbps Ethernet switches for fast throughput. AIR also has Linux servers, which are primarily used for research and development of AIR models. They are also used for running these models for client services. Email is centralized through the Boston office. The AIR network also has a separate sub-network that contains classroom workstations. Students in classes see only what is available to that sub-network, not the servers and workstations of AIR employees.

As a directive from Verisk (AIR's parent company), every employee at AIR is required to complete the online Information Security Awareness with Privacy Principles program during the month of January. The program discusses key security elements that all employees must understand. To successfully complete the course, employees must review and accept the policies stated and score 80 percent or better on the assessment provided at the end of the course. Compliance with certain regulations, including security rules within the Health Insurance Portability and Accountability Act (HIPAA), mandate that all employees be fully trained in security awareness. Failure to complete and pass the course could result in suspension of the employee's LAN access.

Network Access Management

Access to the network is managing using:

- Firewall—The first stage of network protection is the use of firewalls. AIR policy is to maintain the minimum number of open ports necessary.
- Network logon (internal)—Access to the network via workstations at AIR's main office is restricted to AIR-approved Windows®-authenticated accounts with a valid user name and password. Passwords must be a minimum of eight characters in length and must contain a combination of alphabetic and numeric characters, including upper case letters. The Windows' login account password expires every 60 days. Use of personal computers is restricted without AIR network access approval. IS ensures that personal computers have functional anti-virus software, as well as relevant Microsoft patches.

- Network logon (external)—Access to the network from a workstation outside AIR's main office is subject to the internal network logon restrictions mentioned above, as well as access via the VPN gateway. VPN accounts are granted with management approval only.
- Branch offices and remote users—Access to the network from AIR's branch offices is subject to the internal network logon restrictions mentioned above, and can only be accessed via a virtual private network (VPN).

Data Servers Management

Access to the files and folders on AIR's data servers is regulated by permissions (read-only, read/write, etc.) assigned by management. In general, a member of one department has read/write access to that department's files and folders, and read-only access to the files and folders of other departments. Access to and permissions for specific folders are determined by the senior team leader and incorporated into each user's account profile.

The data servers are located in a secure server room. Access to the server room is granted by electronic badge verification and is limited to essential personnel only.

All model and software development is done within AIR's secure network. In general, developers have read-only access to the entire database, and read/write access to the product on which they are working.

Access to the contents of AIR's Visual SourceSafe (VSS) database is limited to authorized accounts approved and created by the senior team leader. The ability to delete code from the VSS database is limited to the senior team leader.

Access to the source file contents within Team Foundation Server (TFS) is limited to authorized employees. The ability to delete code from the TFS is limited to the senior team leaders.

Access to AIRPort—All AIR employees have access to AIRPort. Access is granted using the employee's Windows®-authenticated user name and password. When a site is created, the administrator determines who has access to the site and each member receives an invitation to join the site. The site administrator also assigns rights to team members.

FTP Server Management

The AIR Worldwide FTP Servers are contained within the DMZ zone and are accessed in a secure manner. In computer networks, a DMZ (demilitarized zone) is a computer host or small network inserted as a "neutral zone" between a company's private network and the outside public network. It prevents outside users from getting direct access to a server that has company data. A DMZ is an optional and more secure approach to a firewall and effectively acts as a proxy server as well.

In a typical DMZ configuration for a small company, a separate computer (or host in network terms) receives requests from users within the private network for access to Web sites or other companies accessible on the public network. The DMZ host then initiates sessions for these requests on the public network. However, the DMZ host is not able to initiate a session back into the private network. It can only forward packets that have already been requested. Users of the public network outside the company can access only the DMZ host. However, the DMZ provides access to no other company data.

Remote Access

AIR provides Virtual Private Network (VPN) service to give users access to the internal network while they are traveling or working at home. A VPN connection to AIR network enables employees to work remotely. Users can connect to a server to share files, to share their desktop via Remote Desktop protocol, and use X windows/SSH to connect to Linux resources. Since the home PC is not part of the AIR Worldwide domain, the user cannot see all of the workstations and servers in the Network Neighborhood. However, the can search for a particular server or workstation. Once the user finds the appropriate system, the user will be asked to enter their AIR Windows user name and password.

Using the VPN gateway to access the workstation at AIR Worldwide requires manager's approval, as well as the following computer pre-requisites:

- Symantec Anti-virus provided by AIR installed or equivalent anti-virus software on an employee's PC. The signature files should be updated daily or weekly. (Windows 7/8)
- The built-in Windows firewall (Windows 7/8) must also be installed and configured.

Access for Remote Offices

AIR Worldwide has several offices outside the Boston headquarters. Our branch offices have their own networks and servers, and each office has the ability to access the Boston servers and our Intranet via the VPN gateway.

File Back-up

To provide a safety net to AIR's network, AIR maintains a thorough back-up policy covering all files stored on the network, including all document, source and data files related to Touchstone and the AIR Atlantic Tropical Cyclone Model.

During the workweek, all critical servers are backed up in full to an Avamar/Datadomain grid.

Every thirty days a tape-out action is performed to LTO-6 with AES-256. Tapes are stored offsite at a commercial storage facility for seven years.

Virus Protection

Virus protection software is installed on the AIR servers, desktops, and notebooks. The virus protection maintenance policy is set up to automatically download virus signature pattern files every morning. These files are then automatically sent to all servers and workstations within the network. This protection scans not only incoming email and email attachments, but also any files introduced through external media, such as USB drives.

The virus scanning software, Symantec is always scanning files on our Windows desktops and servers. IS-installed Symantec always scans files as they are opened to ensure that no viruses have infected working files. Symantec is updated for new virus protection immediately upon release of an updated virus signature file.

AIR blocks spam using the third party application Websense Email Security. All email is filtered through the spam servers before being passed to the mail server.

Symantec is also installed on the FTP server. All files that are uploaded and downloaded are scanned automatically.

Microsoft® Patches

Patches to Microsoft products (including security patches) are provided and deployed using Shavlick. As Microsoft releases patches; the patch is deployed and installed automatically.

Laptops

In addition to the security software outlined in this document, all laptops are required to have the Checkpoint Pointsec Full Disk Encryption software installed. Check Point Full Disk Encryption provides the highest level of data security with multi-factor pre-boot authentication and the strongest encryption algorithms. The entire hard drive contents—including the operating system and even temporary files—are automatically encrypted for a completely transparent end-user experience.

Third Party Software

To maintain consistency among departments, any software that transfers data and is used within or between departments must be approved by IS. Wherever possible, functions within the Microsoft Office suite should be used. Only software that has been approved by both the department manager and IS can be installed on any AIR system. Individuals who load software that is not on the following list do so at their own risk. They are responsible for any consequences and will not be given IS support time for that software. Individual departments may have software that is required to perform the department's specific tasks. It is up to the department manager to select appropriate software. But all these products must coexist with the approved and supported software on a persons' desktop, as well as with the network environment. It is therefore a requirement that IS installs all software that is used on AIR equipment.

Disaster Recovery

The Disaster Recovery (DR) Procedure should be executed when any automated or human-sourced information determines there is a service outage at AIR. The goal is to determine if an authorized entity from AIR can determine if DR failover should or should not take place.

An incident response consists of three distinct phases, Emergency Response, Recovery and Restoration, each with its own set of objectives. The duration of each phase will depend on the nature of the event and its effect on AIR's critical business processes.

Emergency Response:—Once an incident is discovered and as it continues to unfold, the Emergency Response Team (ERT) is mobilized to determine the severity and extent of the incident. The ERT identifies what the situation is, how severe it is, what operations will be impacted if any, and what is the extent of the damage from the incident. This team reports all this information along with recommendations on how we should react to the Recovery Management Team (RMT). The RMT, headed by the company's president, decides whether the incident warrants a large scale response by the company. Depending on the severity and impact of the incident, the RMT may activate all or a portion of the Business Continuity Plan.

Recovery:—If the Business Continuity Plan is activated, it means that AIR's headquarters is not operational (fully or partially) and may not be accessible resulting in a focus shift to the recovery phase. The recovery phase involves activating and mobilizing the BCP teams and expanding the level of communications to internal and external parties. Employees will support operations from their designated recovery locations as defined in the BCP.

Restoration:—The restoration phase assumes that some or all of AIR's headquarters was damaged, continuity plans were activated, and employees and operations were relocated. During the restoration phase, the ERT stays at the AIR Headquarters to assess the extent, impact, and damage of any incident. They communicate with the RMT who will decide whether/when AIR can re-occupy its headquarters. When that decision is made, the teams involved in the re-location back from the disaster site will be activated and involved.

Information Security Incident Response Plan

All Suspected Data Breaches should be immediately reported to Verisk Help Desk, whose employees have been trained in managing incident response. They review what is reported and, if they deem it necessary, they invoke the Security Response Team.

Members of the Security Response Team are immediately notified simultaneously until one of the senior staff responds to the help desk. Confidentiality is extremely important and everyone is on a need-to-know basis. The decision-making around who gets notified and what happens next is wholly the Security Response Team's responsibility. The Response team will reach out to the person reporting the incident, get their business leaders involved, and start invoking.

Physical Security

AIR is located in a multi-story office building that contains multiple businesses. The building lobby is staffed by security guards 24 hours a day who verify the security badge of everyone who enters the building. Upon entering the building, the employee is required to swipe their badge by the elevator bank.

Employee Badges

Access to AIR's floor is restricted to current AIR employees and guests. All AIR Employees are issued an electronic security badge on the first day of their employment. All AIR employees (including employees visiting from other offices) should have their AIR security badges on their person at all times.

Employees who forget their badge must stop at the security desk and wait for clearance. In the event that a badge is lost, please notify the Office Manager *immediately* so that it can be deactivated and a new one can be issued.

The main entrances to the AIR offices are locked between 5:30 p.m. and 8:30 a.m. The use of the security badge is required to enter either of the doors on the north side of the building during those hours.

The data servers are located in a secure server room. Access to the server room is granted by electronic badge verification and is limited to essential personnel only.

Visitors

All visitors must be reported *in advance* to the Front Desk where they will be pre-cleared through our Visitor Clearance Program. Please give the visitor's first and last name (spelled correctly), date(s) and time(s) of visit(s), and with whom they are meeting. Upon arrival, all guests must show photo ID at the security desk in the lobby to receive a 24-hour, self-invalidating badge indicating what floor and company they have clearance to visit. This badge cannot access any areas that require electronic badge verification. A new badge will be issued for each day of a guest's visit. All guests that are not pre-cleared will be announced via phone for approval before being given a badge.

During business hours, all guests must check in with the AIR receptionist and must be escorted by an AIR employee.

Emergency Evacuation Team

In the event of an emergency, announcements are made over the loud speaker instructing employees to remain or evacuate. Members of the AIR staff have been trained (Emergency Evacuation Team) to inform and guide employees in the event of an evacuation.

Disclosure

1. *Describe methods used to ensure the security and integrity of the code, data, and documentation.*

AIR employs a number of physical and electronic security measures to protect all code, data and documentation against both internal and external potential sources of damage, and against deliberate and inadvertent, unauthorized changes.

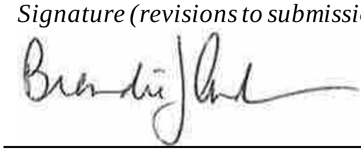
AIR's security policies, which are outlined above, are discussed in the FCHLPM User Help System. An AIR custodian shall be available to further discuss with the Professional Team the AIR security policies and procedures.

Appendix 1: General Standards

Form G-1: General Standards Expert Certification

I hereby certify that I have reviewed the current submission of AIR Atlantic Tropical Cyclone Model *for compliance with the 2013 Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify*:

1) *The model meets the General Standards (G1 – G5),*
2) *The Disclosures and Forms related to the General Standards section are editorially and technically accurate, reliable, unbiased, and complete,*
3) *My review was completed in accordance with the professional standards and code of ethical conduct for my profession,*
4) *My review involved ensuring the consistency of the content in all sections of the submission; and*
5) *In expressing my opinion I have not been influenced by any other party in order to bias or prejudice my opinion.*

Brandie Andrews	B.S., Mathematics
Name	*Professional Credentials (Area of Expertise)*
	October 31, 2014
Signature (original submission)	*Date*
Signature (response to Deficiencies, if any)	*Date*
Signature (revisions to submission, if any)	*Date*
	May 20, 2015
Signature (final submission)	*Date*

An updated signature and form is required following any modification of the model and any revision of the original submission. If a signatory differs from the original signatory, provide the printed name and professional credentials for any new signatories.

Signature (revisions to submission)	*Date*

Note: A facsimile or any properly reproduced signature will be acceptable to meet this requirement. Standard G-2, Disclosure 4

Form G-2: Meteorological Standards Expert Certification

I hereby certify that I have reviewed the current submission of AIR Atlantic Tropical Cyclone Model *for compliance with the 2013 Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify*:

1) *The model meets the Meteorological Standards (M1 – M6),*
2) *The Disclosures and Forms related to the Meteorological Standards section are editorially and technically accurate, reliable, unbiased, and complete,*
3) *My review was completed in accordance with the professional standards and code of ethical conduct for my profession, and*
4) *In expressing my opinion I have not been influenced by any other party in order to bias or prejudice my opinion.*

Arthur Doggett
Name

Ph.D., Geosciences/Atmospheric Science
Professional Credentials (Area of Expertise)

Signature (original submission)

October 31, 2014
Date

Signature (response to Deficiencies, if any)
Date

Signature (revisions to submission, if any)
Date

Signature (final submission)

May 19, 2015
Date

An updated signature and form is required following any modification of the model and any revision of the original submission. If a signatory differs from the original signatory, provide the printed name and professional credentials for any new signatories.

Signature (revisions to submission)
Date

Note: A facsimile or any properly reproduced signature will be acceptable to meet this requirement.

Standard G-2, Disclosure 5

Form G-3: Statistical Standards Expert Certification

I hereby certify that I have reviewed the current submission of AIR Atlantic Tropical Cyclone Model *for compliance with the 2013 Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify*:

1) *The model meets the Vulnerability Standards (S1 – S6),*
2) *The Disclosures and Forms related to the Statistical Standards section are editorially and technically accurate, reliable, unbiased, and complete,*
3) *My review was completed in accordance with the professional standards and code of ethical conduct for my profession, and*
4) *In expressing my opinion I have not been influenced by any other party in order to bias or prejudice my opinion.*

Suilou Huang	M.S. in Statistics, Ph.D., Oceanography
Name	*Professional Credentials (Area of Expertise)*
	October 31, 2014
Signature (original submission)	*Date*
Signature (response to Deficiencies, if any)	*Date*
Signature (revisions to submission, if any)	*Date*
	May 19, 2015
Signature (final submission)	*Date*

An updated signature and form is required following any modification of the model and any revision of the original submission. If a signatory differs from the original signatory, provide the printed name and professional credentials for any new signatories. Additional signature lines shall be added as necessary with the following format:

Signature (revisions to submission)	*Date*

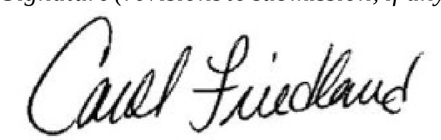
Note: A facsimile or any properly reproduced signature will be acceptable to meet this requirement.

Standard G-2, Disclosure 6

Form G-4: Vulnerability Standards Expert Certification

I hereby certify that I have reviewed the current submission of AIR Atlantic Tropical Cyclone Model *for compliance with the 2013 Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify:*

1) *The model meets the Vulnerability Standards (V1 – V3),*
2) *The Disclosures and Forms related to the Vulnerability Standards section are editorially and technically accurate, reliable, unbiased, and complete,*
3) *My review was completed in accordance with the professional standards and code of ethical conduct for my profession, and*
4) *In expressing my opinion I have not been influenced by any other party in order to bias or prejudice my opinion.*

Carol Friedland	P.E., Ph.D., Civil Engineering
Name	*Professional Credentials (Area of Expertise)*
	October 28, 2014
Signature (original submission)	*Date*
Signature (response to Deficiencies, if any)	*Date*
Signature (revisions to submission, if any)	*Date*
	May 18, 2015
Signature (final submission)	*Date*

An updated signature and form is required following any modification of the model and any revision of the original submission. If a signatory differs from the original signatory, provide the printed name and professional credentials for any new signatories. Additional signature lines shall be added as necessary with the following format:

Signature (revisions to submission)	*Date*

Note: A facsimile or any properly reproduced signature will be acceptable to meet this requirement.

Standard G-2, Disclosure 7

Form G-5: Actuarial Standards Expert Certification

I hereby certify that I have reviewed the current submission of AIR Atlantic Tropical Cyclone Model *for compliance with the 2013 Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify:*

1) *The model meets the Vulnerability Standards (A1 – A6),*
2) *The Disclosures and Forms related to the Actuarial Standards section are editorially and technically accurate, reliable, unbiased, and complete,*
3) *My review was completed in accordance with the Actuarial Standards of Practice and Code of Conduct; and*
4) *In expressing my opinion I have not been influenced by any other party in order to bias or prejudice my opinion.*

Heidi Wang
Name

FCAS, M.S., Actuarial Science
Professional Credentials (Area of Expertise)

Signature (original submission)

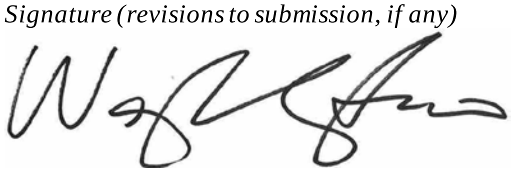
October 31, 2014
Date

Signature (response to Deficiencies, if any)

Date

Signature (revisions to submission, if any)

Date



Signature (final submission)

May 19, 2015
Date

An updated signature and form is required following any modification of the model and any revision of the original submission. If a signatory differs from the original signatory, provide the printed name and professional credentials for any new signatories. Additional signature lines shall be added as necessary with the following format:

Signature (revisions to submission)

Date

Note: A facsimile or any properly reproduced signature will be acceptable to meet this requirement.
Standard G-2, Disclosure 8

Form G-6: Computer Standards Expert Certification

I hereby certify that I have reviewed the current submission of AIR Atlantic Tropical Cyclone Model *for compliance with the 2013 Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify:*

1) *The model meets the Vulnerability Standards (C1 – C7),*
2) *The Disclosures and Forms related to the Computer Standards section are editorially and technically accurate, reliable, unbiased, and complete,*
3) *My review was completed in accordance with the professional standards and code of ethical conduct for my profession, and*
4) *In expressing my opinion I have not been influenced by any other party in order to bias or prejudice my opinion.*

Angelo Jeyarajan

Name

MBA, B.S., Electrical Engineering. Certified ISO 9000 Auditor and Project Management Professional

Professional Credentials (Area of Expertise)

Signature (original submission)

October 27, 2014

Date

Yingqun Wang

Name

M. S. in Computer Science

Professional Credentials (Area of Expertise)

Signature (response to Deficiencies, if any)

January 7, 2015

Date

Signature (revisions to submission, if any)

Date

Signature (final submission)

May 19, 2015

Date

An updated signature and form is required following any modification of the model and any revision of the original submission. If a signatory differs from the original signatory, provide the printed name and professional credentials for any new signatories.

Additional signature lines shall be added as necessary with the following format:

Signature (revisions to submission)

Date

Note: A facsimile or any properly reproduced signature will be acceptable to meet this requirement.

Standard G-2, Disclosure 9

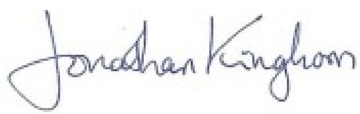
Form G-7: Editorial Certification

I/We hereby certify that I/we have reviewed the current submission of AIR Atlantic Tropical Cyclone Model *for compliance with the "Process for Determining the Acceptability of a Computer Simulation Model" adopted by the Florida Commission on Hurricane Loss Projection Methodology in its Report of Activities as of November 1, 2013, and hereby certify that:*

1) *The model submission is in compliance with the Commission's Notification Requirements and General Standard G-5 (Editorial Compliance);*
2) *The disclosures and forms related to each standards section are editorially accurate and contain complete information and any changes that have been made to the submission during the review process have been reviewed for completeness, grammatical correctness, and typographical errors;*
3) *There are no incomplete responses, inaccurate citations, charts or graphs, or extraneous text or references;*
4) *The current version of the model submission has been reviewed for grammatical correctness, typographical errors, completeness, the exclusion of extraneous data/information and is otherwise acceptable for publication; and in expressing my/our opinion I/we have not been influenced by any other party in order to bias or prejudice my/our opinion.*

Jonathan Kinghorn — B.A., Arts Combination

Name — *Professional Credentials (Area of Expertise)*

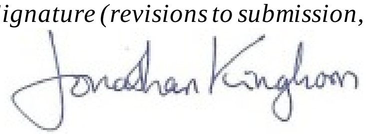


October 31, 2014

Signature (original submission) — *Date*

Signature (response to Deficiencies, if any) — *Date*

Signature (revisions to submission, if any) — *Date*



May 19, 2015

Signature (final submission) — *Date*

An updated signature and form is required following any modification of the model and any revision of the original submission. If a signatory differs from the original signatory, provide the printed name and professional credentials for any new signatories. Additional signature lines shall be added as necessary with the following format:

Signature (revisions to submission) — *Date*

Note: A facsimile or any properly reproduced signature will be acceptable to meet this requirement.

Standard G-5, Disclosure 3

Appendix 2: Meteorological Standards

Form M-1: Annual Occurrence Rates

A. *Provide annual occurrence rates for landfall from the data set defined by marine exposure that the model generates by hurricane category (defined by maximum windspeed at landfall in the Saffir-Simpson scale) for the entire state of Florida and selected regions as defined in Figure 3. List the annual occurrence rate per hurricane category. Annual occurrence rates shall be rounded to two decimal places. The historical frequencies below have been derived from the Base Hurricane Storm Set as defined in Standard M-1 (Base Hurricane Storm Set).*

Figure 65. State of Florida and Neighboring States by Region (RoA, Figure 3)

Table 36. Modeled Annual Occurrence Rates

	Entire State				Region A – NW Florida			
	Historical		Modeled		Historical		Modeled	
Category	Number	Rate	Number	Rate	Number	Rate	Number	Rate
1	23	0.20	11464	0.23	14	0.12	4724	0.09
2	15	0.13	7016	0.14	5	0.04	2491	0.05
3	15	0.13	6395	0.13	5	0.04	1964	0.04
4	7	0.06	3401	0.07	0	0.00	890	0.02
5	2	0.02	514	0.01	0	0.00	103	0.00

	Region B – SW Florida				Region C – SE Florida			
	Historical		Modeled		Historical		Modeled	
Category	Number	Rate	Number	Rate	Number	Rate	Number	Rate
1	5	0.04	3036	0.06	8	0.07	4243	0.08
2	3	0.03	2033	0.04	7	0.06	2543	0.05
3	6	0.05	1977	0.04	4	0.04	2417	0.05
4	2	0.02	1148	0.02	5	0.04	1311	0.03
5	0	0.00	192	0.00	2	0.02	213	0.00

	Region D – NE Florida				Florida Bypassing Hurricanes			
	Historical		Modeled		Historical		Modeled	
Category	Number	Rate	Number	Rate	Number	Rate	Number	Rate
1	1	0.01	561	0.01	4	0.04	3700	0.07
2	1	0.01	253	0.01	1	0.01	1211	0.02
3	1	0.01	210	0.00	2	0.02	783	0.02
4	0	0.00	93	0.00	1	0.01	258	0.01
5	0	0.00	8	0.00	0	0.00	64	0.00

	Region E – Georgia				Region F – Alabama/Mississippi			
	Historical		Modeled		Historical		Modeled	
Category	Number	Rate	Number	Rate	Number	Rate	Number	Rate
1	2	0.02	717	0.01	10	0.09	3555	0.07
2	0	0.00	325	0.01	3	0.03	1924	0.04
3	0	0.00	248	0.00	4	0.04	1577	0.03
4	0	0.00	89	0.00	1	0.01	707	0.01
5	0	0.00	13	0.00	0	0.00	74	0.00

Note: Except where specified, number of hurricanes does not include by-passing hurricanes. Each time a hurricane goes from water to land (once per region) it is counted as a landfall in that region. However, each hurricane is counted only once in the entire state totals. Hurricanes recorded for adjacent states need not have reported damaging winds in Florida.

B. Describe model variations from the historical frequencies.

The modeled frequencies are consistent with the historical frequencies for the period 1900-2012. There are no variations from these frequencies.

C. Provide vertical bar graphs depicting distributions of hurricane frequencies by category by region of Florida (Figure 3) and for the neighboring states of Alabama/Mississippi and Georgia. For the neighboring states, statistics based on the closest milepost to the state boundaries used in the model are adequate.

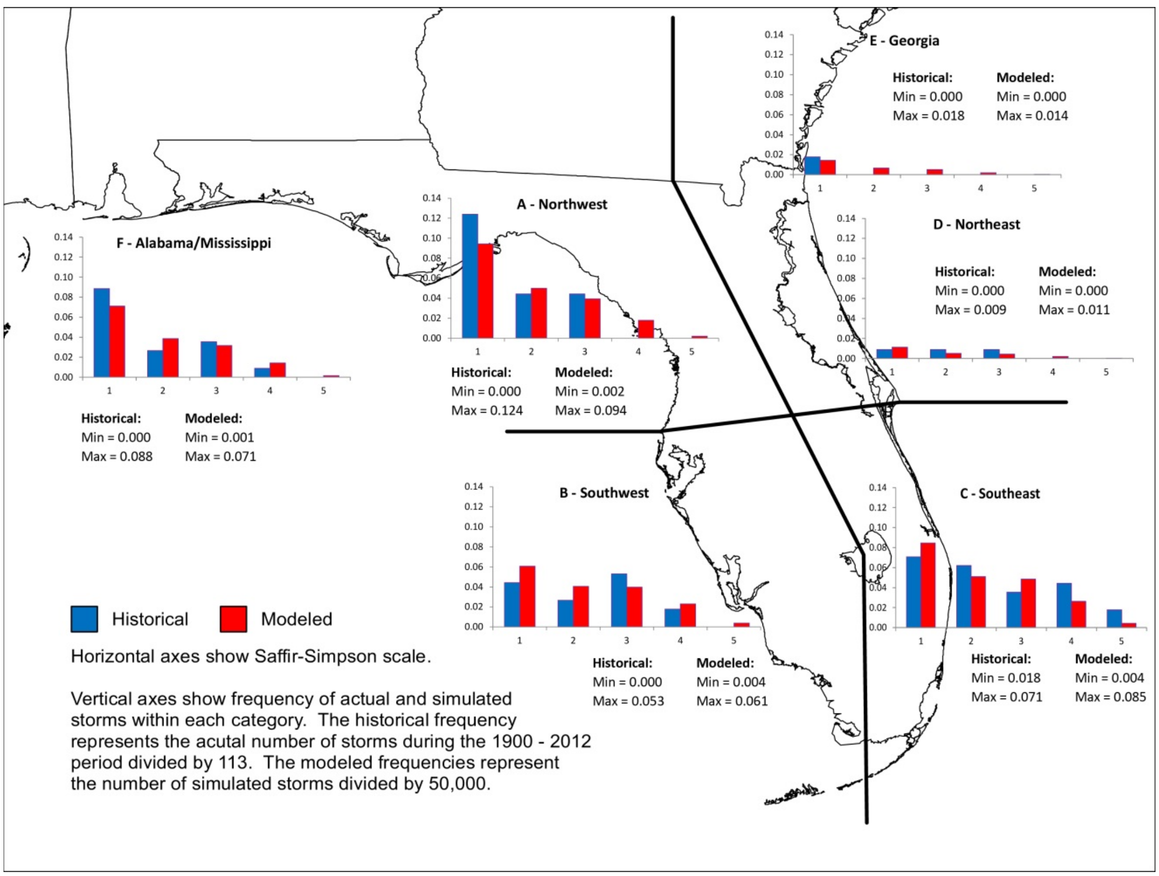


Figure 66. Historical Hurricane Frequency for Florida and Neighboring States by Region

D. *If the data are partitioned or modified, provide the historical annual occurrence rates for the applicable partition (and its complement) or modification as well as the modeled annual occurrence rates in additional copies of Form M-1 (Annual Occurrence Rates).*

The data has not been temporally partitioned or modified.

E. *List all hurricanes added, removed, or modified from the previously accepted submission version of the Base Hurricane Storm Set.*

Three new storms (Hurricane Isaac, 1946 Unnamed4 and Alberto 1982) were added to the base hurricane storm set and were all Florida bypassers. Ninety-four storms were modified due to the use of HURDAT2 and the new methodology associated to the HURDAT2 requirements. Among those ninety-four, eighteen were further modified as part of the HURDAT reanalysis project.

The complete list of changes with impact on Florida is as follows:

Storms added: 1946_04, ALBERTO_1982, ISAAC_2012

Storms modified:

Hurdat2/Methodology: 1901_04, 1903_03, 1904_04, 1906_02, 1906_06, 1906_08, 1909_11, 1910_05, 1911_02, 1912_04, 1915_01, 1915_04, 1916_02, 1916_14, 1917_04, 1919_03, 1921_06, 1924_05, 1924_10, 1926_01, 1926_10, 1928_01, 1928_04, 1929_02, 1946_05, 1947_03, 1947_04, 1947_08, 1948_07, 1948_08, 1949_02, BAKER_1950, EASY_1950, KING_1950, FOX_1952, HOW_1951, FLORENCE_1953, FLOSSY_1956, DONNA_1960, ETHEL_1960, CLEO_1964, DORA_1964, HILDA_1964, ISBELL_1964, BETSY_1965, ALMA_1966, INEZ_1966, ABBY_1968, GLADYS_1968, CAMILLE_1969, AGNES_1972, ELOISE_1975, DAVID_1979, FREDERIC_1979, ELENA_1985, JUAN_1985, KATE_1985, FLOYD_1987, ANDREW_1992, GORDON_1994, ERIN_1995, OPAL_1995, DANNY_1997, EARL_1998, GEORGES_1998, IRENE_1999, GORDON_2000, CHARLEY_2004, FRANCES_2004, IVAN_2004, JEANNE_2004, CINDY_2005, DENNIS_2005, KATRINA_2005, OPHELIA_2005, RITA_2005, WILMA_2005

Hurdat2/Methodology + Reanalysis: 1926_07, 1932_03, 1933_05, 1933_08, 1933_11, 1933_17, 1934_03, 1935_03, 1935_05, 1935_07, 1936_05, 1939_02, 1940_02, 1941_05, 1944_13, 1945_01, 1945_09

F. *Provide this form in Excel format. The file name shall include the abbreviated name of the modeling organization, the standards year, and the form name. Form M-1 (Annual Occurrence Rates) shall also be included in a submission appendix.*

This Form is included in this submission appendix item and is additionally provided in Excel format.

Standard M-1, Disclosure 4

Form M-2: Maps of Maximum Winds

A. *Provide color maps of the maximum winds for the modeled version of the Base Hurricane Storm Set for land use as set for open terrain and land use set for actual terrain as defined by the modeling organization.*

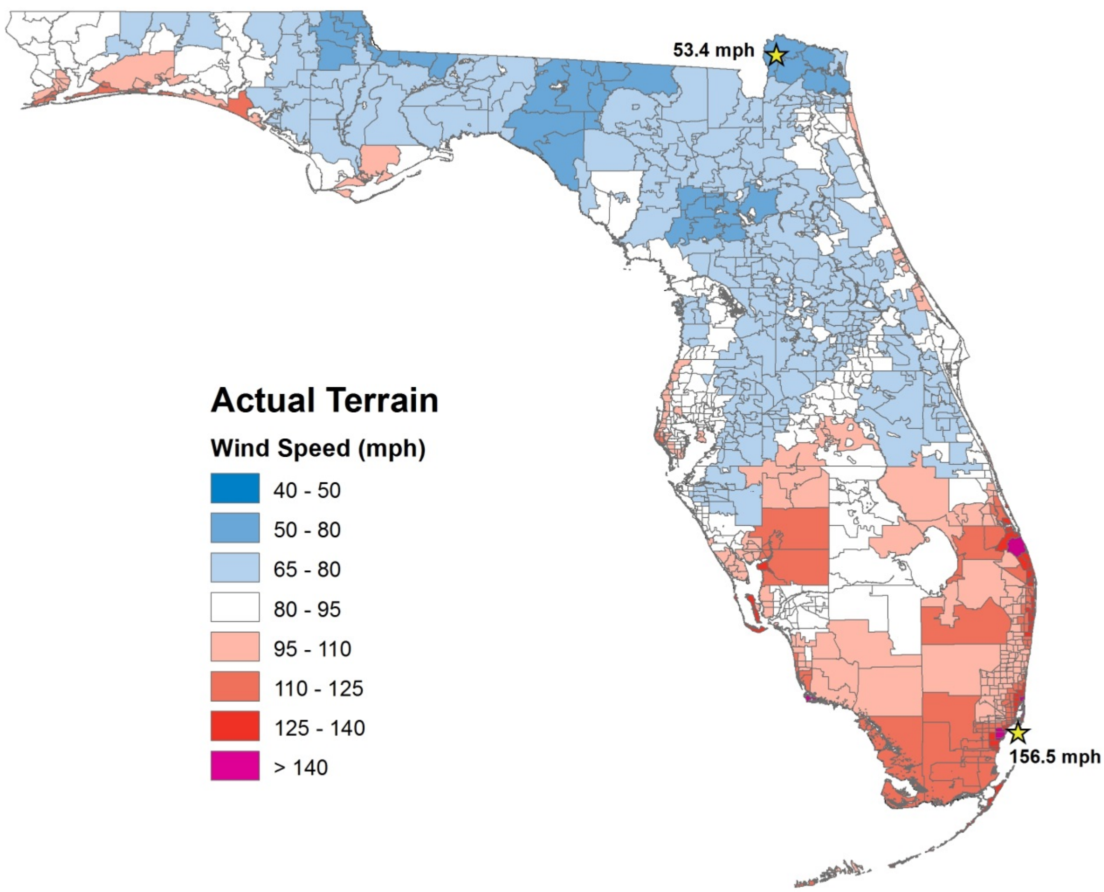


Figure 67. Maximum Winds for the Modeled Version of the Base Hurricane Storm Set for Actual Terrain

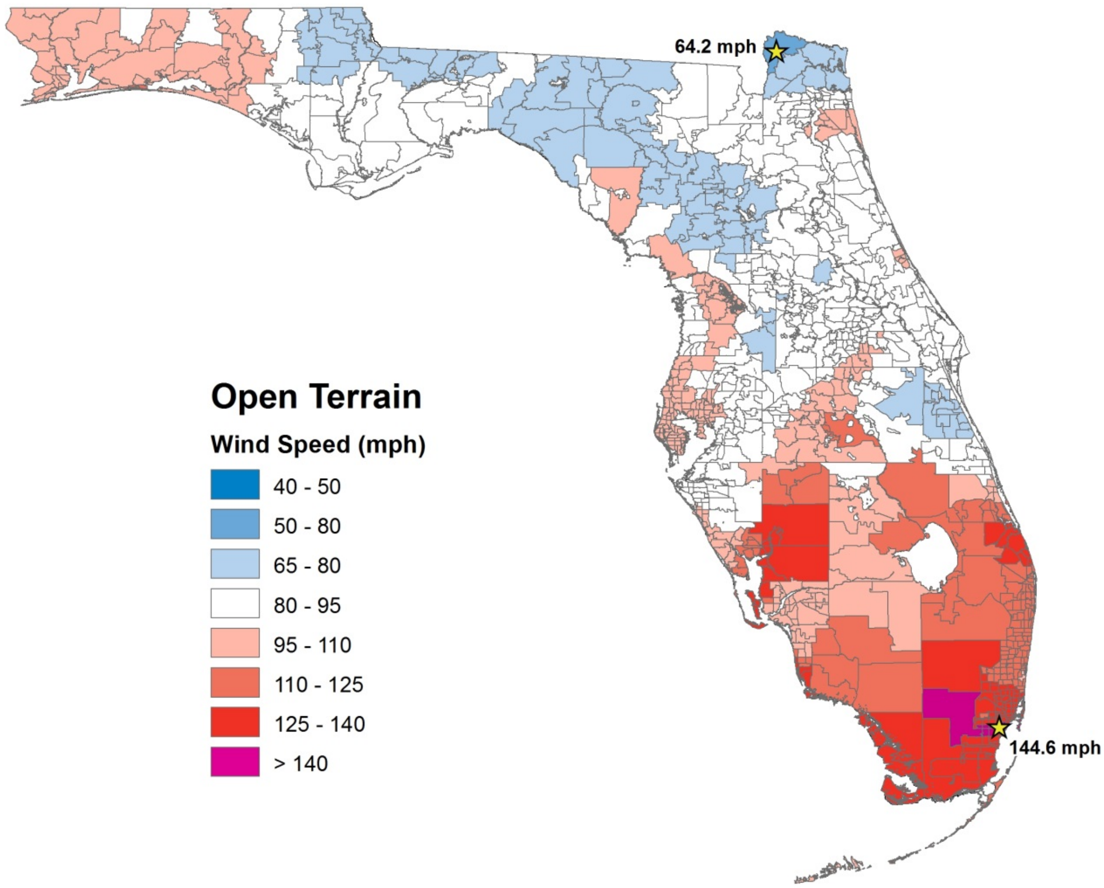


Figure 68. Maximum Winds for the Modeled Version of the Base Hurricane Storm Set for Open Terrain

B. *Provide color maps of the maximum winds for a 100-year and a 250-year return period from the stochastic storm set for both open terrain and actual terrain.*

C. *Plot the position and values of the maximum windspeeds on each contour map.*

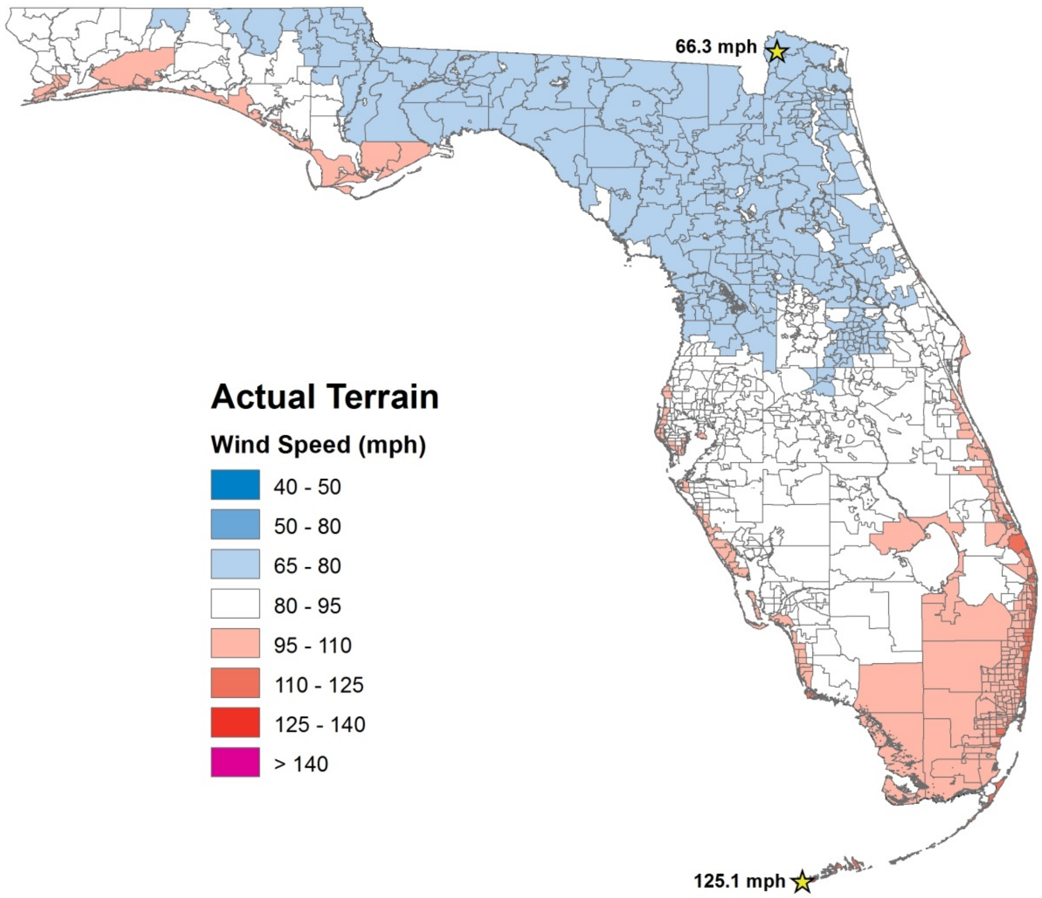


Figure 69. 100-Year Return Period Maximum Winds for Actual Terrain

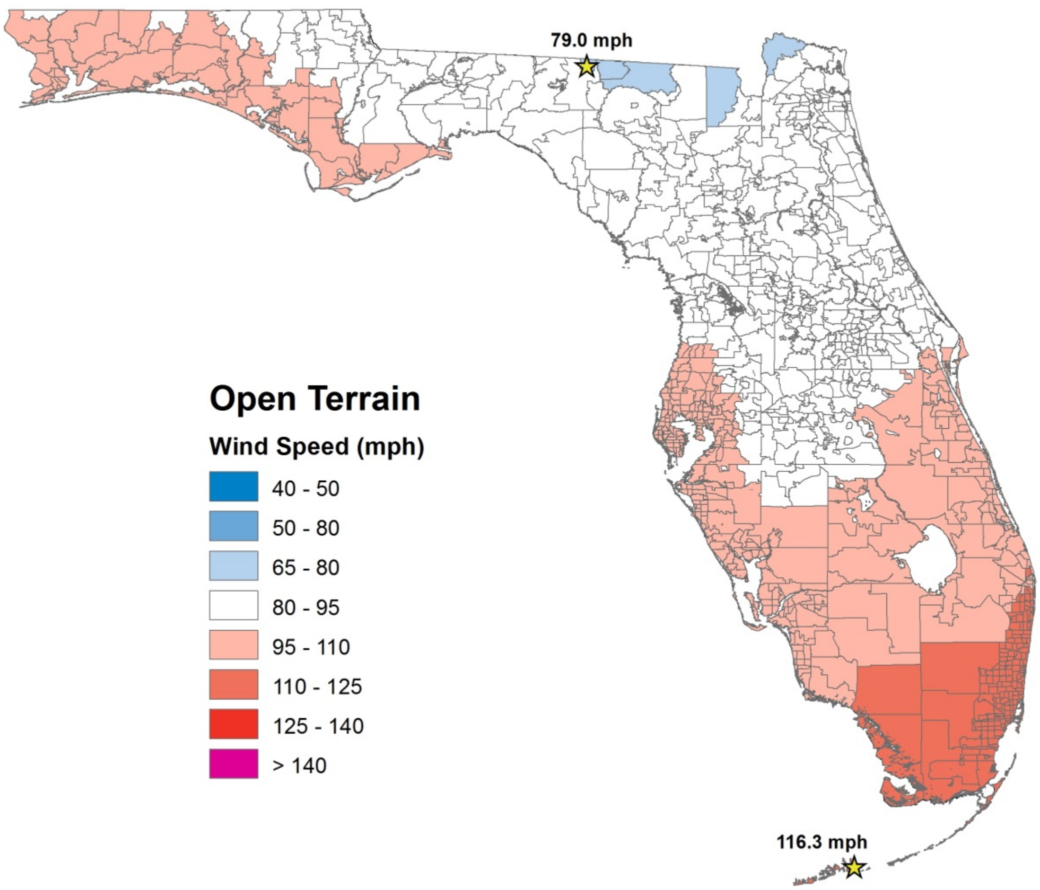


Figure 70. 100-Year Return Period Maximum Winds for Open Terrain

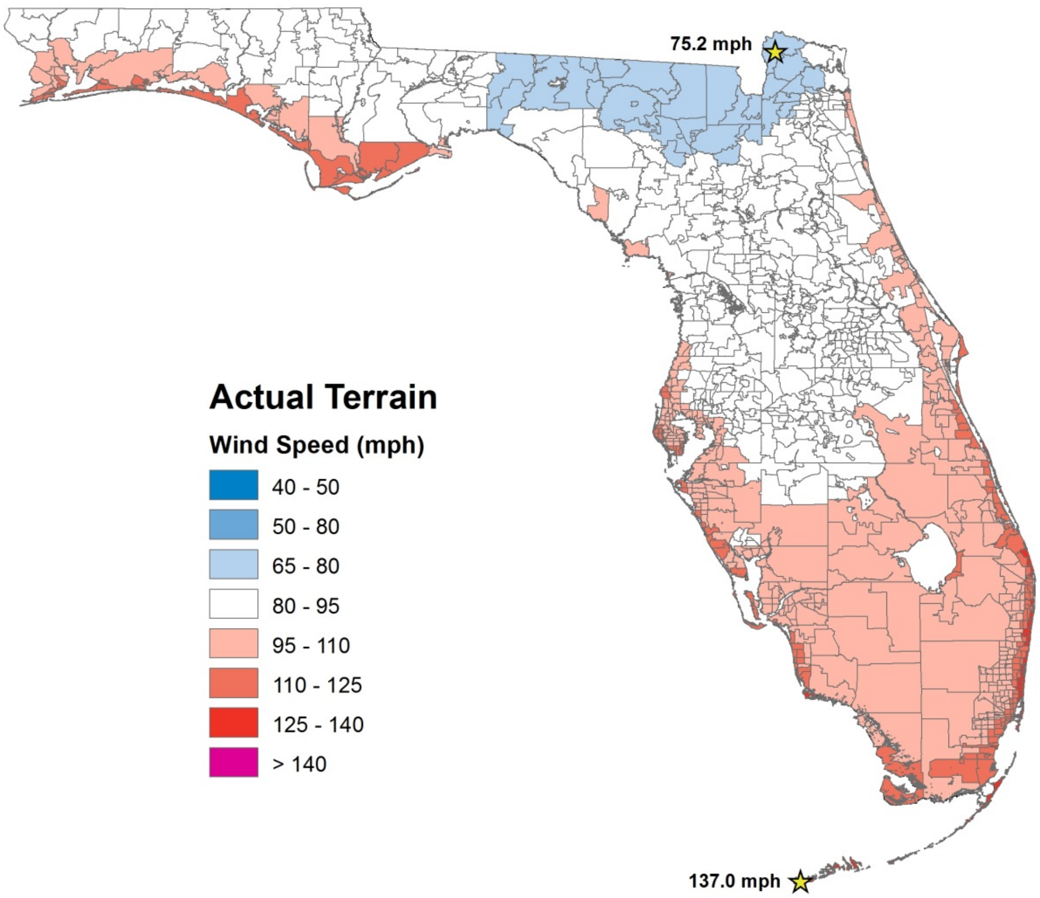


Figure 71. 250-Year Return Period Maximum Winds for Actual Terrain

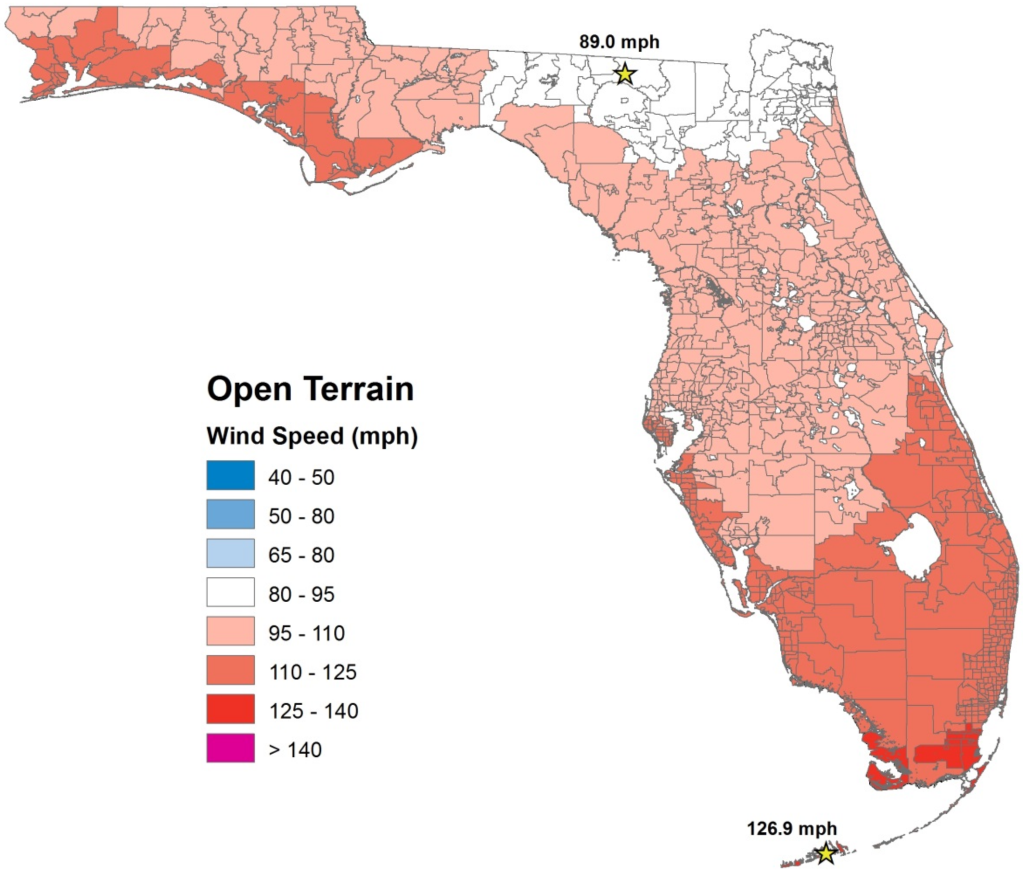


Figure 72. 250-Year Return Period Maximum Winds Open Terrain

Standard M-4, Disclosure 12

Form M-3: Radius of Maximum Winds and Radii of Standard Wind Thresholds

A. *For the central pressures in the table below, provide the minimum and maximum values for (1) the radius of maximum winds (Rmax) used by the model to create the stochastic storm set, and the minimum and maximum values for the outer radii (R) of (2) Category 3 winds (>110 mph), (3) Category 1 winds (>73 mph), and (4) gale force winds (>40 mph). This information should be readily calculated from the windfield formula input to the model and does not require running the stochastic storm set. Describe the procedure used to complete this form.*

Table 37. Radius of Maximum Winds and Radii of Standard Wind Thresholds

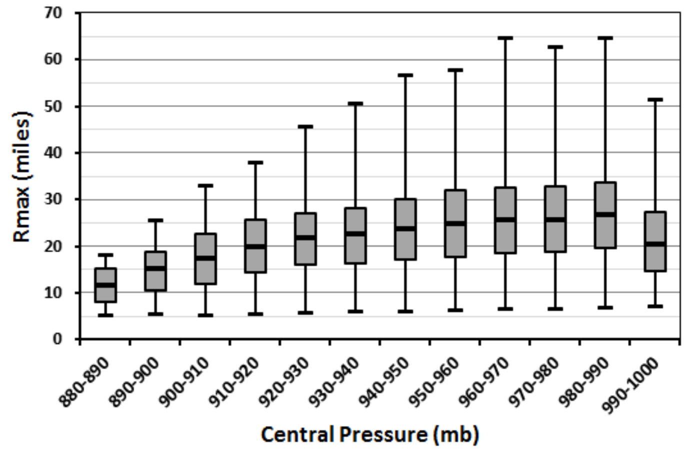
Central Pressure (mb)	R_{max} (mi)		Outer Radii (>110 mph) (mi)		Outer Radii (>73 mph) (mi)		Outer Radii (>40 mph) (mi)	
	Min	Max	Min	Max	Min	Max	Min	Max
990	7.00	65.00			8.7		39.8	144.2
980	6.78	65.00			11.8	83.9	55.9	172.7
970	6.56	65.00			14.3	101.3	68.4	195.1
960	6.33	61.67	7.5		16.2	109.4	78.9	207.5
950	6.11	57.50	8.7	64.6	18.6	113.1	87.0	214.4
940	5.89	52.00	9.3	67.7	21.1	111.8	92.6	215.6
930	5.67	46.00	9.9	65.9	23.6	105.6	96.9	211.3
920	5.44	40.00	10.6	62.1	25.5	100.7	99.4	204.4
910	5.22	33.75	11.2	55.9	26.7	93.8	101.3	195.1
900	5.00	27.50	11.2	49.1	28.0	85.7	102.5	183.9

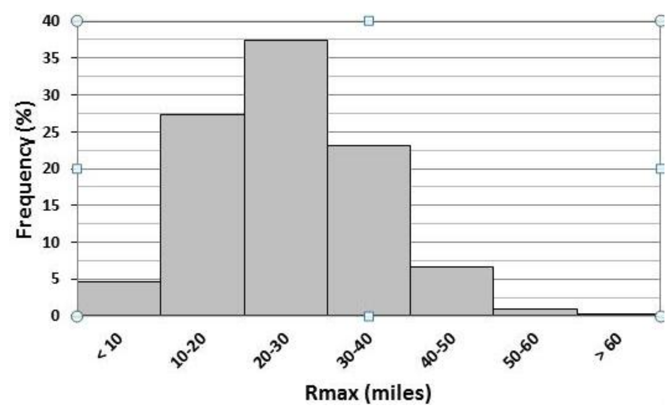
For each designated central pressure interval, the range of the radius of maximum winds (Rmax) was computed using the limits coded in the catalog generation methodology. The requested wind radii were then computed using the maximum and minimum Rmax values as input into the model's radial wind profile. Additionally, representative values for other necessary parameters were assumed as follows: latitude (28°N), forward speed (28 mph), and gradient wind reduction factor (0.88). A procedure was created that computes the wind profile for the given storm parameters, and then identifies the distance where this the profile equals the requested wind speed thresholds (110 mph, 73 mph and 40 mph). When a maximum or minimum Rmax fails to produce a wind equal to the requested wind threshold, the table entry is left blank.

B. *Identify the other variables that influence Rmax.*

The value of Rmax is a function of central pressure, latitude and time after landfall.

C. *Provide a box plot and histogram of Central Pressure (x-axis) versus Rmax (y-axis) to demonstrate relative populations and continuity of sampled hurricanes in the stochastic storm set.*





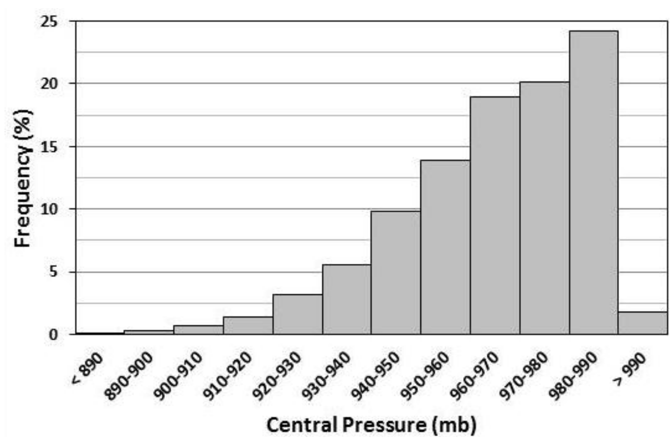


Figure 73. Box Plot and Histogram of Central Pressure vs Rmax, Florida and Neighboring States

D. Provide this form in Excel using the format given in the file named "2013FormM3.xlsx." The file name shall include the abbreviated name of the modeling organization, the standards year, and the form name. Form M-3 (Radius of Maximum Winds and Radii of Standard Wind Thresholds) shall also be included in a submission appendix.

Hard copy of Form M-3 is included here in this submission appendix and is additionally provided in Excel format

Standard M-6, Disclosure 2

Appendix 3: Statistical Standards

Form S-1: Probability and Frequency of Florida Landfalling Hurricanes per Year

Complete the table below showing the probability and modeled frequency of landfalling Florida hurricanes per year. Modeled probability shall be rounded to four decimal places. The historical probabilities and frequencies below have been derived from the Base Hurricane Storm Set for the 113 year period 1900-2012 (as given in Form A-2, Base Hurricane Storm Set Statewide Losses). Exclusion of hurricanes that caused zero modeled Florida damage or additional Florida landfalls included in the modeling organization Base Hurricane Storm Set as identified in their response to Standard M-1 (Base Hurricane Storm Set) should be used to adjust the historical probabilities and frequencies provided here.

If the data are partitioned or modified, provide the historical probabilities and frequencies for the applicable partition (and its complement) or modification as well as the modeled probabilities and frequencies in additional copies of Form S-1 (Probability and Frequency of Florida Landfalling Hurricanes per Year).

Table 38 Model Results: Probability and Frequency of Florida Landfalling Hurricanes per Year

Hurricanes Per Year	Historical Probabilities	Modeled Probabilities	Historical Frequencies	Modeled Frequencies
0	0.6195	0.5601	70	28004
1	0.2389	0.3297	27	16485
2	0.1150	0.0883	13	4415
3	0.0265	0.0187	3	934
4	0.0000	0.0028	0	139
5	0.0000	0.0004	0	21
6	0.0000	0.0000	0	2
7	0.0000	0.0000	0	0
8	0.0000	0.0000	0	0
9	0.0000	0.0000	0	0
10 or more	0.0000	0.0000	0	0

Standard S-1, Disclosure 7

Form S-2A: Examples of Loss Exceedance Estimates (2007 FHCF Exposure Data)

Provide projections of the aggregate personal and commercial insured losses for various probability levels using the notional risk data set specified in Form A-1 (Zero Deductible Personal Residential Loss Costs by ZIP Code) and using the 2007 Florida Hurricane Catastrophe Fund aggregate personal and commercial residential exposure data provided in the file named "hlpm2007c.exe." Provide the total average annual loss for the loss exceedance distribution. If the modeling methodology does not allow the model to produce a viable answer, please state so and why.

Table 39. Examples of Loss Exceedance Estimates. Part A

Return Period (years)	Probability of Exceedance	Estimated Loss Notional Risk Data Set	Estimated Personal & Commercial Residential Loss FHCF Data Set
Top Event	N/A	89,277,730	358,770,184,588
10,000	0.01%	70,896,590	298,650,695,654
5,000	0.02%	60,827,280	236,480,745,519
2,000	0.05%	45,517,440	190,101,366,092
1,000	0.10%	40,299,940	159,637,200,522
500	0.20%	35,115,210	127,033,281,194
250	0.40%	28,678,420	102,759,319,928
100	1.00%	20,380,460	68,366,816,752
50	2.00%	14,702,340	46,508,729,133
20	5.00%	8,168,616	23,554,080,520
10	10.00%	4,410,571	11,851,030,133
5	20.00%	1,725,658	4,248,660,259

Table 40. Examples of Loss Exceedance Estimates. Part B

	Estimated Loss Notional Risk Data Set	Estimated Personal & Commercial Residential Loss FHCF Data Set
Mean (Total Average Annual Loss)	1,549,434	4,580,489,709
Median	54,055	106,661,716
Standard Deviation	4,081,414	14,017,895,263
Interquartile Range	1,126,376	2,692,995,312
Sample Size	50,000 Years of Simulated Events	50,000 Years of Simulated Events

Standard S-1, Disclosure 8

Form S-2B: Examples of Loss Exceedance Estimates (2012 FHCF Exposure Data)

Provide projections of the aggregate personal and commercial insured losses for various probability levels using the notional risk data set specified in Form A-1 (Zero Deductible Personal Residential Loss Costs by ZIP Code) and using the 2012 Florida Hurricane Catastrophe Fund aggregate personal and commercial residential exposure data provided in the file named "hlpm2012c.exe." Provide the total average annual loss for the loss exceedance distribution. If the modeling methodology does not allow the model to produce a viable answer, please state so and why.

Table 41. Examples of Loss Exceedance Estimates. Part A

Return Period (years)	Probability of Exceedance	Estimated Loss Notional Risk Data Set	Estimated Personal & Commercial Residential Loss FHCF Data Set
Top Event	N/A	89,277,730	345,145,139,060
10,000	0.01%	70,896,590	287,996,528,016
5,000	0.02%	60,827,280	224,497,667,826
2,000	0.05%	45,517,440	176,959,548,345
1,000	0.10%	40,299,940	151,039,465,692
500	0.20%	35,115,210	120,993,512,173
250	0.40%	28,678,420	96,993,047,700
100	1.00%	20,380,460	64,559,277,695
50	2.00%	14,702,340	43,913,882,795
20	5.00%	8,168,616	22,334,822,776
10	10.00%	4,410,571	11,264,026,483
5	20.00%	1,725,658	4,044,371,604

Table 42. Examples of Loss Exceedance Estimates. Part B

	Estimated Loss Notional Risk Data Set	Estimated Personal & Commercial Residential Loss FHCF Data Set
Mean (Total Average Annual Loss)	1,549,434	4,337,178,846
Median	54,055	102,329,996
Standard Deviation	4,081,414	13,257,575,437
Interquartile Range	1,126,376	2,557,122,483
Sample Size	50,000 Years of Simulated Events	50,000 Years of Simulated Events

Standard S-1, Disclosure 9

Form S-3: Distributions of Stochastic Hurricane Parameters

Provide the probability distribution functional form used for each stochastic hurricane parameter in the model. Provide a summary of the rationale for each functional form selected for each general classification.

Table 43. Distributions of Stochastic Hurricane Parameters

Stochastic Hurricane Parameter (Function or Variable)	Functional Form of Distribution	Data Source	Year Range Used	Justification for Functional Form
Annual Frequency	Negative Binomial(s,p) $s>0$ $0<p<1$	HURDAT2	1900-2012	Appropriate for count data when the variance exceeds the mean. The Negative Binomial is also known as a gamma-Poisson mixture, since it can be derived from a Poisson where the annual rate follows a gamma distribution. These considerations, combined with goodness-of-fit results, justify the use of the Negative Binomial distribution for annual landfall frequency.
Landfall Location	Cumulative distribution function (CDF) derived by smoothing historical landfall frequencies grouped by 50-mile coastal segments	HURDAT2	1900-2012	Due to the relative scarcity of historical data at this spatial resolution, smoothing is used to arrive at credible landfall probabilities. The smoothing is based on a formula available in NWS-38, p. 75. Graphical comparisons and goodness-of-fit tests indicate that the resulting landfall distribution is reasonable.
Central Pressure	Weibull(k, λ) where $k>0$ is the shape parameter, and $\lambda>0$ is the scale parameter.	HURDAT	1900-2008	The distribution of the historical central pressures is a skewed distribution since very intense hurricanes are less frequent than weak hurricanes. The two-parameter Weibull distribution has a very flexible shape and is able to capture the skewness present in the historical data. Goodness-of-fit tests support the use of this distribution. A comparison to the Log-normal distribution was reported by Clark (1986).

Stochastic Hurricane Parameter (Function or Variable)	Functional Form of Distribution	Data Source	Year Range Used	Justification for Functional Form
Radius of Maximum Winds	Regression model of the form: $R_{max} = f(CP, latitude) + \varepsilon$	HURDAT	1900-2008	The model captures the correlation between Rmax, central pressure, and latitude. The model is similar to a regression model proposed earlier by (Vickery et. al., 2001). The noise ε is bounded to capture the fact that intense hurricanes tend to have a smaller Rmax than weaker hurricanes.
Forward Speed	Log-normal(μ, σ) where μ is the mean and σ is the standard deviation	HURDAT	1900-2008	This distribution is well-suited to represent forward speed which has a skewed distribution. Graphical comparisons between historical and modeled forward speeds combined with goodness-of-fit tests support the use of the Log-normal distribution.
Gradient Wind Reduction Factor	Normal distribution	Dropsonde data analysis; Research by Franklin, et al. (2005) and Powell et al. (2009)	2002-2005 for dropsonde data	An analysis of the historical data shows a symmetrical distribution well approximated by a Normal distribution
Peak Weighting Factor	Skewed distribution modeled as a Normal Distribution after variable transformation	Dropsonde data analysis; Research by Powell et al. (2009)	2002-2005 for dropsonde data	The distribution of the historical data is skewed. However, the distribution becomes Normal after an inverse power transformation of the data. Correlation between GWRF and PWF is modeled using a bivariate normal distribution fitted to GWRF and the transformed PWF.
Storm Heading at Landfall	Mixture of normal distributions with constraints imposed on the drawings	HURDAT	1900-2008	Modeled as combined Normal distributions, and bounded based on the historical record and orientation of the coast-line. Comparisons of historical and simulated tracks provide support for this procedure.

Stochastic Hurricane Parameter (Function or Variable)	Functional Form of Distribution	Data Source	Year Range Used	Justification for Functional Form
Storm Tracks	Multi-step procedure involving the use of Markov chains and Autoregressive models to describe the evolution of storm parameters across time and space	HURDAT	1900-2007	Time series model are appropriate since the storm parameters are typically correlated across time. Appropriate models were selected by calculating autocorrelation and partial auto-correlation functions for different model parameters. The models selected include a random walk with drift for track direction, a first-order autoregressive model for forward speed, and a second-order autoregressive model for central pressure. The resulting model is similar to a track model used by AIR for the Northwest Pacific basin; see Pawale, et. al. (2003).

Standard S-1, Disclosure 1

Form S-4: Validation Comparisons

A. *Provide five validation comparisons of actual personal residential exposures and loss to modeled exposures and loss. These comparisons must be provided by line of insurance, construction type, policy coverage, county or other level of similar detail in addition to total losses. Include loss as a percent of total exposure. Total exposure represents the total amount of insured values (all coverages combined) in the area affected by the hurricane. This would include exposures for policies that did not have a loss. If this is not available, use exposures for only those policies that had a loss. Specify which was used. Also, specify the name of the hurricane event compared.*

Table 44. Validation Comparisons

Comparison #1
Hurricane = Erin
Exposure = total (Personal Residential)

Company C	Actual			Modeled		
	Exposure	Loss	Loss/Exposure	Exposure	Loss	Loss/Exposure
Frame	9,003,772,462	6,881,690	0.000764	9,003,772,462	10,049,133	0.001116
Masonry	7,729,395,776	2,987,052	0.000386	7,729,395,776	4,479,543	0.000580
Mobile Home	464,017,336	663,292	0.001429	464,017,336	3,194,402	0.006884
Total	**17,197,185,574**	**10,532,034**	**0.000612**	**17,197,185,574**	**17,723,078**	**0.001031**

Note: All the exposures and losses have been multiplied by a single constant to disguise the identity of the client.

Comparison #2
Hurricane = Andrew
Exposure = total (Personal Residential)

Company A	Actual			Modeled		
	Exposure	Loss	Loss/Exposure	Exposure	Loss	Loss/Exposure
Frame	2,360,887,194	49,465,744	0.020952	2,360,887,194	19,244,414	0.008151
Masonry	17,572,031,076	650,233,285	0.037004	17,572,031,076	560,238,169	0.031882
Total	**19,932,918,270**	**699,699,029**	**0.035103**	**19,932,918,270**	**579,482,583**	**0.029072**

Comparison #3
Hurricane = Wilma
Exposure = total (Personal Residential)

Company M	Actual			Modeled		
	Exposure	Loss	Loss/Exposure	Exposure	Loss	Loss/Exposure
Frame	140,684,876	1,078,031	0.007663	140,684,876	870,738	0.006189
Masonry	3,207,428,158	12,859,659	0.004009	3,207,428,158	12,857,470	0.004009
Total	**3,348,113,033**	**13,937,690**	**0.004163**	**3,348,113,033**	**13,728,208**	**0.004100**

Note: All the exposures and losses have been multiplied by a single constant to disguise the identity of the client.

Comparison #4
Hurricane = Charley
Exposure = total (Personal Residential)

Company J	Actual			Modeled		
	Exposure	Loss	Loss/Exposure	Exposure	Loss	Loss/Exposure
Coverage A	6,093,742,480	62,338,151	0.010230	6,093,742,480	47,473,882	0.007791
Coverage C	2,160,691,981	4,087,663	0.001892	2,160,691,981	4,050,518	0.001875
Coverage D	582,010,740	1,449,072	0.002490	582,010,740	1,462,009	0.002512
Total	**8,836,445,201**	**67,874,886**	**0.007681**	**8,836,445,201**	**52,986,408**	**0.005996**

Note: All the exposures and losses have been multiplied by a single constant to disguise the identity of the client.

Comparison #5
Hurricane = Frances
Exposure = total (Personal Residential)

Company G	Actual			Modeled		
	Exposure	Loss	Loss/Exposure	Exposure	Loss	Loss/Exposure
Coverage A	1,836,353,374	9,755,814	0.005313	1,836,353,374	6,607,925	0.003598
Coverage C	1,031,144,163	772,325	0.000749	1,031,144,163	730,029	0.000708
Coverage D	166,700,982	239,072	0.001434	166,700,982	131,646	0.000790
Total	**3,034,198,519**	**10,767,211**	**0.003549**	**3,034,198,519**	**7,469,600**	**0.002462**

Note: All the exposures and losses have been multiplied by a single constant to disguise the identity of the client.

Comparison #6
Hurricane = Wilma
Exposure = total (Personal Residential)

Company N	Actual			Modeled		
	Exposure	Loss	Loss/Exposure	Exposure	Loss	Loss/Exposure
Coverage A	2,336,868,242	51,124,993	0.021878	2,336,868,242	42,284,860	0.018095
Coverage C	786,969,185	1,813,070	0.002304	786,969,185	3,351,497	0.004259
Coverage D	214,939,504	369,507	0.001719	214,939,504	202,486	0.000942
Total	**3,338,776,930**	**53,307,571**	**0.015966**	**3,338,776,930**	**45,838,843**	**0.013729**

Note: All the exposures and losses have been multiplied by a single constant to disguise the identity of the client.

Comparison #7
Hurricane = Bonnie

Exposure = total (Personal Residential)

Company D	Actual			Modeled		
	Exposure	Loss	Loss/Exposure	Exposure	Loss	Loss/Exposure
Brunswick	185,761,296	902,555	0.004859	185,761,296	1,394,449	0.007507
Duplin	9,712,367	10,593	0.001091	9,712,367	61,297	0.006311
Lenoir	60,723,614	5,396	0.000089	60,723,614	313,879	0.005169
Onslow	673,111,082	881,104	0.001309	673,111,082	4,536,356	0.006739
Pender	34,660,493	88,708	0.002559	34,660,493	377,985	0.010905
Total	**963,968,852**	**1,888,356**	**0.001959**	**963,968,852**	**6,683,965**	**0.006934**

Note: All the exposures and losses have been multiplied by a single constant to disguise the identity of the client.

Comparison #8

Hurricane = Wilma

Exposure = total (Commercial Residential)

Company N	Actual			Modeled		
	Exposure	Loss	Loss/Exposure	Exposure	Loss	Loss/Exposure
Masonry	3,523,834,122	57,537,128	0.016328	3,523,834,122	49,097,675	0.013933
Concrete	4,913,776,098	60,983,157	0.012411	4,913,776,098	35,343,541	0.007193
Total	**8,437,610,221**	**118,520,285**	**0.014047**	**8,437,610,221**	**84,441,216**	**0.010008**

Note: All the exposures and losses have been multiplied by a single constant to disguise the identity of the client.

Standard S-5, Disclosure 2

B. *Provide a validation comparison of actual commercial residential exposures and loss to modeled exposures and loss. Use and provide a definition of the model's relevant commercial residential classifications.*

The table below contains a comparison of actual commercial residential exposures and loss to modeled exposures and loss. The exposure data used is AIR occupancy code 306—commercial residential and includes reinforced concrete, masonry and wood frame constructions as defined in Table 16 on page 116. The data also contains height information. The description of AIR height bands is given in Table 17 on page 117.

Table 45. Comparison of Actual Commercial Residential Exposures and Loss to Modeled Exposures and Loss

Hurricane	Exposure	Actual Loss	Modeled Loss
Charley	9,744,212,954	65,465,443	96,273,858
Frances	5,984,272,905	60,324,157	32,169,465
Ivan	769,935,738	22,407,198	22,555,777
Jeanne	6,270,282,204	11,708,119	23,816,284
Wilma	15,004,104,155	140,144,282	132,131,473
Katrina	8,098,990,923	7,139,327	12,222,306
Total	**45,871,798,879**	**307,188,525**	**319,169,162**

Note: All the exposures and losses have been multiplied by a single constant to disguise the identity of clients.

C. *Provide scatter plot(s) of modeled vs. historical losses for each of the required validation comparisons. (Plot the historical losses on the x-axis and the modeled losses on the y-axis.)*

Rather than using directly a specific published hurricane windfield, the winds underlying the modeled loss cost calculations must be produced by the model being evaluated and should be the same hurricane parameters as used in completing Form A-2 (Base Hurricane Storm Set Statewide Losses).

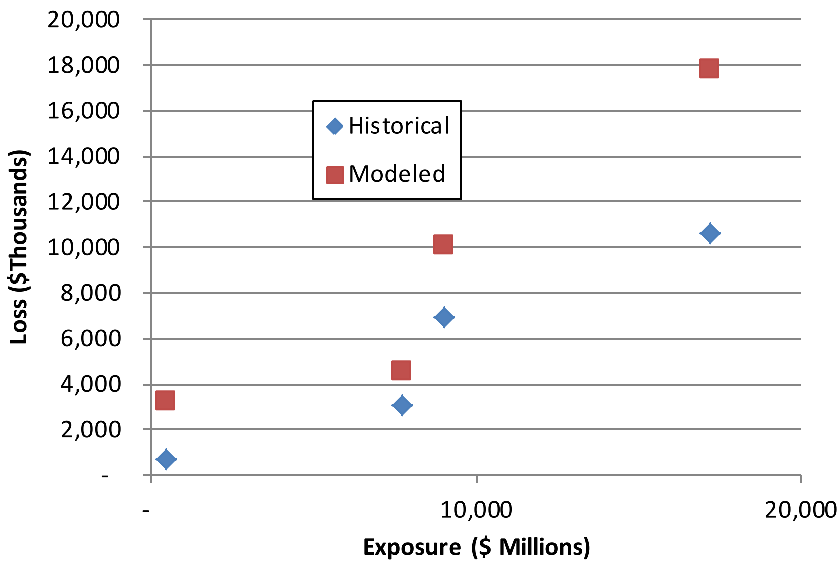


Figure 74. Scatter Plot of Comparison #1

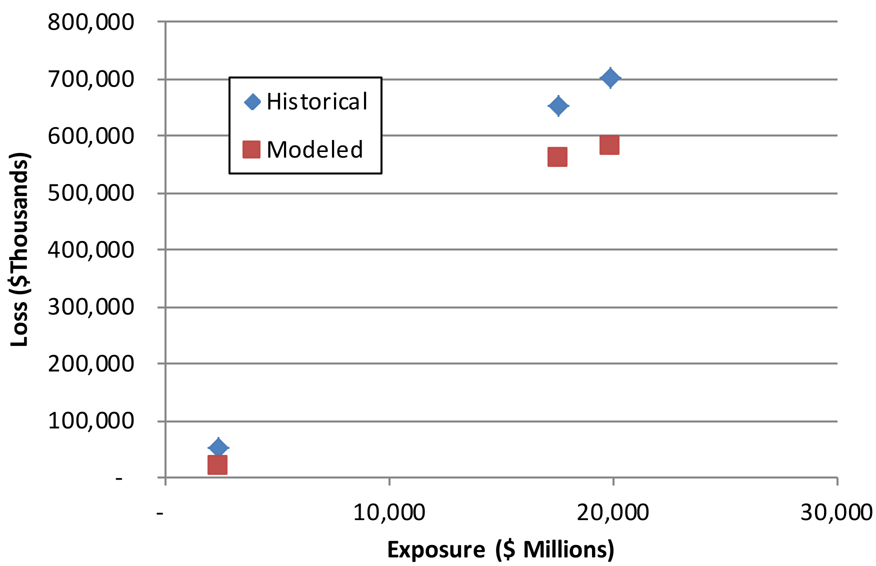


Figure 75. Scatter Plot of Comparison #2

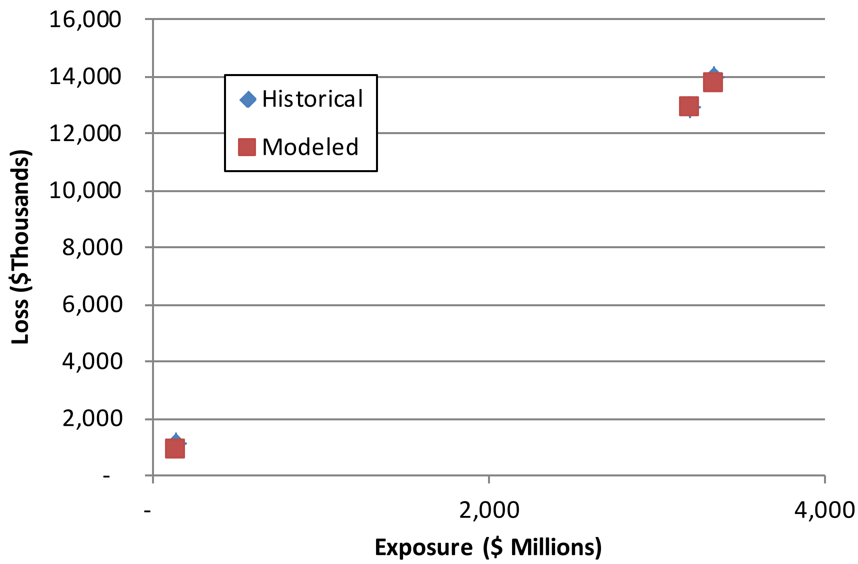


Figure 76. Scatter Plot of Comparison #3

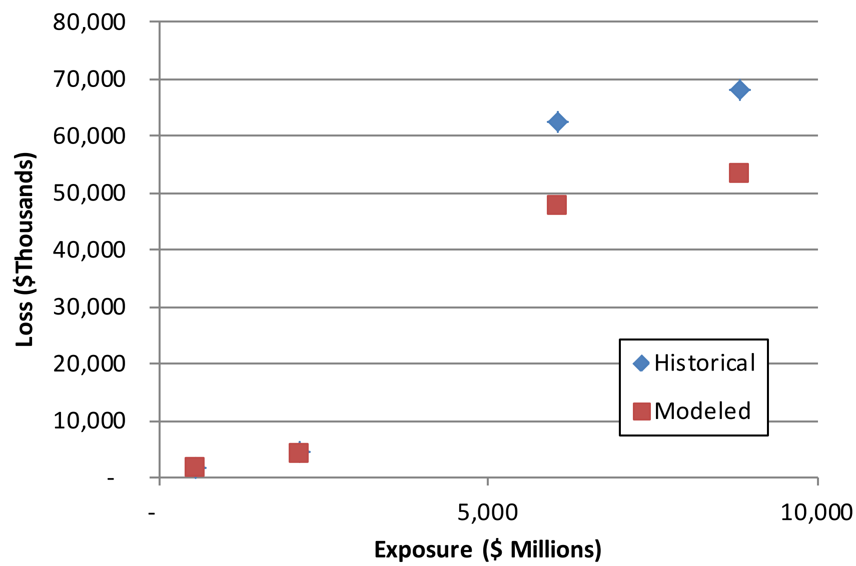


Figure 77. Scatter Plot of Comparison #4

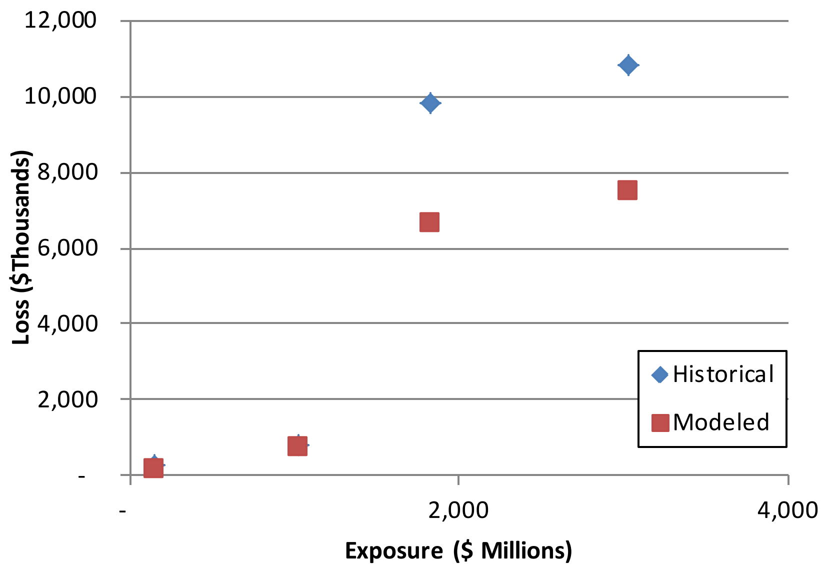


Figure 78. Scatter Plot of Comparison #5

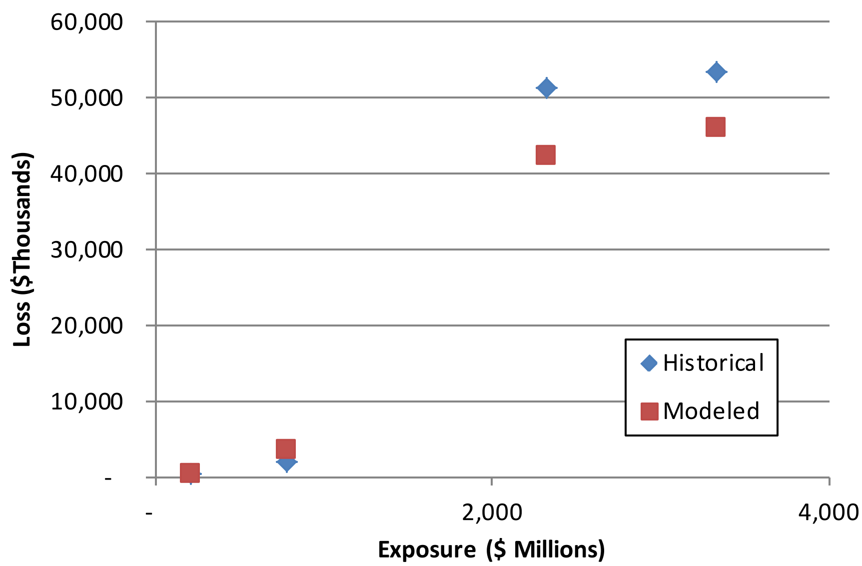


Figure 79. Scatter Plot of Comparison #6

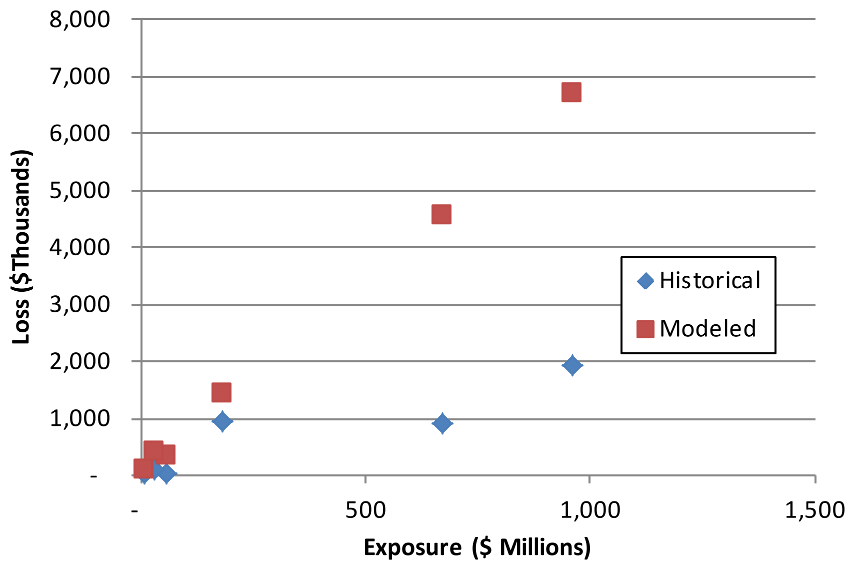


Figure 80. Scatter Plot of Comparison #7

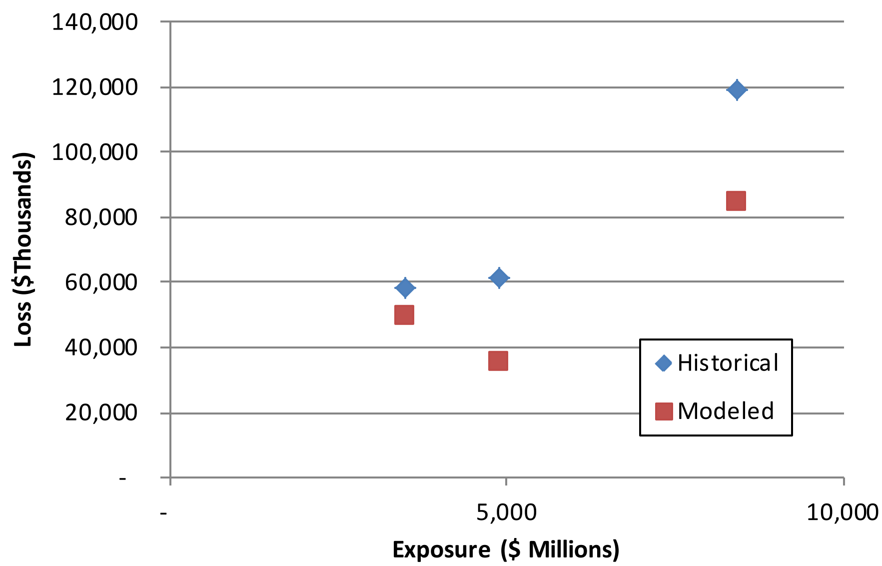


Figure 81 . Scatter Plot of Comparison #8

Form S-5: Average Annual Zero Deductible Statewide Loss Costs – Historical versus Modeled

Part A

A. *Provide the average annual zero deductible statewide personal and commercial residential loss costs produced using the list of hurricanes in the Base Hurricane Storm Set as defined in Standard M-1 (Base Hurricane Storm Set) based on the 2007 Florida Hurricane Catastrophe Fund's aggregate personal and commercial residential exposure data found in the file named "hlpm2007c.exe."*

The average annual zero deductible statewide personal and commercial residential loss costs produced using the list of hurricanes in M-1 based on the 2007 FHCF aggregate data has been provided in Table 46

Table 46. Average Annual Zero Deductible Statewide Personal and Commercial Residential Loss Costs

Time Period	Historical Hurricanes	Produced by Model
Current Submission	3.734 billion	4.580 billion
Previously Accepted Submission	3.445 billion	4.345 billion
Percentage Change Current Submission /Previously Accepted Submission	8.397%	5.410%
Second Previously Accepted Submission	3.490 billion	4.439 billion
Percentage Change Current Submission/Second Previously Accepted Submission	6.991%	3.176%

B. *Provide a comparison with the statewide personal and commercial residential loss costs produced by the model on an average industry basis.*

The average annual zero deductible statewide loss cost produced using the list of hurricanes in the Base Hurricane Storm Set and the 2007 FHCF aggregate personal and commercial residential exposure data is $3.734 billion ($\mu_H$). The statewide loss cost produced on an average industry basis is $4.580 billion ($\mu_S$).

C. *Provide the 95% confidence interval on the differences between the mean of the historical and modeled personal and commercial residential loss.*

The 95% confidence interval on the difference between the mean historical and modeled losses is (-2.679 billion <= (μ_H - μ_S) <= +0.986 billion).

D. If the data are partitioned or modified, provide the average annual zero deductible statewide personal and commercial residential loss costs for the applicable partition (and its complement) or modification, as well as the modeled average annual zero deductible statewide personal and commercial residential loss costs in additional copies of Form S-5 (Average Annual Zero Deductible Statewide Loss Costs – Historical versus Modeled).

The data has not been partitioned or modified in any way.

Part B

A. Provide the average annual zero deductible statewide personal and commercial residential loss costs produced using the list of hurricanes in the Base Hurricane Storm Set as defined in Standard M-1 (Base Hurricane Storm Set) based on the 2012 Florida Hurricane Catastrophe Fund's aggregate personal and commercial residential exposure data found in the file named "hlpm2012c.exe."

The average annual zero deductible statewide personal and commercial residential loss costs produced using the list of hurricanes in M-1 based on the 2012 FHCF aggregate data has been provided in Table 47.

Table 47. Average Annual Zero Deductible Statewide Personal and Commercial Residential Loss Costs

Time Period – 2012 FHCF Exposure Data	Historical Hurricanes	Produced by Model
Current Submission	3.536 billion	4.337 billion

B. Provide a comparison with the statewide personal and commercial residential loss costs produced by the model on an average industry basis.

The average annual zero deductible statewide loss cost produced using the list of hurricanes in the Base Hurricane Storm Set and the 2012 FHCF aggregate personal and commercial residential exposure data is \$3.536 billion (μ_H). The statewide loss cost produced on an average industry basis is \$4.337 billion (μ_S).

C. Provide the 95% confidence interval on the differences between the mean of the historical and modeled personal and commercial residential loss.

The 95% confidence interval on the difference between the mean historical and modeled losses is (-2.523 billion <= (μ_H - μ_S) <= +0.922 billion).

D. If the data are partitioned or modified, provide the average annual zero deductible statewide personal and commercial residential loss costs for the applicable partition (and its complement) or modification, as well as the modeled average annual zero deductible statewide personal and commercial residential loss costs in additional copies of Form S-5 (Average Annual Zero Deductible Statewide Loss Costs – Historical versus Modeled).

The data has not been partitioned or modified in any way.

Standard S-6, Disclosure 3

Form S-6: Hypothetical Events for Sensitivity and Uncertainty Analysis

Form S-6 was submitted as a requirement under the 2009 Standards. The results are unchanged.

Appendix 4: Vulnerability Standards

Form V-1: One Hypothetical Event

A. *Windspeeds for 96 ZIP Codes and sample personal and commercial residential exposure data are provided in the file named "FormV1Input13.xlsx." The windspeeds and ZIP Codes represent a hypothetical hurricane track. Model the sample personal and commercial residential exposure data provided in the file against these windspeeds at the specified ZIP Codes and provide the damage ratios summarized by windspeed (mph) and construction type.*

The windspeeds provided are one-minute sustained 10-meter windspeeds. The sample personal and commercial residential exposure data provided consists of four structures (one of each construction type – wood frame, masonry, mobile home, and concrete) individually placed at the population centroid of each of the ZIP Codes provided. Each ZIP Code is subjected to a specific windspeed. For completing Part A, Estimated Damage for each individual windspeed range is the sum of ground up loss to all structures in the ZIP Codes subjected to that individual windspeed range, excluding demand surge and storm surge. Subject Exposure is all exposures in the ZIP Codes subjected to that individual windspeed range. For completing Part B, Estimated Damage is the sum of the ground up loss to all structures of a specific type (wood frame, masonry, mobile home, or concrete) in all of the windspeed ranges, excluding demand surge and storm surge. Subject Exposure is all exposures of that specific type in all of the ZIP Codes.

One reference structure for each of the construction types shall be placed at the population centroid of the ZIP Codes. Do not include contents, appurtenant structures, or time element coverages.

Reference Frame Structure: One story Unbraced gable end roof Normal shingles (55mph) ½" plywood deck 6d nails, deck to roof members Toe nail truss to wall anchor Wood framed exterior walls 5/8" diameter anchors at 48" centers for wall/floor/foundation connections No shutters Standard glass windows No door covers No skylight covers Constructed in 1980	**Reference Masonry Structure**: One story Unbraced gable end roof Normal shingles (55mph) ½" plywood deck 6d nails, deck to roof members Toe nail truss to wall anchor Masonry exterior walls No vertical wall reinforcing No shutters Standard glass windows No door covers No skylight covers Constructed in 1980
Reference Mobile Home Structure: Tie downs Single unit Manufactured in 1980	**Reference Concrete Structure**: Twenty story Eight apartment units per story No shutters Standard glass windows Constructed in 1980

Table 48. Damage Ratios Summarized by Windspeed (mph) and Construction Type

Part A	
Windspeed* (mph)	**Estimated Damage/Subject Exposure**
41 – 50	0.299%
51 – 60	1.757%
61 – 70	4.806%
71 – 80	10.798%
81 – 90	18.382%
91 – 100	24.534%
101 – 110	35.526%
111 – 120	47.321%
121 – 130	54.659%
131 – 140	68.445%
141 – 150	76.781%
151 – 160	81.315%
161 – 170	84.856%
Part B	
Construction Type	**Estimated Damage/Subject Exposure**
Wood Frame	40.148%
Masonry	37.314%
Mobile Home	60.155%
Concrete Structure	14.064%

** Windspeeds are one-minute sustained, ten-meter windspeeds*

B. *Confirm that the structures used in completing the form are identical to those in the above table for the reference structures. If additional assumptions are necessary to complete this form (for example, regarding structural characteristics, duration, or surface roughness), provide the reasons why the assumptions were necessary as well as a detailed description of how they were included.*

The structures used in completing this Form are identical to those in the above table. The AIR vulnerability model requires a complete time profile of one minute sustained wind speeds to calculate the damage for a particular risk. Therefore using just the peak wind speed is not sufficient to calculate damage ratios. To provide information for Form V-1, AIR chose a hypothetical storm that produces the range of wind speeds given in Form V-1. The AIR model additionally considers actual terrain surface roughness to calculate the wind speeds used in Form V-1.

C. *Provide a plot of the Form V-1 (One Hypothetical Event), Part A data.*

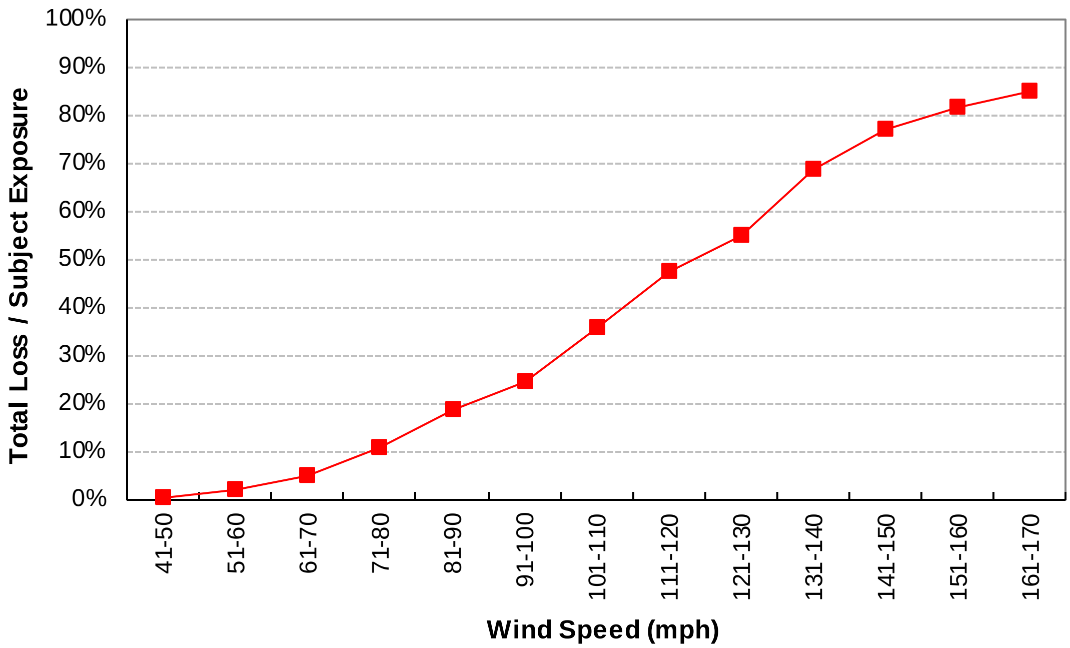


Figure 82. Total Loss Percentages by Wind Speed

Standard V-1, Disclosure 19

Form V-2: Mitigation Measures – Range of Changes in Damage

A. *Provide the change in the zero deductible personal residential reference building damage rate (not loss cost) for each individual mitigation measure listed in Form V-2 (Mitigation Measures – Range of Changes in Damage) as well as for the combination of the four mitigation measures provided for the Mitigated Frame Building and the Mitigated Masonry Building below.*

A completed Form V-2 is provided in this submission appendix in Excel format.

B. *If additional assumptions are necessary to complete this form (for example, regarding duration or surface roughness), provide the rationale for the assumptions as well as a detailed description of how they are included.*

The AIR vulnerability model requires a complete time profile of one minute sustained wind speeds in order to calculate damage for a particular risk. For the purpose of completion of Form V-2, the effect of duration is not accounted for. The instructions for Form V-2 require a wind speed input. Wind speed is not an explicit input to the AIR model. To populate Form V-2 we create a set of events, which approximate the requested wind speeds at the specified locations.

C. *Provide this form in Excel format without truncation. The file name shall include the abbreviated name of the modeling organization, the standards year, and the form name. Form V-2 (Mitigation Measures – Range of Changes in Damage) shall also be included in a submission appendix.*

A hard copy of Form V-2 is included in this submission appendix item and is additionally provided in Excel format without truncation.

Reference Frame Building:	**Reference Masonry Building**:
One story Unbraced gable end roof Normal shingles (55mph) ½" plywood deck 6d nails, deck to roof members Toe nail truss to wall anchor Wood framed exterior walls 5/8" diameter anchors at 48" centers for wall/floor/foundation connections No shutters Standard glass windows No door covers No skylight covers Constructed in 1980	One story Unbraced gable end roof Normal shingles (55mph) ½" plywood deck 6d nails, deck to roof members Toe nail truss to wall anchor Masonry exterior walls No vertical wall reinforcing No shutters Standard glass windows No door covers No skylight covers Constructed in 1980
Mitigated Frame Building: Rated shingles (110mph) 8d nails, deck to roof members Truss straps at roof Plywood Shutters	**Mitigated Masonry Building**: Rated shingles (110mph) 8d nails, deck to roof members Truss straps at roof Plywood Shutters

Reference and mitigated buildings are fully insured building structures with a zero deductible building only policy.

Place the reference building at the population centroid for ZIP Code 33921.

Windspeeds used in the form are one-minute sustained 10-meter windspeeds.

Table 49. Mitigation Measures—Range of Changes in Damage

Individual Mitigation Measures			Percentage Changes In Damage ((Reference Damage Rate - Mitigated Damage Rate) / Reference Damage Rate) * 100									
			Frame Building					Masonry Building				
			Wind Speed (MPH)					Wind Speed (MPH)				
			60	85	110	135	160	60	85	110	135	160
	Reference Structure		-	-	-	-	-	-	-	-	-	-
Roof Strength	Braced Gable Ends		12.7	16.3	14.8	9.7	3.7	12.5	15.9	14.2	9.7	6.3
Roof Strength	Hip Roof		16.7	20.3	18.5	13.2	6.5	16.6	20.0	18.3	13.2	9.0
Roof Covering	Metal		14.2	8.5	5.2	3.1	1.0	14.2	8.1	5.0	3.3	1.8
Roof Covering	Rated Shingles (110 Mph)		17.3	10.6	6.2	3.6	1.2	17.2	10.1	6.0	3.7	2.2
Roof Covering	Membrane		0.0	8.4	8.1	0.0	0.0	0.0	8.3	8.0	0.0	0.0
Roof Covering	Nailing of Deck (8d)		7.3	15.9	18.8	15.1	6.5	7.0	15.5	18.6	15.3	9.0
Roof-Wall Strength	Clips		1.6	5.0	10.2	10.6	4.5	1.6	4.8	9.8	10.7	7.1
Roof-Wall Strength	Straps		2.0	6.3	12.8	13.5	6.7	2.0	6.0	12.3	13.5	9.3
Wall-Floor Strength	Ties or Clips		0.0	0.4	0.5	2.3	3.9	0.0	0.4	0.5	2.4	6.6
Wall-Floor Strength	Straps		0.0	0.7	1.9	5.4	9.5	0.0	0.7	1.8	5.6	11.9
Wall-Foundation Strength	Larger Anchors Or Closer Spacing		0.0	0.4	0.5	2.3	3.9	--	--	--	--	--
Wall-Foundation Strength	Straps		0.0	0.7	1.9	5.4	9.5	--	--	--	--	--
Wall-Foundation Strength	Vertical Reinforcing		--	--	--	--	--	0.0	1.0	2.0	6.3	14.5
Opening Protection	Window Shutter	Plywood	8.3	12.9	12.0	8.9	5.1	7.8	12.1	11.3	8.8	7.6
Opening Protection	Window Shutter	Steel	8.3	12.9	12.0	8.9	5.1	7.8	12.1	11.3	8.8	7.6
Opening Protection	Window Shutter	Engineered	11.9	18.6	18.7	15.5	11.0	11.3	17.9	18.0	15.4	13.1
Opening Protection	Door and Skylight Covers		1.6	3.6	4.7	4.4	2.3	1.4	3.3	4.4	4.5	4.1

Individual Mitigation Measures			Percentage Changes In Damage ((Reference Damage Rate - Mitigated Damage Rate) / Reference Damage Rate) * 100									
			Frame Building					Masonry Building				
			Wind Speed (MPH)					Wind Speed (MPH)				
			60	85	110	135	160	60	85	110	135	160
	Reference Structure		-	-	-	-	-	-	-	-	-	-
Window, Door, Skylight Strength	Windows											
		Laminated	5.0	7.5	6.6	4.5	2.1	4.8	7.0	6.2	4.6	3.7
		Impact Glass	11.9	18.6	18.7	15.5	11.0	11.3	17.9	18.0	15.4	13.1
	Entry Doors	High Strength	1.6	3.6	4.7	4.4	2.3	1.4	3.3	4.4	4.5	4.1
	Garage Doors	High Strength	2.3	3.8	3.3	1.9	0.7	2.5	4.0	3.4	2.1	1.4
	Sliding Glass Doors	High Strength	-0.2	-0.6	-0.7	-0.6	-0.3	-0.2	-0.6	-0.7	-0.7	-0.6
	Skylight	High Strength	1.0	1.3	1.2	0.8	0.3	1.0	1.3	1.2	0.8	0.6

Mitigation Measures In Combination		Percentage Changes In Damage (Reference Damage Rate – Mitigated Damage Rate) / Reference Damage Rate) * 100									
		Frame Building					Masonry Building				
		Wind Speed (MPH)					Wind Speed (MPH)				
		60.0	85.0	110.0	135.0	160.0	60.0	85.0	110.0	135.0	160.0
Structure											
	Mitigated Structure	35.5	46.7	50.4	42.0	25.8	34.6	44.9	48.6	41.3	27.5

The following modification factors to the vulnerability functions are based on structural characteristics. A positive value implies a mitigation credit, while a negative value implies a debit or increase in damage. All the modification factors in the following table have been calculated with respect to frame reference structure as defined in the V-2 standards.

Table 50. Modification Factors to Vulnerability Functions

Modification Factors	Frame Building				
	60 mph	85 mph	110 mph	135 mph	160 mph
Building Condition					
Average	0.0	0.0	0.0	0.0	0.0
Good	0.9	0.9	0.8	0.6	0.2
Poor	-4.9	-5.7	-5.4	-4.2	-1.5
Tree Exposure					
No	0.1	0.2	0.3	0.4	0.2
Yes	-0.6	-1.9	-2.5	-2.6	-1.6
Small Debris Source					
No	3.7	6.4	7.7	7.1	4.2
Yes	-1.1	-1.4	-1.2	-0.9	-0.4
Large Missile Source					
No	2.7	6.3	10.2	10.6	7.2
Yes	-0.9	-1.1	-1.0	-0.8	-0.3
Roof Geometry					
Flat	0.2	0.2	0.2	0.2	0.1
Gable W/O Bracing	0.0	0.0	0.0	0.0	0.0
Hip	16.7	20.3	18.5	13.2	6.5
Complex	4.4	5.4	4.9	3.5	1.4
Stepped	10.7	13.4	12.1	8.3	3.4
Shed	-2.0	-2.6	-2.4	-1.6	-0.5
Mansard	13.4	16.5	15.0	10.2	4.4
Gable W/Bracing	12.7	16.3	14.8	9.7	3.7
Pyramid	13.4	16.4	15.0	10.4	5.3
Gambrel	9.9	12.4	11.3	7.8	3.2
Roof Pitch					
Low	-4.6	-5.8	-5.3	-3.6	-1.1
Medium	-0.6	-1.0	-0.9	-0.5	-0.2
High	4.5	6.0	5.4	3.3	1.0
Roof Covering					
Asphalt Shingles	0.0	0.0	0.0	0.0	0.0
Wooden Shingles	1.8	0.3	-0.2	-0.2	-0.1
Clay/Concrete Tiles	12.7	8.9	5.7	3.2	1.0
Light Metal Panels	-6.5	-6.1	-4.7	-2.6	-0.6
Slate	14.2	8.5	5.2	3.1	1.0
Built-Up Roof With Gravel	14.2	8.5	5.2	3.1	1.0
Single Ply Membrane	14.2	8.5	5.2	3.1	1.0
Standing Seam Metal Roofs	14.2	8.5	5.2	3.1	1.0
Built-Up Roof Without Gravel	14.2	8.5	5.2	3.1	1.0
Single Ply Membrane Ballasted	14.2	8.5	5.2	3.1	1.0
Fbc Equivalent	17.3	10.6	6.2	3.6	1.2

Modification Factors	Frame Building				
	60 mph	85 mph	110 mph	135 mph	160 mph
Roof Deck					
Plywood	0.0	0.0	0.0	0.0	0.0
Wood Planks	3.0	4.0	3.8	3.0	1.4
Particle Board/Osb	2.4	3.3	3.2	2.4	1.1
Metal Deck W/ Insulation Board	0.0	0.0	0.0	0.0	0.0
Metal Deck W/ Concrete	2.1	3.0	2.9	2.2	1.0
Pre-Cast Concrete Slabs	2.0	2.9	2.8	2.1	1.0
Reinforced Concrete Slabs	2.0	2.9	2.8	2.1	1.0
Light Metal	-1.8	-2.7	-1.4	-0.2	0.1
Roof Cover Attachment					
Screws	4.3	3.4	2.3	1.2	0.3
Nails/Staples	0.0	0.0	0.0	0.0	0.0
Adhesive/Epoxy	-3.6	-2.6	-1.6	-0.8	-0.2
Mortar	0.0	0.0	0.0	0.0	0.0
Roof Deck Attachment					
Screws/Bolts	7.3	15.9	18.8	15.1	6.5
Nails/Staples	0.0	0.0	0.0	0.0	0.0
Adhesive/Epoxy	-5.6	-10.1	-12.1	-10.1	-2.3
Structurally Connected	12.0	18.2	20.5	17.9	11.9
6d Nails @ 6" Spacing, 12" Oc	0.0	0.0	0.0	0.0	0.0
8d Nails @ 6" Spacing, 12" Oc	7.3	15.9	18.8	15.1	6.5
8d Nails @ 8" Spacing, 6" Oc	11.5	18.0	20.4	17.4	10.4
Roof Anchorage					
Hurricane Ties	2.0	6.3	12.8	13.5	6.7
Nails/Screws	0.0	0.0	0.0	0.0	0.0
Anchor Bolts	1.6	5.0	10.2	10.6	4.5
Gravity/Friction	-0.7	-2.7	-6.1	-6.6	-1.9
Adhesive/Epoxy	0.3	-0.5	-2.3	-2.6	-0.7
Structurally Connected	1.8	6.0	12.7	13.6	6.8
Clips	1.6	5.0	10.2	10.6	4.5
Wall Type					
Brick/Unreinforced Masonry	-3.1	-3.5	-3.3	-2.5	-0.9
Reinforced Masonry	3.2	3.9	3.9	3.1	1.4
Plywood	0.0	0.0	0.0	0.0	0.0
Wood Planks	3.2	3.8	3.6	2.7	1.1
Particle Board/Osb	0.9	1.2	1.2	0.9	0.3
Metal Panels	-4.6	-5.4	-5.2	-3.9	-1.3
Pre-Cast Concrete Elements	3.2	3.9	3.9	3.1	1.4
Cast-In-Place Concrete	3.2	3.9	3.9	3.1	1.4
Gypsum Board	-4.0	-4.5	-3.9	-2.6	-0.9
Wall Siding					
Veneer Brick/Masonry	3.4	3.2	2.3	1.3	0.5
Wood Shingles	0.6	0.5	0.3	0.2	0.1

Modification Factors	Frame Building				
	60 mph	85 mph	110 mph	135 mph	160 mph
Clapboards	1.9	2.2	1.5	0.8	0.3
Aluminum/Vinyl Siding	-6.3	-6.4	-4.6	-2.4	-0.7
Stone Panels	4.2	3.6	2.6	1.6	0.5
Eifs	-15.2	-13.5	-9.9	-6.2	-1.7
Stucco	-4.5	-4.5	-3.1	-1.7	-0.5
Glass Type					
Annealed	0.0	0.0	0.0	0.0	0.0
Tempered	4.0	5.5	4.5	2.9	1.4
Heat Strengthened	3.2	4.2	3.3	2.2	1.1
Laminated	5.0	7.5	6.6	4.5	2.1
Insulating	2.6	3.4	2.8	1.9	1.0
Glass Percent					
Less Than 5%	0.9	1.4	1.3	1.0	0.5
Between 5% And 20%	0.4	0.5	0.4	0.2	0.2
Between 20% And 60%	-3.1	-4.9	-4.6	-3.1	-1.1
Greater Than 60%	-4.3	-6.9	-6.2	-4.1	-1.5
Window Protection					
None	0.0	0.0	0.0	0.0	0.0
Non-Engineered	8.3	12.9	12.0	8.9	5.1
Engineered	11.9	18.6	18.7	15.5	11.0
Exterior Doors					
Single Width	0.3	0.6	0.7	0.6	0.3
Double Width	-1.7	-3.7	-4.4	-3.8	-1.5
Reinforced Single Width	1.6	3.6	4.7	4.4	2.3
Reinforced Double Width	0.6	1.2	1.5	1.5	0.8
Sliding	-2.0	-4.6	-5.8	-5.4	-2.2
Reinforced Sliding	-0.2	-0.6	-0.7	-0.6	-0.3
Building Foundation Connection					
Hurricane Ties	0.0	0.7	1.9	5.4	9.5
Nails/Screws	0.0	0.0	0.0	0.0	0.0
Anchor Bolts	0.0	0.4	0.5	2.3	3.9
Gravity/Friction	0.0	-0.6	-1.5	-4.2	-2.3
Adhesive/Epoxy	0.0	-0.3	-0.6	-2.1	-2.3
Structurally Connected	0.0	1.0	2.1	6.1	12.2
Roof Attached Structures					
Chimney	-0.7	-1.0	-0.8	-0.5	-0.2
A/C Unit	-1.9	-2.8	-2.3	-1.3	-0.5
Skylights	-2.4	-3.5	-2.8	-1.5	-0.5
Parapet Walls	1.2	0.5	-0.5	-0.9	-0.4
Overhang/Rake (8 To 36 Inches)	-0.7	-1.0	-0.8	-0.5	-0.2
Dormers	-1.1	-1.3	-0.8	-0.5	-0.2
Other	-0.6	-0.9	-0.8	-0.5	-0.2
No Attached Structures	1.0	1.3	1.2	0.8	0.3

Modification Factors	Frame Building				
	60 mph	85 mph	110 mph	135 mph	160 mph
Overhang/Rake (Less Than 8 Inches)	0.8	1.1	0.9	0.6	0.3
Overhang/Rake (Greater Than 36 Inches)	-1.1	-1.4	-0.9	-0.4	-0.2
Waterproof Membrane/Fabric	1.1	1.5	1.3	0.9	0.4
Secondary Water Resistance	0.0	8.4	8.1	0.0	0.0
Wall Attached Structures					
Carports/Canopies/Porches	-2.3	-3.3	-3.2	-2.3	-0.9
Single Door Garage	0.6	0.7	0.7	0.4	0.2
Double Door Garage	-3.7	-5.1	-5.0	-3.9	-1.5
Reinforced Single Door Garage	2.3	3.8	3.3	1.9	0.7
Reinforced Double Door Garage	0.6	0.7	0.7	0.4	0.2
Screened Porches/Glass Patio Doors	-2.8	-3.8	-3.6	-2.7	-1.1
Balcony	-2.1	-3.2	-3.0	-2.2	-0.8
No Attached Wall Structures	2.3	3.8	3.3	1.9	0.7
Appurtenant Structures					
Detached Garage	-0.6	-1.0	-1.1	-0.9	-0.3
Pool Enclosures	-11.1	-17.5	-12.6	-3.4	0.1
No Pool Enclosures	1.8	2.3	2.0	1.3	0.6
Shed	-0.6	-1.0	-1.1	-0.9	-0.3
Masonry Boundary Wall	-0.6	-1.0	-1.1	-0.9	-0.3
Other Fence	-0.6	-1.0	-1.1	-0.9	-0.3
No Appurtenant Structures	3.1	3.9	3.3	2.2	0.9
Roof Built					
0-10 Years Old	3.8	5.7	4.8	2.6	0.6
11-20 Years Old	0.7	0.9	0.8	0.5	0.2
21+ Years Old	-6.0	-7.1	-6.5	-4.7	-1.5

Standard V-3, Disclosure 2

Form V-3: Mitigation Measures—Mean Damage Ratios and Loss Costs (Trade Secret Item)

A. *Provide the mean damage ratio (prior to any insurance considerations) to the reference building for each individual mitigation measure listed in Form V-3 (Mitigation Measures – Mean Damage Ratios and Loss Costs, Trade Secret item) as well as the percent damage for the combination of the four mitigation measures provided for the Mitigated Frame Building and the Mitigated Masonry Building below.*

B. *Provide the loss cost rounded to three decimal places, for the reference building and for each individual mitigation measure listed in Form V-3 (Mitigation Measurers – Mean Damage Ratios and Loss Costs, Trade Secret item) as well as the loss cost for the combination of the four mitigation measures provided for the Mitigated Frame Building and the Mitigated Masonry Building below.*

C. *If additional assumptions are necessary to complete this form (for example, regarding duration or surface roughness), provide the rationale for the assumptions as well as a detailed description of how they are included.*

D. *Provide a graphical representation of the vulnerability curves for the reference and the fully mitigated building.*

Reference Frame Building: One story Unbraced gable end roof Normal shingles (55mph) ½" plywood deck 6d nails, deck to roof members Toe nail truss to wall anchor Wood framed exterior walls 5/8" diameter anchors at 48" centers for wall/floor/foundation connections No shutters Standard glass windows No door covers No skylight covers Constructed in 1980	**Reference Masonry Building:** One story Unbraced gable end roof Normal shingles (55mph) ½" plywood deck 6d nails, deck to roof members Toe nail truss to wall anchor Masonry exterior walls No vertical wall reinforcing No shutters Standard glass windows No door covers No skylight covers Constructed in 1980
Mitigated Frame Building: Rated shingles (110mph) 8d nails, deck to roof members Truss straps at roof Plywood Shutters	**Mitigated Masonry Building:** Rated shingles (110mph) 8d nails, deck to roof members Truss straps at roof Plywood Shutters

Reference and mitigated buildings are fully insured building structures with a zero deductible building only policy.

Place the reference building at the population centroid for ZIP Code 33921.

Windspeeds used in the form are one-minute sustained 10-meter windspeeds.

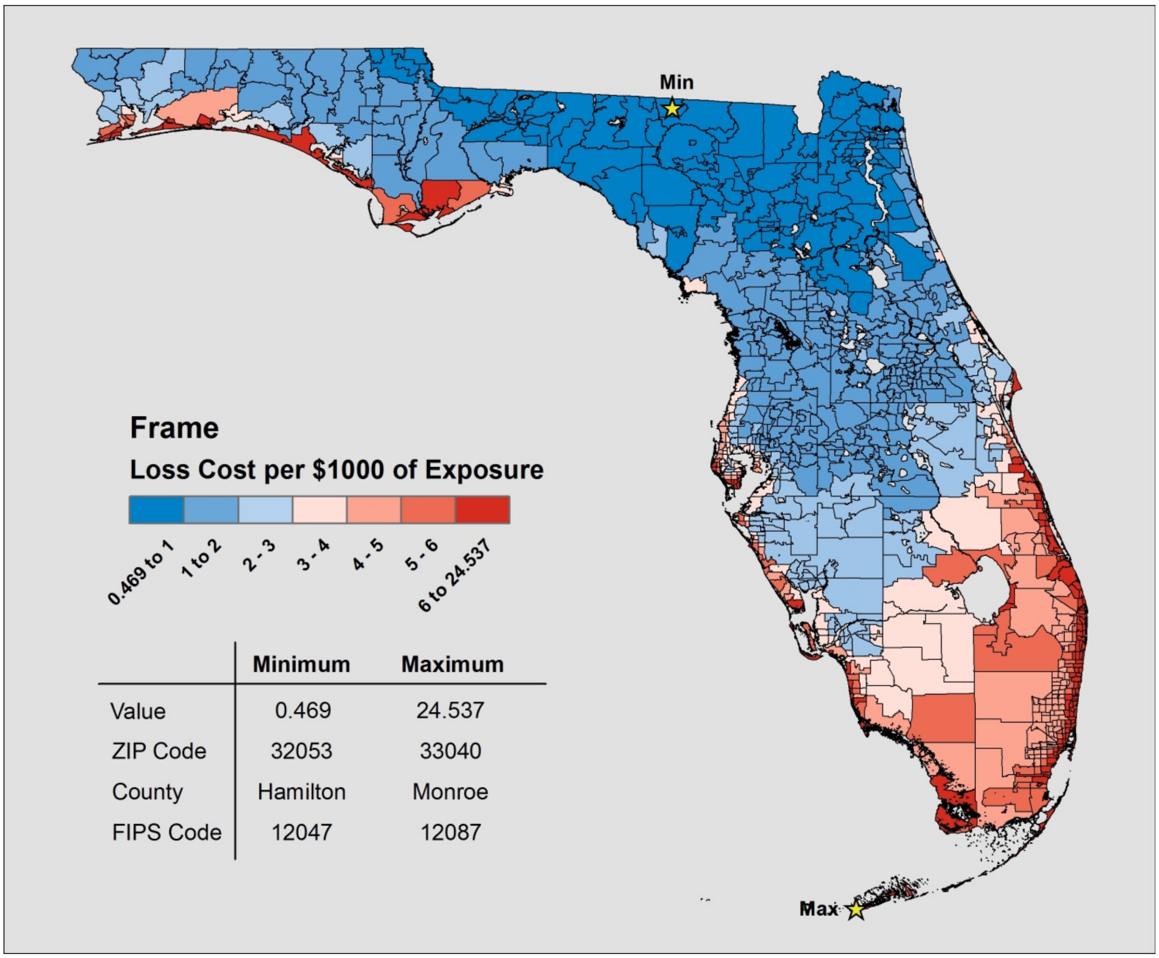
Form V-3 will be presented at the closed meeting of the Commission.

Standard V-3, Disclosure 3

Appendix 5: Actuarial Standards

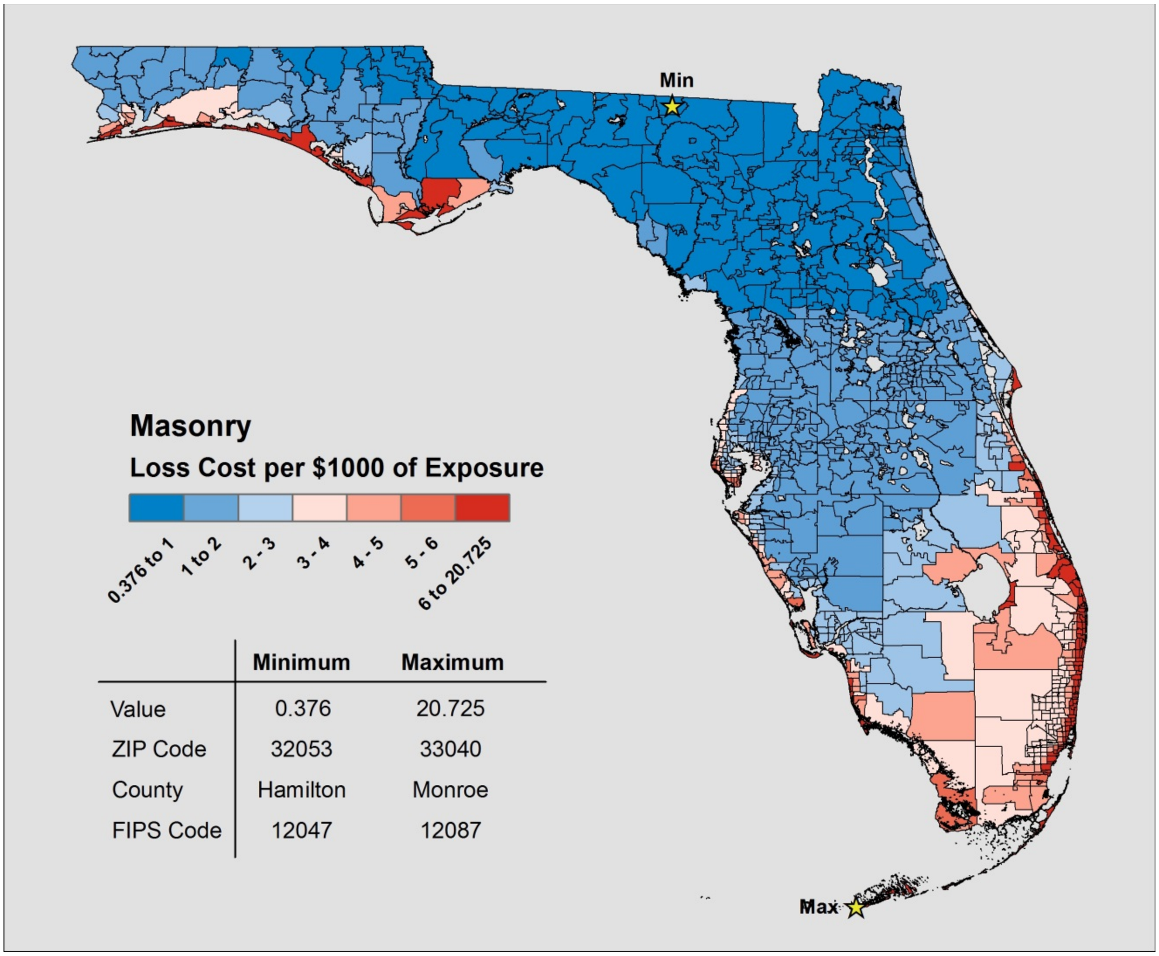
Form A-1: Zero Deductible Personal Residential Loss Costs by ZIP Code

A. Provide three maps, color-coded by ZIP Code (with a minimum of 6 value ranges), displaying zero deductible personal residential loss costs per $1,000 of exposure for frame, masonry, and mobile home.



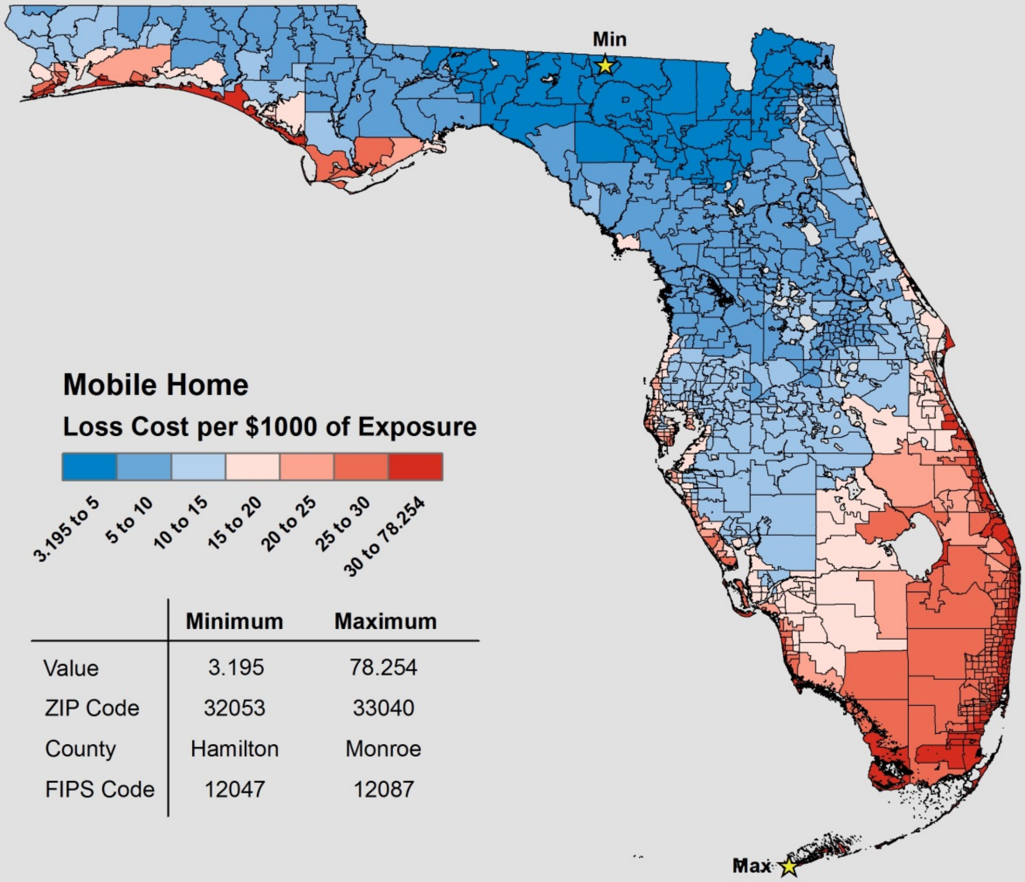
	Minimum	Maximum
Value	0.469	24.537
ZIP Code	32053	33040
County	Hamilton	Monroe
FIPS Code	12047	12087

Figure 83. Loss Costs by ZIP Code for Owners Wood Frame, Zero Deductible



	Minimum	Maximum
Value	0.376	20.725
ZIP Code	32053	33040
County	Hamilton	Monroe
FIPS Code	12047	12087

Figure 84. Loss Costs by ZIP Code for Owners Masonry, Zero Deductible



	Minimum	Maximum
Value	3.195	78.254
ZIP Code	32053	33040
County	Hamilton	Monroe
FIPS Code	12047	12087

Figure 85. Loss Costs by ZIP Code for Mobile Home, Zero Deductible

*B. Create exposure sets for these exhibits by modeling all of the buildings from Notional Set 3 described in the file "**NotionalInput13.xlsx**" geocoded to each ZIP Code centroid in the state, as provided in the model. Provide the predominant County name and the Federal Information Processing Standards (FIPS) Code associated with each ZIP Code centroid. Refer to the Notional Policy Specification below for additional modeling information. Explain any assumptions, deviations, and differences from the prescribed exposure information.*

Exposure sets for these exhibits have been created as specified.

C. Provide, in the format given in the file named "2013FormA1.xlsx," the underlying loss cost data rounded to 3 decimal places used for A. above in both Excel and PDF format. The file name shall include the abbreviated name of the modeling organization, the standards year, and the form name.

A completed Form A-1 is provided in an Excel format.

Standard A-6, Disclosure 1

Form A-2: Base Hurricane Storm Set Statewide Losses

A. *Provide the total insured loss and the dollar contribution to the average annual loss assuming zero deductible policies for individual historical hurricanes using the Florida Hurricane Catastrophe Fund's aggregate personal and commercial residential exposure data found in the files named "**hlpm2007c.exe**" and "hlpm2012c.exe." The list of hurricanes in this form should include all Florida and by-passing hurricanes in the modeling organization Base Hurricane Storm Set, as defined in Standard M-1 (Base Hurricane Storm Set).*

The FHCF aggregate exposure data has been modeled with a zero deductible assumption. The gross modeled loss from each specific hurricane in the Official Storm Set is provided in Form A-2 on page278.

The table below contains the minimum number of hurricanes from HURDAT2 to be included in the Base Hurricane Storm Set, based on the 113-year period 1900-2012. Each hurricane has been assigned an ID number. As defined in Standard M-1 (Base Hurricane Storm Set), the Base Hurricane Storm Set for the modeling organization may exclude hurricanes that had zero modeled impact, or it may include additional hurricanes when there is clear justification for the changes. For hurricanes in the table below resulting in zero loss, the table entry should be left blank. Additional hurricanes included in the model's Base Hurricane Storm Set shall be added to the table below in order of year and assigned an intermediate ID number as the hurricane falls within the bounding ID numbers.

Table 51. Base Hurricane Storm Set Statewide Losses

				2007 FHCF Exposure Data		2012 FHCF Exposure Data	
ID	Landfall/ Closest Approach Date	Year	Name	Personal and Commercial Residential Insured Losses ($)	Dollar Contribution	Personal and Commercial Residential Insured Losses ($)	Dollar Contribution
001	09/09/1900	1900	NoName01-1900	444,499	3,934	400,646	3,546
005	08/15/1901	1901	NoName04-1901	138,656,499	1,227,049	135,338,104	1,197,682
010	09/11/1903	1903	NoName03-1903	3,412,124,280	30,195,790	3,264,161,301	28,886,383
015	10/17/1904	1904	NoName04-1904	1,181,252,620	10,453,563	1,095,545,761	9,695,095
020	06/17/1906	1906	NoName02-1906	1,377,048,096	12,186,266	1,309,054,368	11,584,552
025	09/27/1906	1906	NoName06-1906	134,059,503	1,186,367	131,471,947	1,163,469
030	10/18/1906	1906	NoName08-1906	4,228,094,748	37,416,768	4,009,850,099	35,485,399
035	10/11/1909	1909	NoName11-1909	1,137,741,998	10,068,513	1,088,533,306	9,633,038
040	10/18/1910	1910	NoName05-1910	9,246,379,294	81,826,365	8,458,263,968	74,851,894
045	08/11/1911	1911	NoName02-1911	501,378,763	4,436,980	483,466,902	4,278,468
050	09/14/1912	1912	NoName04-1912	368,465,691	3,260,758	357,862,639	3,166,926
055	08/01/1915	1915	NoName01-1915	192,764,813	1,705,883	187,471,009	1,659,035
060	09/04/1915	1915	NoName04-1915	73,928,856	654,238	62,772,676	555,510
065	07/05/1916	1916	NoName02-1916	106,682,500	944,093	104,495,134	924,736
070	10/18/1916	1916	NoName14-1916	511,455,583	4,526,156	498,903,852	4,415,078
075	09/29/1917	1917	NoName04-1917	2,987,079,329	26,434,330	2,675,361,534	23,675,766
080	09/10/1919	1919	NoName02-1919	790,123,808	6,992,246	710,613,002	6,288,611
085	10/25/1921	1921	TampaBay06-1921	9,580,019,851	84,778,937	9,414,758,980	83,316,451
090	09/15/1924	1924	NoName05-1924	101,455,203	897,834	88,447,931	782,725
095	10/21/1924	1924	NoName10-1924	810,175,873	7,169,698	764,068,479	6,761,668
096	12/01/1925	1925	NoName04-1925	403,271,158	3,568,771	378,013,988	3,345,257
100	07/28/1926	1926	NoName01-1926	3,105,643,329	27,483,569	2,969,160,778	26,275,759
105	09/18/1926	1926	GreatMaimi07-1926	65,753,538,263	581,889,719	60,898,820,943	538,927,619
110	10/21/1926	1926	NoName10-1926	233,193,939	2,063,663	222,066,914	1,965,194

				2007 FHCF Exposure Data		2012 FHCF Exposure Data	
ID	Landfall/ Closest Approach Date	Year	Name	Personal and Commercial Residential Insured Losses ($)	Dollar Contribution	Personal and Commercial Residential Insured Losses ($)	Dollar Contribution
115	08/08/1928	1928	NoName01-1928	1,792,248,666	15,860,608	1,676,663,641	14,837,731
120	09/17/1928	1928	LakeOkeechobee04-1928	47,805,891,569	423,060,987	44,961,294,625	397,887,563
125	09/28/1929	1929	NoName02-1929	8,728,712,105	77,245,240	8,256,195,816	73,063,680
126	09/12/1930	1930	NoName02-1930	5,968,811	52,821	6,096,211	53,949
130	09/01/1932	1932	NoName03-1932	761,490,839	6,738,857	721,462,635	6,384,625
135	07/30/1933	1933	NoName05-1933	482,154,714	4,266,856	460,070,671	4,071,422
140	09/04/1933	1933	NoName11-1933	7,286,657,160	64,483,692	6,866,981,804	60,769,750
141	09/05/1933	1933	NoName08-1933	3,499,640	30,970	3,219,324	28,490
142	10/05/1933	1933	NoName18-1933	83,554,177	739,417	81,587,030	722,009
143	07/25/1934	1934	NoName03-1934	24,560,738	217,352	25,370,800	224,520
145	09/03/1935	1935	LaborDay03-1935	14,347,618,689	126,970,077	13,096,333,765	115,896,759
146	09/29/1935	1935	NoName04-1935	1,205,130,738	10,664,874	1,121,605,625	9,925,713
150	11/04/1935	1935	NoName07-1935	2,483,541,452	21,978,243	2,327,949,379	20,601,322
155	07/31/1936	1936	NoName05-1936	1,316,772,462	11,652,854	1,165,410,954	10,313,371
160	08/11/1939	1939	NoName02-1939	957,534,818	8,473,759	919,566,271	8,137,755
161	08/07/1940	1940	NoName02-1940	739,124	6,541	805,353	7,127
165	10/06/1941	1941	NoName05-1941	2,195,605,313	19,430,136	2,068,922,922	18,309,052
170	10/18/1944	1944	NoName13-1944	11,281,500,511	99,836,288	10,953,323,414	96,932,066
175	06/24/1945	1945	NoName01-1945	1,495,644,930	13,235,796	1,504,438,688	13,313,617
180	09/15/1945	1945	NoName09-1945	12,310,121,644	108,939,130	11,952,621,691	105,775,413
185	10/08/1946	1946	NoName05-1946	1,684,219,224	14,904,595	1,619,682,327	14,333,472
186	08/24/1947	1947	NoName03-1947	4,547,705	40,245	4,201,459	37,181
190	09/17/1947	1947	NoName04-1947	36,270,353,750	320,976,582	34,098,506,026	301,756,690
195	10/12/1947	1947	NoName08-1947	969,317,195	8,578,028	919,138,585	8,133,970
200	09/22/1948	1948	NoName07-1948	3,500,865,914	30,981,114	3,367,363,135	29,799,674
205	10/05/1948	1948	NoName08-1948	681,388,288	6,029,985	650,021,976	5,752,407
210	08/27/1949	1949	NoName02-1949	11,135,683,240	98,545,869	10,732,385,663	94,976,864
215	08/31/1950	1950	Baker-1950	73,394,846	649,512	71,545,579	633,147

				2007 FHCF Exposure Data		2012 FHCF Exposure Data	
ID	Landfall/ Closest Approach Date	Year	Name	Personal and Commercial Residential Insured Losses ($)	Dollar Contribution	Personal and Commercial Residential Insured Losses ($)	Dollar Contribution
220	09/05/1950	1950	Easy-1950	20,592,926,113	182,238,284	20,202,922,171	178,786,922
225	10/18/1950	1950	King-1950	4,807,982,237	42,548,515	4,507,896,704	39,892,891
226	10/04/1951	1951	How-1951	381,052,568	3,372,147	359,681,241	3,183,020
230	09/26/1953	1953	Florence-1953	207,211,691	1,833,732	189,809,721	1,679,732
235	09/25/1956	1956	Flossy-1956	384,824,931	3,405,530	351,408,141	3,109,807
240	09/10/1960	1960	Donna-1960	19,641,868,489	173,821,845	18,715,229,346	165,621,499
245	08/27/1964	1964	Cleo-1964	5,745,134,812	50,841,901	5,467,670,962	48,386,469
250	09/10/1964	1964	Dora-1964	5,153,325,443	45,604,650	5,170,489,622	45,756,545
251	10/02/1964	1964	Hilda-1964	22,094,457	195,526	20,723,099	183,390
255	10/14/1964	1964	Isbell-1964	1,598,207,384	14,143,428	1,543,677,824	13,660,866
260	09/08/1965	1965	Betsy-1965	10,875,363,404	96,242,154	10,373,848,947	91,803,973
265	06/09/1966	1966	Alma-1966	226,055,053	2,000,487	220,145,049	1,948,186
270	10/04/1966	1966	Inez-1966	144,354,064	1,277,470	139,304,745	1,232,785
271	06/04/1968	1968	Abby-1968	396,638,016	3,510,071	388,776,864	3,440,503
275	10/19/1968	1968	Gladys-1968	1,887,020,996	16,699,301	1,921,454,268	17,004,020
276	08/18/1969	1969	Camille-1969	16,518,261	146,179	16,207,911	143,433
280	06/19/1972	1972	Agnes-1972	63,639,101	563,178	57,186,414	506,074
285	09/23/1975	1975	Eloise-1975	834,276,603	7,382,979	712,425,536	6,304,651
290	09/04/1979	1979	David-1979	3,277,219,556	29,001,943	3,171,866,527	28,069,615
295	09/13/1979	1979	Frederic-1979	830,631,729	7,350,723	800,809,272	7,086,808
300	09/02/1985	1985	Elena-1985	787,872,652	6,972,324	738,079,457	6,531,677
301	10/29/1985	1985	Juan-1985	324,403,915	2,870,831	316,199,718	2,798,228
305	11/21/1985	1985	Kate-1985	449,627,469	3,979,004	417,288,903	3,692,822
310	10/12/1987	1987	Floyd-1987	34,767,213	307,674	32,853,190	290,736
315	08/24/1992	1992	Andrew-1992	28,318,894,489	250,609,686	27,129,670,741	240,085,582
316	11/18/1994	1994	Gordon-1994	250,324,358	2,215,260	238,501,468	2,110,632
320	08/02/1995	1995	Erin-1995	1,194,736,251	10,572,887	1,170,655,422	10,359,782
325	10/04/1995	1995	Opal-1995	2,448,222,237	21,665,684	2,170,411,201	19,207,179

				2007 FHCF Exposure Data		2012 FHCF Exposure Data	
ID	Landfall/ Closest Approach Date	Year	Name	Personal and Commercial Residential Insured Losses ($)	Dollar Contribution	Personal and Commercial Residential Insured Losses ($)	Dollar Contribution
330	07/19/1997	1997	Danny-1997	47,629,941	421,504	46,406,616	410,678
335	09/03/1998	1998	Earl-1998	60,130,135	532,125	57,067,211	505,020
340	09/25/1998	1998	Georges-1998	148,434,455	1,313,579	139,298,770	1,232,732
345	10/15/1999	1999	Irene-1999	301,113,113	2,664,718	288,285,786	2,551,202
346	09/17/2000	2000	Gordon-2000	160,513,766	1,420,476	159,026,322	1,407,313
350	08/13/2004	2004	Charley-2004	7,754,172,229	68,620,993	7,137,458,863	63,163,353
355	09/05/2004	2004	Frances-2004	6,625,917,455	58,636,438	6,453,127,996	57,107,327
360	09/16/2004	2004	Ivan-2004	2,413,771,221	21,360,807	2,298,195,482	20,338,013
365	09/26/2004	2004	Jeanne-2004	4,739,421,904	41,941,787	4,643,810,740	41,095,670
366	07/06/2005	2005	Cindy-2005	408,903	3,619	344,447	3,048
370	07/10/2005	2005	Dennis-2005	965,326,463	8,542,712	935,019,467	8,274,509
375	08/25/2005	2005	Katrina-2005	839,522,442	7,429,402	788,617,650	6,978,917
376	09/15/2005	2005	Ophelia-2005	1,222,134	10,815	1,166,822	10,326
377	09/21/2005	2005	Rita-2005	7,397,124	65,461	6,808,793	60,255
380	10/24/2005	2005	Wilma-2005	11,734,169,095	103,842,204	11,197,406,305	99,092,091
381	09/13/2008	2008	Ike-2008	423,726	3,750	381,863	3,379
382	08/29/2012	2012	Isaac-2012	1,620,454	14,340	1,461,229	12,931
			Total	**421,960,084,811**	**3,734,160,043**	**399,640,748,459**	**3,536,643,792**

Dollar Contribution = (Insured Losses)/(Number of Years in Historical Record).

B. *Provide this form in Excel format. The file name shall include the abbreviated name of the modeling organization, the standards year, and the form name. Form A-2 (Base Hurricane Storm Set Statewide Losses) shall also be included in a submission appendix.*

A hard copy of Form A-2 is included in this submission appendix item and is also provided in an Excel format.

Note: Total dollar contributions should agree with the total average annual zero deductible statewide loss costs provided in Form S-5 (Average Annual Zero Deductible Statewide Loss Costs – Historical versus Modeled), Part A and Part B) for current year.

Total dollar contributions agree with the total average annual zero deductible statewide loss costs provided in Form S-5.

Standard A-6, Disclosure 2

Form A-3A: 2004 Hurricane Season Losses (2007 FHCF Exposure Data)

A. *Provide the percentage of residential zero deductible losses, rounded to four decimal places, and the monetary contribution from Hurricane Charley (2004), Hurricane Frances (2004), Hurricane Ivan (2004), and Hurricane Jeanne (2004) for each affected ZIP Code, individually and in total. Include all ZIP Codes where losses are equal to or greater than $500,000.*
Use the 2007 Florida Hurricane Catastrophe Fund's aggregate personal and commercial residential exposure data found in the file named "hlpm2007c.exe."
Rather than using directly a specified published windfield, the winds underlying the loss cost calculations must be produced by the model being evaluated and should be the same hurricane parameters as used in completing Form A-2 (Base Hurricane Storm Set Statewide Losses).

The 2007 FHCF aggregate exposure data has been modeled with a zero deductible assumption used. The percentage of personal and commercial residential losses from Hurricane Charley (2004), Hurricane Frances (2004), Hurricane Ivan (2004) and Hurricane Jeanne (2004) for each affected ZIP Code is provided in Table 52. Note that all ZIP Codes where the total (i.e. all four events) losses are equal to or greater than $500,000 have been included. Zero deductible, gross modeled losses have been used in the creation of this form.

Table 52. Percentage of Total Personal and Commercial Residential Losses from 2004 Storms

	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
ZIP Code	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
32003	-	0.0000%	-	0.0000%	-	0.0000%	2,212,045.3644	0.0467%	2,212,045.3644	0.0103%
32008	-	0.0000%	232,151.4155	0.0035%	-	0.0000%	762,608.2353	0.0161%	994,759.6508	0.0046%
32024	-	0.0000%	-	0.0000%	-	0.0000%	4,365,194.4028	0.0921%	4,365,194.4028	0.0203%
32025	-	0.0000%	-	0.0000%	-	0.0000%	2,940,155.3036	0.0620%	2,940,155.3036	0.0137%
32034	-	0.0000%		0.0000%	-	0.0000%	4,143,299.7657	0.0874%	4,143,299.7657	0.0192%
32038		0.0000%	42,139.7731	0.0006%	-	0.0000%	1,949,530.7089	0.0411%	1,991,670.4820	0.0092%
32040	-	0.0000%	-	0.0000%	-	0.0000%	700,550.8510	0.0148%	700,550.8510	0.0033%
32043	-	0.0000%	-	0.0000%	-	0.0000%	1,901,686.8498	0.0401%	1,901,686.8498	0.0088%
32052	-	0.0000%	-	0.0000%	-	0.0000%	768,109.6660	0.0162%	768,109.6660	0.0036%
32053	-	0.0000%	63,223.9844	0.0010%	-	0.0000%	509,772.9643	0.0108%	572,996.9487	0.0027%
32054	-	0.0000%	-	0.0000%	-	0.0000%	1,745,244.6284	0.0368%	1,745,244.6284	0.0081%
32055	-	0.0000%	-	0.0000%	-	0.0000%	2,575,616.2045	0.0543%	2,575,616.2045	0.0120%
32059	-	0.0000%	238,080.9215	0.0036%	-	0.0000%	264,853.4420	0.0056%	502,934.3634	0.0023%
32060	-	0.0000%	748,029.5308	0.0113%	-	0.0000%	3,684,716.8782	0.0777%	4,432,746.4090	0.0206%
32062	-	0.0000%	121,648.1990	0.0018%	-	0.0000%	428,277.6549	0.0090%	549,925.8539	0.0026%
32063	-	0.0000%	-	0.0000%	-	0.0000%	824,885.7718	0.0174%	824,885.7718	0.0038%
32064	-	0.0000%	68,825.0465	0.0010%	-	0.0000%	471,940.2058	0.0100%	540,765.2523	0.0025%
32065	-	0.0000%	-	0.0000%	-	0.0000%	1,988,481.1573	0.0420%	1,988,481.1573	0.0092%
32066	-	0.0000%	434,351.7795	0.0066%	-	0.0000%	412,396.3898	0.0087%	846,748.1693	0.0039%
32068	-	0.0000%	-	0.0000%	-	0.0000%	4,270,813.1131	0.0901%	4,270,813.1131	0.0198%
32071	-	0.0000%	163,795.5009	0.0025%	-	0.0000%	644,528.0781	0.0136%	808,323.5789	0.0038%
32073	-	0.0000%	-	0.0000%	-	0.0000%	3,689,933.5055	0.0779%	3,689,933.5055	0.0171%
32080	2,196,134.0959	0.0283%	4,020,551.1617	0.0607%	-	0.0000%	6,370,290.8578	0.1344%	12,586,976.1154	0.0585%
32082	746,755.5945	0.0096%	2,071,787.3958	0.0313%	-	0.0000%	9,623,444.6099	0.2031%	12,441,987.6003	0.0578%
32084	687,849.0307	0.0089%	,113,883.8917	0.0168%	-	0.0000%	2,170,283.7407	0.0458%	3,972,016.6632	0.0184%
32086	840,118.8755	0.0108%	1,341,059.3481	0.0202%	-	0.0000%	2,251,269.8564	0.0475%	4,432,448.0800	0.0206%
32091	-	0.0000%	-	0.0000%	-	0.0000%	1,919,362.8416	0.0405%	1,919,362.8416	0.0089%
32092	-	0.0000%	-	0.0000%	-	0.0000%	1,508,818.9429	0.0318%	1,508,818.9429	0.0070%
32094	-	0.0000%	14,857.0351	0.0002%	-	0.0000%	637,466.4421	0.0135%	652,323.4772	0.0030%
32095	160,261.5805	0.0021%	318,113.4416	0.0048%	-	0.0000%	836,871.8549	0.0177%	1,315,246.8770	0.0061%
32102	287,180.3937	0.0037%	472,898.6170	0.0071%	-	0.0000%	731,648.1989	0.0154%	1,491,727.2097	0.0069%
32110	401,491.8776	0.0052%	-	0.0000%	-	0.0000%	501,145.3765	0.0106%	902,637.2541	0.0042%
32112	111,410.5469	0.0014%	439,654.5795	0.0066%	-	0.0000%	965,024.0424	0.0204%	1,516,089.1687	0.0070%
32113	-	0.0000%	378,766.3032	0.0057%	-	0.0000%	2,296,697.5863	0.0485%	2,675,463.8895	0.0124%
32114	9,587,982.3918	0.1236%	2,827,044.3306	0.0427%	-	0.0000%	1,669,096.0973	0.0352%	14,084,122.8198	0.0654%

ZIP Code	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
32117	11,703,533.8222	0.1509%	2,999,848.3123	0.0453%	-	0.0000%	1,889,050.1384	0.0399%	16,592,432.2729	0.0771%
32118	34,369,995.5328	0.4432%	8,229,681.0325	0.1242%	-	0.0000%	5,229,081.3958	0.1103%	47,828,757.9611	0.2221%
32119	14,728,005.7065	0.1899%	5,454,150.1780	0.0823%	-	0.0000%	3,155,499.2579	0.0666%	23,337,655.1423	0.1084%
32124	977,606.0251	0.0126%	202,325.0430	0.0031%	-	0.0000%	224,429.8565	0.0047%	1,404,360.9245	0.0065%
32127	20,729,713.8992	0.2673%	8,399,411.9849	0.1268%	-	0.0000%	4,479,015.5270	0.0945%	33,608,141.4110	0.1561%
32128	9,825,669.2139	0.1267%	2,121,184.4240	0.0320%	-	0.0000%	1,587,341.1432	0.0335%	13,534,194.7811	0.0629%
32129	8,727,735.2332	0.1126%	3,397,086.6035	0.0513%	-	0.0000%	2,021,934.2757	0.0427%	14,146,756.1124	0.0657%
32130	628,573.2058	0.0081%	347,333.0023	0.0052%	-	0.0000%	472,394.4103	0.0100%	1,448,300.6184	0.0067%
32132	2,404,859.9946	0.0310%	2,113,188.8944	0.0319%	-	0.0000%	1,044,026.5009	0.0220%	5,562,075.3898	0.0258%
32134	-	0.0000%	437,516.9603	0.0066%	-	0.0000%	1,924,400.1813	0.0406%	2,361,917.1417	0.0110%
32136	6,022,925.0214	0.0777%	3,080,248.0504	0.0465%	-	0.0000%	2,490,920.0554	0.0526%	11,594,093.1271	0.0538%
32137	8,727,748.6191	0.1126%	4,358,984.0418	0.0658%	-	0.0000%	4,105,060.3789	0.0866%	17,191,793.0398	0.0798%
32139	26,281.5059	0.0003%	215,867.1582	0.0033%	-	0.0000%	869,725.9561	0.0184%	1,111,874.6202	0.0052%
32141	7,199,147.0660	0.0928%	7,857,757.7635	0.1186%	-	0.0000%	3,914,351.2803	0.0826%	8,971,256.1098	0.0881%
32148	-	0.0000%	-	0.0000%	-	0.0000%	1,830,868.1492	0.0386%	1,830,868.1492	0.0085%
32159	448,710.6534	0.0058%	19,279,498.5968	0.2910%	-	0.0000%	32,305,484.3950	0.6816%	52,033,693.6452	0.2416%
32162	-	0.0000%	11,955,211.4458	0.1804%	-	0.0000%	21,604,196.8677	0.4558%	33,559,408.3135	0.1558%
32164	3,408,533.4922	0.0440%	883,981.9240	0.0133%	-	0.0000%	1,322,313.1113	0.0279%	5,614,828.5275	0.0261%
32168	12,499,445.3224	0.1612%	3,624,103.7547	0.0547%	-	0.0000%	2,050,583.7095	0.0433%	18,174,132.7866	0.0844%
32169	7,876,067.9812	0.1016%	9,414,816.4479	0.1421%	-	0.0000%	4,856,174.1581	0.1025%	22,147,058.5873	0.1029%
32174	39,492,452.8152	0.5093%	8,104,107.3402	0.1223%	-	0.0000%	5,859,968.6965	0.1236%	53,456,528.8518	0.2483%
32176	18,280,005.6782	0.2357%	6,135,534.3180	0.0926%	-	0.0000%	4,293,543.3679	0.0906%	28,709,083.3641	0.1333%
32177	-	0.0000%	-	0.0000%	-	0.0000%	2,237,645.3626	0.0472%	2,237,645.3626	0.0104%
32179	-	0.0000%	1,285,587.6034	0.0194%	-	0.0000%	3,407,226.1253	0.0719%	4,692,813.7287	0.0218%
32180	155,932.0435	0.0020%	194,882.7113	0.0029%	-	0.0000%	316,918.4492	0.0067%	667,733.2040	0.0031%
32181	-	0.0000%	221,978.7555	0.0034%	-	0.0000%	495,723.1197	0.0105%	717,701.8752	0.0033%
32189	-	0.0000%	226,617.0136	0.0034%	-	0.0000%	1,243,124.2173	0.0262%	1,469,741.2310	0.0068%
32195	-	0.0000%	1,221,285.9006	0.0184%	-	0.0000%	2,277,387.4369	0.0481%	3,498,673.3375	0.0162%
32205	-	0.0000%	-	0.0000%	-	0.0000%	2,001,517.4936	0.0422%	2,001,517.4936	0.0093%
32207	-	0.0000%	-	0.0000%	-	0.0000%	1,324,860.4269	0.0280%	1,324,860.4269	0.0062%
32208	-	0.0000%	-	0.0000%	-	0.0000%	742,911.2168	0.0157%	742,911.2168	0.0035%
32209	-	0.0000%	-	0.0000%	-	0.0000%	684,844.0031	0.0144%	684,844.0031	0.0032%
32210	-	0.0000%	-	0.0000%	-	0.0000%	3,813,953.7605	0.0805%	3,813,953.7605	0.0177%
32211	-	0.0000%	-	0.0000%	-	0.0000%	601,970.5210	0.0127%	601,970.5210	0.0028%
32216	-	0.0000%	-	0.0000%	-	0.0000%	861,720.8805	0.0182%	861,720.8805	0.0040%
32217	-	0.0000%	-	0.0000%	-	0.0000%	864,378.7550	0.0182%	864,378.7550	0.0040%
32218	-	0.0000%	-	0.0000%	-	0.0000%	1,395,031.1598	0.0294%	1,395,031.1598	0.0065%
32220	-	0.0000%	-	0.0000%	-	0.0000%	622,740.6721	0.0131%	622,740.6721	0.0029%

ZIP Code	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
32221	-	0.0000%	-	0.0000%	-	0.0000%	1,252,085.4883	0.0264%	1,252,085.4883	0.0058%
32222	-	0.0000%	-	0.0000%	-	0.0000%	504,449.5863	0.0106%	504,449.5863	0.0023%
32223	-	0.0000%	-	0.0000%	-	0.0000%	1,700,079.6237	0.0359%	1,700,079.6237	0.0079%
32224	-	0.0000%	-	0.0000%	-	0.0000%	1,117,915.3634	0.0236%	1,117,915.3634	0.0052%
32225	-	0.0000%	-	0.0000%	-	0.0000%	1,547,429.3848	0.0327%	1,547,429.3848	0.0072%
32233	-	0.0000%	-	0.0000%	-	0.0000%	2,813,533.4098	0.0594%	2,813,533.4098	0.0131%
32244	-	0.0000%	-	0.0000%	-	0.0000%	3,727,838.7653	0.0787%	3,727,838.7653	0.0173%
32246	-	0.0000%	-	0.0000%	-	0.0000%	935,254.7080	0.0197%	935,254.7080	0.0043%
32250	91,122.0034	0.0012%	168,087.0767	0.0025%	-	0.0000%	3,524,959.2097	0.0744%	3,784,168.2898	0.0176%
32256	-	0.0000%	-	0.0000%	-	0.0000%	1,086,131.5451	0.0229%	1,086,131.5451	0.0050%
32257	-	0.0000%	-	0.0000%	-	0.0000%	1,496,736.6624	0.0316%	1,496,736.6624	0.0070%
32258	-	0.0000%	-	0.0000%	-	0.0000%	919,462.5515	0.0194%	919,462.5515	0.0043%
32259	-	0.0000%	-	0.0000%	-	0.0000%	2,241,419.0477	0.0473%	2,241,419.0477	0.0104%
32266	-	0.0000%	116,045.4080	0.0018%	-	0.0000%	1,275,833.3484	0.0269%	1,391,878.7564	0.0065%
32277	-	0.0000%	-	0.0000%	-	0.0000%	625,092.1306	0.0132%	625,092.1306	0.0029%
32301	-	0.0000%	3,146,302.4532	0.0475%	-	0.0000%	-	0.0000%	3,146,302.4532	0.0146%
32303	-	0.0000%	5,390,330.3637	0.0814%	-	0.0000%	-	0.0000%	5,390,330.3637	0.0250%
32304	-	0.0000%	1,844,705.1492	0.0278%	-	0.0000%	-	0.0000%	1,844,705.1492	0.0086%
32305	-	0.0000%	1,516,824.5599	0.0229%	-	0.0000%	-	0.0000%	1,516,824.5599	0.0070%
32308	-	0.0000%	4,756,864.6789	0.0718%	-	0.0000%	-	0.0000%	4,756,864.6789	0.0221%
32309	-	0.0000%	5,951,582.3229	0.0898%	-	0.0000%	101,738.2628	0.0021%	6,053,320.5857	0.0281%
32310	-	0.0000%	1,589,541.3038	0.0240%	-	0.0000%	-	0.0000%	1,589,541.3038	0.0074%
32311	-	0.0000%	2,836,172.5781	0.0428%	-	0.0000%	121,813.5564	0.0026%	2,957,986.1345	0.0137%
32312	-	0.0000%	7,573,509.2025	0.1143%	-	0.0000%	-	0.0000%	7,573,509.2025	0.0352%
32317	-	0.0000%	2,374,567.5184	0.0358%	-	0.0000%	96,068.6283	0.0020%	2,470,636.1468	0.0115%
32327	-	0.0000%	2,367,910.3463	0.0357%	-	0.0000%	-	0.0000%	2,367,910.3463	0.0110%
32331	-	0.0000%	1,065,369.2006	0.0161%	-	0.0000%	232,014.3697	0.0049%	1,297,383.5703	0.0060%
32333	-	0.0000%	1,675,637.7078	0.0253%	-	0.0000%	-	0.0000%	1,675,637.7078	0.0078%
32340	-	0.0000%	1,192,978.8338	0.0180%	-	0.0000%	748,486.7824	0.0158%	1,941,465.6162	0.0090%
32344	-	0.0000%	3,173,681.0968	0.0479%	-	0.0000%	495,431.7198	0.0105%	3,669,112.8166	0.0170%
32347	-	0.0000%	2,224,965.9835	0.0336%	-	0.0000%	322,915.6031	0.0068%	2,547,881.5866	0.0118%
32348	-	0.0000%	1,777,989.7766	0.0268%	-	0.0000%	273,311.0755	0.0058%	2,051,300.8521	0.0095%
32351	-	0.0000%	1,478,795.2188	0.0223%	-	0.0000%	-	0.0000%	1,478,795.2188	0.0069%
32359	-	0.0000%	1,440,925.6201	0.0217%	-	0.0000%	285,059.7729	0.0060%	1,725,985.3929	0.0080%
32401	-	0.0000%	-	0.0000%	1,056,720.5603	0.0438%	-	0.0000%	1,056,720.5603	0.0049%
32405	-	0.0000%	-	0.0000%	638,171.6641	0.0264%	-	0.0000%	638,171.6641	0.0030%
32407	-	0.0000%	-	0.0000%	2,912,211.7117	0.1206%	-	0.0000%	2,912,211.7117	0.0135%
32408	-	0.0000%	-	0.0000%	5,400,335.1662	0.2237%	-	0.0000%	5,400,335.1662	0.0251%

ZIP Code	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
32413	-	0.0000%	-	0.0000%	7,822,494.1241	0.3241%	-	0.0000%	7,822,494.1241	0.0363%
32433	-	0.0000%	-	0.0000%	922,319.7397	0.0382%	-	0.0000%	922,319.7397	0.0043%
32439	-	0.0000%	-	0.0000%	1,038,400.6407	0.0430%	-	0.0000%	1,038,400.6407	0.0048%
32446	-	0.0000%	623,089.1238	0.0094%	-	0.0000%	-	0.0000%	623,089.1238	0.0029%
32459	-	0.0000%	-	0.0000%	17,210,476.8112	0.7130%	-	0.0000%	17,210,476.8112	0.0799%
32501	-	0.0000%	-	0.0000%	68,160,148.1285	2.8238%	-	0.0000%	68,160,148.1285	0.3165%
32502	-	0.0000%	-	0.0000%	6,591,647.5758	0.2731%	-	0.0000%	6,591,647.5758	0.0306%
32503	-	0.0000%	-	0.0000%	153,746,416.7025	6.3696%	-	0.0000%	153,746,416.7025	0.7140%
32504	-	0.0000%	-	0.0000%	106,034,788.7635	4.3929%	-	0.0000%	106,034,788.7635	0.4924%
32505	-	0.0000%	-	0.0000%	79,368,292.1606	3.2881%	-	0.0000%	79,368,292.1606	0.3686%
32506	-	0.0000%	-	0.0000%	231,933,385.9771	9.6088%	-	0.0000%	231,933,385.9771	1.0771%
32507	-	0.0000%	-	0.0000%	606,962,273.6766	25.1458%	-	0.0000%	606,962,273.6766	2.8187%
32508	-	0.0000%	-	0.0000%	2,118,630.0026	0.0878%	-	0.0000%	2,118,630.0026	0.0098%
32514	-	0.0000%	-	0.0000%	107,296,809.3386	4.4452%	-	0.0000%	107,296,809.3386	0.4983%
32526	-	0.0000%	-	0.0000%	133,050,040.6251	5.5121%	-	0.0000%	133,050,040.6251	0.6179%
32531	-	0.0000%	-	0.0000%	1,397,951.8646	0.0579%	-	0.0000%	1,397,951.8646	0.0065%
32533	-	0.0000%	-	0.0000%	93,735,173.3912	3.8833%	-	0.0000%	93,735,173.3912	0.4353%
32534	-	0.0000%	-	0.0000%	33,612,768.5397	1.3925%	-	0.0000%	33,612,768.5397	0.1561%
32535	-	0.0000%	-	0.0000%	7,293,971.1588	0.3022%	-	0.0000%	7,293,971.1588	0.0339%
32536	-	0.0000%	-	0.0000%	3,002,862.1557	0.1244%	-	0.0000%	3,002,862.1557	0.0139%
32539	-	0.0000%	-	0.0000%	3,070,470.9070	0.1272%	-	0.0000%	3,070,470.9070	0.0143%
32541	-	0.0000%	-	0.0000%	38,795,302.6194	1.6072%	-	0.0000%	38,795,302.6194	0.1802%
32547	-	0.0000%	-	0.0000%	22,938,571.9743	0.9503%	-	0.0000%	22,938,571.9743	0.1065%
32548	-	0.0000%	-	0.0000%	27,275,033.4363	1.1300%	-	0.0000%	27,275,033.4363	0.1267%
32550	-	0.0000%	-	0.0000%	16,161,629.1641	0.6696%	-	0.0000%	16,161,629.1641	0.0751%
32561	-	0.0000%	-	0.0000%	210,293,014.0870	8.7122%	-	0.0000%	210,293,014.0870	0.9766%
32563	-	0.0000%	-	0.0000%	121,892,623.4623	5.0499%	-	0.0000%	121,892,623.4623	0.5661%
32564	-	0.0000%	-	0.0000%	820,039.2785	0.0340%	-	0.0000%	820,039.2785	0.0038%
32565	-	0.0000%	-	0.0000%	8,681,592.6825	0.3597%	-	0.0000%	8,681,592.6825	0.0403%
32566	-	0.0000%	-	0.0000%	94,988,878.1543	3.9353%	-	0.0000%	94,988,878.1543	0.4411%
32568	-	0.0000%	-	0.0000%	5,507,236.5988	0.2282%	-	0.0000%	5,507,236.5988	0.0256%
32569	-	0.0000%	-	0.0000%	22,088,107.7350	0.9151%	-	0.0000%	22,088,107.7350	0.1026%
32570	-	0.0000%	-	0.0000%	30,141,745.8394	1.2487%	-	0.0000%	30,141,745.8394	0.1400%
32571	-	0.0000%	-	0.0000%	68,413,736.1847	2.8343%	-	0.0000%	68,413,736.1847	0.3177%
32577	-	0.0000%	-	0.0000%	15,013,629.2047	0.6220%	-	0.0000%	15,013,629.2047	0.0697%
32578	-	0.0000%	-	0.0000%	13,520,130.9123	0.5601%	-	0.0000%	13,520,130.9123	0.0628%
32579	-	0.0000%	-	0.0000%	10,198,920.9170	0.4225%	-	0.0000%	10,198,920.9170	0.0474%
32580	-	0.0000%	-	0.0000%	1,322,700.9705	0.0548%	-	0.0000%	1,322,700.9705	0.0061%

ZIP Code	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
32583	-	0.0000%	-	0.0000%	29,888,165.4960	1.2382%	-	0.0000%	29,888,165.4960	0.1388%
32601	-	0.0000%	209,436.8032	0.0032%	-	0.0000%	2,543,119.7181	0.0537%	2,752,556.5213	0.0128%
32603	-	0.0000%	36,113.4444	0.0005%	-	0.0000%	488,653.0823	0.0103%	524,766.5267	0.0024%
32605	-	0.0000%	477,306.5462	0.0072%	-	0.0000%	6,902,482.4491	0.1456%	7,379,788.9953	0.0343%
32606	-	0.0000%	443,296.4571	0.0067%	-	0.0000%	5,690,793.5641	0.1201%	6,134,090.0211	0.0285%
32607	-	0.0000%	472,074.4610	0.0071%	-	0.0000%	5,575,439.7388	0.1176%	6,047,514.1998	0.0281%
32608	-	0.0000%	813,750.4934	0.0123%	-	0.0000%	7,724,837.2933	0.1630%	8,538,587.7866	0.0397%
32609	-	0.0000%	209,078.4956	0.0032%	-	0.0000%	3,078,712.4044	0.0650%	3,287,790.9000	0.0153%
32615	-	0.0000%	109,614.5457	0.0017%	-	0.0000%	3,682,781.2265	0.0777%	3,792,395.7723	0.0176%
32617	-	0.0000%	284,974.2081	0.0043%	-	0.0000%	1,367,306.6527	0.0288%	1,652,280.8608	0.0077%
32618	-	0.0000%	270,765.6610	0.0041%	-	0.0000%	1,620,989.3156	0.0342%	1,891,754.9766	0.0088%
32619	-	0.0000%	333,505.1241	0.0050%	-	0.0000%	574,962.8932	0.0121%	908,468.0173	0.0042%
32621	-	0.0000%	564,795.9343	0.0085%	-	0.0000%	881,181.0351	0.0186%	1,445,976.9693	0.0067%
32625	-	0.0000%	4,191,357.5543	0.0633%	-	0.0000%	673,303.0830	0.0142%	4,864,660.6373	0.0226%
32626	-	0.0000%	1,573,688.2815	0.0238%	-	0.0000%	1,039,829.8034	0.0219%	2,613,518.0850	0.0121%
32628	-	0.0000%	514,267.3845	0.0078%	-	0.0000%	128,358.8263	0.0027%	642,626.2108	0.0030%
32640	-	0.0000%	251,924.6269	0.0038%	-	0.0000%	2,461,418.8051	0.0519%	2,713,343.4320	0.0126%
32641	-	0.0000%	115,382.2545	0.0017%	-	0.0000%	1,515,655.1589	0.0320%	1,631,037.4134	0.0076%
32643	-	0.0000%	137,842.3195	0.0021%	-	0.0000%	2,517,923.1713	0.0531%	2,655,765.4908	0.0123%
32648	-	0.0000%	504,232.0203	0.0076%	-	0.0000%	66,947.2758	0.0014%	571,179.2962	0.0027%
32653	-	0.0000%	186,270.9746	0.0028%	-	0.0000%	4,158,877.8518	0.0878%	4,345,148.8265	0.0202%
32656	-	0.0000%	-	0.0000%	-	0.0000%	2,516,444.9993	0.0531%	2,516,444.9993	0.0117%
32666	-	0.0000%	47,315.7879	0.0007%	-	0.0000%	1,456,787.4053	0.0307%	1,504,103.1932	0.0070%
32667	-	0.0000%	265,742.5509	0.0040%	-	0.0000%	1,800,861.3045	0.0380%	2,066,603.8553	0.0096%
32668	-	0.0000%	1,132,335.5458	0.0171%	-	0.0000%	1,771,743.5885	0.0374%	2,904,079.1344	0.0135%
32669	-	0.0000%	327,292.7970	0.0049%	-	0.0000%	2,559,185.6853	0.0540%	2,886,478.4823	0.0134%
32680	-	0.0000%	1,863,226.5601	0.0281%	-	0.0000%	886,570.0423	0.0187%	2,749,796.6024	0.0128%
32686	-	0.0000%	492,564.8408	0.0074%	-	0.0000%	1,981,922.0766	0.0418%	2,474,486.9173	0.0115%
32693	-	0.0000%	1,245,834.9514	0.0188%	-	0.0000%	1,272,869.6323	0.0269%	2,518,704.5837	0.0117%
32696	-	0.0000%	842,829.7765	0.0127%	-	0.0000%	2,603,758.1863	0.0549%	3,446,587.9628	0.0160%
32701	10,162,708.0207	0.1311%	5,200,839.1902	0.0785%	-	0.0000%	4,119,970.3692	0.0869%	19,483,517.5801	0.0905%
32702	88,162.9895	0.0011%	485,739.1487	0.0073%	-	0.0000%	823,827.0620	0.0174%	1,397,729.2002	0.0065%
32703	14,371,685.8103	0.1853%	10,495,228.8476	0.1584%	-	0.0000%	9,376,807.3397	0.1978%	34,243,721.9976	0.1590%
32707	20,780,625.1489	0.2680%	8,789,213.5262	0.1326%	-	0.0000%	6,587,467.7121	0.1390%	36,157,306.3872	0.1679%
32708	34,724,499.1855	0.4478%	13,086,486.0625	0.1975%	-	0.0000%	9,639,523.9590	0.2034%	57,450,509.2070	0.2668%
32709	835,304.1124	0.0108%	830,050.3892	0.0125%	-	0.0000%	487,000.3516	0.0103%	2,152,354.8532	0.0100%
32712	13,182,636.8254	0.1700%	12,688,865.1093	0.1915%	-	0.0000%	13,858,752.4487	0.2924%	39,730,254.3834	0.1845%
32713	10,365,491.0021	0.1337%	5,025,447.4434	0.0758%	-	0.0000%	4,789,291.6226	0.1011%	20,180,230.0680	0.0937%

ZIP Code	Hurricane Charley Personal and Commercial Residential Monetary Contribution ($)	Hurricane Charley Percent of Losses (%)	Hurricane Frances Personal and Commercial Residential Monetary Contribution ($)	Hurricane Frances Percent of Losses (%)	Hurricane Ivan Personal and Commercial Residential Monetary Contribution ($)	Hurricane Ivan Percent of Losses (%)	Hurricane Jeanne Personal and Commercial Residential Monetary Contribution ($)	Hurricane Jeanne Percent of Losses (%)	Total Personal and Commercial Residential Monetary Contribution ($)	Total Percent of Losses (%)
32714	13,598,532.3494	0.1754%	8,077,504.5180	0.1219%	-	0.0000%	6,574,258.7292	0.1387%	28,250,295.5966	0.1312%
32720	6,317,021.0970	0.0815%	3,067,050.7751	0.0463%	-	0.0000%	3,360,573.0355	0.0709%	12,744,644.9076	0.0592%
32724	7,791,067.9972	0.1005%	3,211,267.5042	0.0485%	-	0.0000%	3,471,893.8109	0.0733%	14,474,229.3123	0.0672%
32725	20,257,391.5907	0.2612%	5,881,817.5722	0.0888%	-	0.0000%	6,279,209.4651	0.1325%	32,418,418.6280	0.1506%
32726	1,243,218.6890	0.0160%	6,053,345.9626	0.0914%	-	0.0000%	8,445,629.6050	0.1782%	15,742,194.2566	0.0731%
32730	2,499,534.0808	0.0322%	1,133,746.5134	0.0171%	-	0.0000%	861,014.0294	0.0182%	4,494,294.6237	0.0209%
32732	6,860,892.6144	0.0885%	1,563,425.4597	0.0236%	-	0.0000%	1,096,605.0544	0.0231%	9,520,923.1285	0.0442%
32735	190,613.1915	0.0025%	1,964,574.5935	0.0296%	-	0.0000%	3,164,392.1703	0.0668%	5,319,579.9553	0.0247%
32736	1,315,695.7841	0.0170%	2,079,098.1741	0.0314%	-	0.0000%	2,816,387.3074	0.0594%	6,211,181.2656	0.0288%
32738	22,484,375.2552	0.2900%	4,468,194.5440	0.0674%	-	0.0000%	4,157,106.1543	0.0877%	31,109,675.9534	0.1445%
32744	1,335,951.9829	0.0172%	407,153.8860	0.0061%	-	0.0000%	415,855.1731	0.0088%	2,158,961.0420	0.0100%
32746	23,515,241.1421	0.3033%	12,490,906.5354	0.1885%	-	0.0000%	10,168,964.5465	0.2146%	46,175,112.2239	0.2144%
32750	14,097,324.2610	0.1818%	7,232,149.1789	0.1091%	-	0.0000%	5,752,182.9222	0.1214%	27,081,656.3621	0.1258%
32751	20,101,298.6769	0.2592%	9,230,804.6215	0.1393%	-	0.0000%	6,992,056.2777	0.1475%	36,324,159.5761	0.1687%
32754	2,807,937.6277	0.0362%	3,942,728.6826	0.0595%	-	0.0000%	1,976,107.8709	0.0417%	8,726,774.1811	0.0405%
32757	2,190,615.0135	0.0283%	7,410,254.0095	0.1118%	-	0.0000%	9,263,300.3669	0.1955%	18,864,169.3899	0.0876%
32759	1,027,269.6561	0.0132%	1,528,962.2108	0.0231%	-	0.0000%	759,468.3605	0.0160%	3,315,700.2275	0.0154%
32763	6,569,203.7258	0.0847%	2,462,590.3216	0.0372%	-	0.0000%	2,614,251.8661	0.0552%	11,646,045.9135	0.0541%
32764	3,334,250.2642	0.0430%	621,002.9553	0.0094%	-	0.0000%	527,755.7248	0.0111%	4,483,008.9442	0.0208%
32765	52,711,736.8499	0.6798%	15,859,452.0303	0.2394%	-	0.0000%	10,610,825.0255	0.2239%	79,182,013.9057	0.3677%
32766	12,312,209.1008	0.1588%	3,934,666.8500	0.0594%	-	0.0000%	2,459,227.4661	0.0519%	18,706,103.4169	0.0869%
32767	290,802.4146	0.0038%	460,116.3663	0.0069%	-	0.0000%	631,671.4484	0.0133%	1,382,590.2293	0.0064%
32771	18,138,975.6116	0.2339%	8,708,339.2036	0.1314%	-	0.0000%	7,130,613.3418	0.1505%	33,977,928.1571	0.1578%
32773	10,469,275.8205	0.1350%	4,487,836.4131	0.0677%	-	0.0000%	3,478,267.9719	0.0734%	18,435,380.2054	0.0856%
32776	2,490,541.3142	0.0321%	2,221,944.9501	0.0335%	-	0.0000%	2,627,940.3580	0.0554%	7,340,426.6223	0.0341%
32778	1,757,399.7089	0.0227%	10,165,141.7745	0.1534%	-	0.0000%	13,750,480.6943	0.2901%	25,673,022.1777	0.1192%
32779	23,249,947.1820	0.2998%	15,303,225.5508	0.2310%	-	0.0000%	13,202,236.9262	0.2786%	51,755,409.6590	0.2404%
32780	5,504,035.0929	0.0710%	12,466,019.1215	0.1881%	-	0.0000%	5,744,972.7750	0.1212%	23,715,026.9894	0.1101%
32784	235,395.3675	0.0030%	2,419,862.2784	0.0365%	-	0.0000%	4,044,565.1760	0.0853%	6,699,822.8220	0.0311%
32789	40,347,701.3153	0.5203%	15,660,090.3640	0.2363%	-	0.0000%	11,603,105.9438	0.2448%	67,610,897.6231	0.3140%
32792	29,478,435.4976	0.3802%	11,000,519.7814	0.1660%	-	0.0000%	7,932,268.2048	0.1674%	48,411,223.4838	0.2248%
32796	3,651,839.9572	0.0471%	6,419,228.7244	0.0969%	-	0.0000%	3,210,359.6569	0.0677%	13,281,428.3385	0.0617%
32798	2,184,826.5149	0.0282%	3,192,650.2648	0.0482%	-	0.0000%	4,717,797.3357	0.0995%	10,095,274.1154	0.0469%
32801	7,542,690.5981	0.0973%	3,011,969.3267	0.0455%	-	0.0000%	2,175,038.8400	0.0459%	12,729,698.7647	0.0591%
32803	25,595,813.7211	0.3301%	8,813,185.0982	0.1330%	-	0.0000%	6,366,070.4393	0.1343%	40,775,069.2587	0.1894%
32804	24,228,142.1323	0.3125%	9,247,644.2502	0.1396%	-	0.0000%	6,945,297.4008	0.1465%	40,421,083.7832	0.1877%
32805	8,049,178.0593	0.1038%	3,742,862.8704	0.0565%	-	0.0000%	2,735,218.7677	0.0577%	14,527,259.6975	0.0675%
32806	30,394,232.6027	0.3920%	12,318,278.1398	0.1859%	-	0.0000%	8,645,191.1337	0.1824%	51,357,701.8762	0.2385%

ZIP Code	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
32807	21,312,070.9419	0.2748%	6,566,196.4339	0.0991%	-	0.0000%	4,577,686.4555	0.0966%	32,455,953.8313	0.1507%
32808	19,316,595.9483	0.2491%	9,057,890.4169	0.1367%	-	0.0000%	7,197,886.8096	0.1519%	35,572,373.1748	0.1652%
32809	17,220,431.8997	0.2221%	8,140,719.7790	0.1229%	-	0.0000%	5,780,701.3040	0.1220%	31,141,852.9827	0.1446%
32810	13,659,017.3877	0.1762%	6,903,385.6249	0.1042%	-	0.0000%	5,511,051.9661	0.1163%	26,073,454.9787	0.1211%
32811	10,122,656.7461	0.1305%	5,387,442.4483	0.0813%	-	0.0000%	4,149,439.6266	0.0876%	19,659,538.8210	0.0913%
32812	31,521,538.2583	0.4065%	11,887,020.7741	0.1794%	-	0.0000%	8,233,122.0978	0.1737%	51,641,681.1302	0.2398%
32814	4,365,992.1403	0.0563%	1,532,945.5251	0.0231%	-	0.0000%	1,107,928.3173	0.0234%	7,006,865.9828	0.0325%
32817	25,408,161.2554	0.3277%	7,961,652.9771	0.1202%	-	0.0000%	5,308,920.2053	0.1120%	38,678,734.4378	0.1796%
32818	22,100,575.6662	0.2850%	11,356,753.1914	0.1714%	-	0.0000%	9,550,302.7574	0.2015%	43,007,631.6149	0.1997%
32819	29,571,200.7729	0.3814%	18,754,116.4782	0.2830%	-	0.0000%	14,625,784.4287	0.3086%	62,951,101.6798	0.2923%
32820	3,280,019.3250	0.0423%	2,125,935.2511	0.0321%	-	0.0000%	1,329,061.7534	0.0280%	6,735,016.3295	0.0313%
32821	9,927,992.5538	0.1280%	6,622,931.6837	0.1000%	-	0.0000%	4,961,898.8600	0.1047%	21,512,823.0974	0.0999%
32822	43,487,247.7889	0.5608%	14,029,800.5959	0.2117%	-	0.0000%	9,664,672.4524	0.2039%	67,181,720.8372	0.3120%
32824	37,904,468.1702	0.4888%	17,868,931.4596	0.2697%	-	0.0000%	12,275,020.4506	0.2590%	68,048,420.0804	0.3160%
32825	37,813,833.6393	0.4877%	14,342,465.6306	0.2165%	-	0.0000%	9,592,645.4203	0.2024%	61,748,944.6902	0.2868%
32826	17,757,710.4988	0.2290%	6,095,129.6016	0.0920%	-	0.0000%	3,909,245.7759	0.0825%	27,762,085.8763	0.1289%
32827	10,847,536.4887	0.1399%	3,597,225.2019	0.0543%	-	0.0000%	2,459,298.9539	0.0519%	16,904,060.6445	0.0785%
32828	33,749,590.4299	0.4352%	15,782,046.1450	0.2382%	-	0.0000%	9,988,061.7889	0.2107%	59,519,698.3638	0.2764%
32829	15,132,773.3844	0.1952%	5,356,286.1195	0.0808%	-	0.0000%	3,620,263.1962	0.0764%	24,109,322.7000	0.1120%
32832	12,740,393.0788	0.1643%	6,300,137.5011	0.0951%	-	0.0000%	4,186,791.1829	0.0883%	23,227,321.7628	0.1079%
32833	3,333,697.8755	0.0430%	2,854,484.2474	0.0431%	-	0.0000%	1,743,288.4707	0.0368%	7,931,470.5936	0.0368%
32835	24,021,249.1010	0.3098%	14,595,397.6408	0.2203%	-	0.0000%	11,895,359.4297	0.2510%	50,512,006.1715	0.2346%
32836	19,907,011.2979	0.2567%	14,591,150.1779	0.2202%	-	0.0000%	11,300,330.0617	0.2384%	45,798,491.5375	0.2127%
32837	44,247,387.0195	0.5706%	25,221,007.1707	0.3806%	-	0.0000%	18,032,282.9101	0.3805%	87,500,677.1004	0.4064%
32839	12,818,208.6265	0.1653%	6,298,807.0261	0.0951%	-	0.0000%	4,582,398.0020	0.0967%	23,699,413.6546	0.1101%
32901	1,038,791.8139	0.0134%	29,154,434.1311	0.4400%	-	0.0000%	12,675,236.2890	0.2674%	42,868,462.2340	0.1991%
32903	1,382,912.5657	0.0178%	46,964,468.9243	0.7088%	-	0.0000%	19,237,170.7188	0.4059%	67,584,552.2088	0.3139%
32904	2,223,573.8205	0.0287%	28,805,590.3746	0.4347%	-	0.0000%	13,664,961.0379	0.2883%	44,694,125.2330	0.2076%
32905	1,180,680.6759	0.0152%	40,609,891.0669	0.6129%	-	0.0000%	17,707,909.8768	0.3736%	59,498,481.6196	0.2763%
32907	2,697,660.5971	0.0348%	35,389,372.7981	0.5341%	-	0.0000%	18,396,996.7205	0.3882%	56,484,030.1157	0.2623%
32908	545,464.4911	0.0070%	7,470,291.3304	0.1127%	-	0.0000%	4,258,030.4629	0.0898%	12,273,786.2845	0.0570%
32909	1,513,143.4286	0.0195%	25,970,601.1592	0.3920%	-	0.0000%	13,937,337.9369	0.2941%	41,421,082.5247	0.1924%
32920	2,026,946.1668	0.0261%	13,469,433.8729	0.2033%	-	0.0000%	5,904,585.0230	0.1246%	21,400,965.0627	0.0994%
32922	1,021,266.1990	0.0132%	4,316,039.2656	0.0651%	-	0.0000%	1,949,791.5832	0.0411%	7,287,097.0478	0.0338%
32926	3,458,490.7879	0.0446%	10,339,146.5416	0.1560%	-	0.0000%	4,881,069.3532	0.1030%	18,678,706.6827	0.0867%
32927	3,142,456.1451	0.0405%	8,149,857.0032	0.1230%	-	0.0000%	3,817,012.4314	0.0805%	15,109,325.5798	0.0702%
32931	3,783,838.8484	0.0488%	32,538,325.2206	0.4911%	-	0.0000%	13,766,852.2613	0.2905%	50,089,016.3303	0.2326%
32934	1,855,627.2627	0.0239%	17,305,542.0966	0.2612%	-	0.0000%	7,846,622.5810	0.1656%	27,007,791.9403	0.1254%

ZIP Code	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
32935	2,339,432.3739	0.0302%	36,229,372.2852	0.5468%	-	0.0000%	15,222,787.1551	0.3212%	53,791,591.8142	0.2498%
32937	2,886,414.7457	0.0372%	66,330,124.6832	1.0011%	-	0.0000%	26,936,673.5214	0.5684%	96,153,212.9503	0.4465%
32940	3,744,771.9663	0.0483%	31,672,850.3804	0.4780%	-	0.0000%	13,654,211.7098	0.2881%	49,071,834.0566	0.2279%
32948	166,989.1478	0.0022%	4,749,801.7230	0.0717%	-	0.0000%	3,927,587.9487	0.0829%	8,844,378.8195	0.0411%
32949	114,914.9638	0.0015%	8,146,200.3119	0.1229%	-	0.0000%	3,604,537.1678	0.0761%	11,865,652.4435	0.0551%
32950	268,689.9650	0.0035%	12,089,350.8908	0.1825%	-	0.0000%	5,201,066.6814	0.1097%	17,559,107.5372	0.0815%
32951	1,143,474.4116	0.0147%	63,555,539.3570	0.9592%	-	0.0000%	26,437,322.4559	0.5578%	91,136,336.2246	0.4232%
32952	3,217,396.8643	0.0415%	23,056,245.8938	0.3480%	-	0.0000%	9,976,741.2896	0.2105%	36,250,384.0477	0.1683%
32953	3,043,581.2533	0.0393%	14,082,781.9129	0.2125%	-	0.0000%	6,388,036.6457	0.1348%	23,514,399.8119	0.1092%
32955	4,040,554.0656	0.0521%	25,681,226.8116	0.3876%	-	0.0000%	11,235,370.8647	0.2371%	40,957,151.7419	0.1902%
32958	1,145,361.3217	0.0148%	122,803,811.3295	1.8534%	-	0.0000%	63,931,842.7760	1.3489%	187,881,015.4273	0.8725%
32960	580,126.7420	0.0075%	81,660,198.0924	1.2324%	-	0.0000%	82,393,650.2303	1.7385%	164,633,975.0647	0.7646%
32962	612,057.7266	0.0079%	80,070,460.9376	1.2084%	-	0.0000%	85,039,739.0665	1.7943%	165,722,257.7307	0.7696%
32963	1,565,340.8487	0.0202%	336,233,667.6591	5.0745%	-	0.0000%	255,127,468.0864	5.3831%	592,926,476.5942	2.7535%
32966	1,037,713.5537	0.0134%	39,666,406.2494	0.5987%	-	0.0000%	41,880,592.3067	0.8837%	82,584,712.1098	0.3835%
32967	516,803.6071	0.0067%	44,613,606.3813	0.6733%	-	0.0000%	35,662,017.9791	0.7525%	80,792,427.9674	0.3752%
32968	473,999.9646	0.0061%	28,023,273.7539	0.4229%	-	0.0000%	31,537,021.8917	0.6654%	60,034,295.6102	0.2788%
32976	1,958,959.4569	0.0253%	121,565,050.0244	1.8347%	-	0.0000%	61,140,357.9579	1.2900%	184,664,367.4392	0.8576%
33040	5,519,190.4608	0.0712%	-	0.0000%	-	0.0000%	-	0.0000%	5,519,190.4608	0.0256%
33042	942,062.3670	0.0121%	-	0.0000%	-	0.0000%	-	0.0000%	942,062.3670	0.0044%
33050	626,754.7969	0.0081%	-	0.0000%	-	0.0000%	-	0.0000%	626,754.7969	0.0029%
33062	-	0.0000%	1,528,434.4048	0.0231%	-	0.0000%	-	0.0000%	1,528,434.4048	0.0071%
33063	-	0.0000%	796,642.4944	0.0120%	-	0.0000%	-	0.0000%	796,642.4944	0.0037%
33064	-	0.0000%	2,250,583.9937	0.0340%	-	0.0000%	-	0.0000%	2,250,583.9937	0.0105%
33065	-	0.0000%	741,043.7416	0.0112%	-	0.0000%	-	0.0000%	741,043.7416	0.0034%
33067	-	0.0000%	1,576,075.3548	0.0238%	-	0.0000%	-	0.0000%	1,576,075.3548	0.0073%
33073	-	0.0000%	1,174,463.5163	0.0177%	-	0.0000%	-	0.0000%	1,174,463.5163	0.0055%
33076	-	0.0000%	1,121,644.9897	0.0169%	-	0.0000%	-	0.0000%	1,121,644.9897	0.0052%
33308	-	0.0000%	680,652.3206	0.0103%	-	0.0000%	-	0.0000%	680,652.3206	0.0032%
33401	-	0.0000%	21,885,438.0592	0.3303%	-	0.0000%	4,464,711.5622	0.0942%	26,350,149.6214	0.1224%
33403	-	0.0000%	10,290,635.2338	0.1553%	-	0.0000%	3,346,155.4081	0.0706%	13,636,790.6419	0.0633%
33404	-	0.0000%	30,998,763.5388	0.4678%	-	0.0000%	8,931,988.0930	0.1885%	39,930,751.6318	0.1854%
33405	-	0.0000%	15,525,645.0312	0.2343%	-	0.0000%	2,525,866.3251	0.0533%	18,051,511.3563	0.0838%
33406	-	0.0000%	14,618,569.3970	0.2206%	-	0.0000%	2,322,554.3461	0.0490%	16,941,123.7430	0.0787%
33407	-	0.0000%	20,387,571.7790	0.3077%	-	0.0000%	4,922,538.2181	0.1039%	25,310,109.9971	0.1175%
33408	-	0.0000%	55,793,543.2583	0.8421%	-	0.0000%	19,753,611.4278	0.4168%	75,547,154.6861	0.3508%
33409	-	0.0000%	18,658,958.9180	0.2816%	-	0.0000%	3,941,262.3040	0.0832%	22,600,221.2220	0.1050%
33410	-	0.0000%	60,687,443.4178	0.9159%	-	0.0000%	25,289,708.4417	0.5336%	85,977,151.8595	0.3993%

ZIP Code	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
33411	-	0.0000%	58,701,756.4717	0.8859%	-	0.0000%	12,652,626.7509	0.2670%	71,354,383.2226	0.3314%
33412	-	0.0000%	25,857,048.7937	0.3902%	-	0.0000%	8,435,855.1000	0.1780%	34,292,903.8937	0.1593%
33413	-	0.0000%	8,536,151.1113	0.1288%	-	0.0000%	1,475,895.6957	0.0311%	10,012,046.8069	0.0465%
33414	-	0.0000%	51,634,896.2368	0.7793%	-	0.0000%	8,795,028.7531	0.1856%	60,429,924.9899	0.2806%
33415	-	0.0000%	20,816,467.4054	0.3142%	-	0.0000%	3,359,454.1273	0.0709%	24,175,921.5327	0.1123%
33417	-	0.0000%	24,444,286.8323	0.3689%	-	0.0000%	5,094,105.0658	0.1075%	29,538,391.8982	0.1372%
33418	-	0.0000%	88,474,921.1218	1.3353%	-	0.0000%	37,704,542.1112	0.7956%	126,179,463.2330	0.5860%
33426	-	0.0000%	8,016,308.2802	0.1210%	-	0.0000%	598,995.0999	0.0126%	8,615,303.3801	0.0400%
33428	-	0.0000%	3,845,916.8880	0.0580%	-	0.0000%	-	0.0000%	3,845,916.8880	0.0179%
33430	162,470.3542	0.0021%	3,156,388.0979	0.0476%	-	0.0000%	800,178.0866	0.0169%	4,119,036.5387	0.0191%
33431	-	0.0000%	3,920,776.2869	0.0592%	-	0.0000%	-	0.0000%	3,920,776.2869	0.0182%
33432	-	0.0000%	4,159,610.2532	0.0628%	-	0.0000%	-	0.0000%	4,159,610.2532	0.0193%
33433	-	0.0000%	5,638,171.0848	0.0851%	-	0.0000%	-	0.0000%	5,638,171.0848	0.0262%
33434	-	0.0000%	5,179,450.2555	0.0782%	-	0.0000%	97,673.5393	0.0021%	5,277,123.7948	0.0245%
33435	-	0.0000%	12,053,548.9901	0.1819%	-	0.0000%	822,490.3323	0.0174%	12,876,039.3224	0.0598%
33436	-	0.0000%	24,064,744.6728	0.3632%	-	0.0000%	2,067,957.2470	0.0436%	26,132,701.9198	0.1214%
33437	-	0.0000%	27,248,060.4279	0.4112%	-	0.0000%	2,079,526.8586	0.0439%	29,327,587.2865	0.1362%
33438	19,319.3137	0.0002%	1,384,250.4899	0.0209%	-	0.0000%	710,378.5523	0.0150%	2,113,948.3558	0.0098%
33440	1,012,943.3889	0.0131%	3,225,779.7887	0.0487%	-	0.0000%	1,266,074.5479	0.0267%	5,504,797.7256	0.0256%
33441	-	0.0000%	1,474,328.9693	0.0223%	-	0.0000%	-	0.0000%	1,474,328.9693	0.0068%
33442	-	0.0000%	2,126,251.5556	0.0321%	-	0.0000%	-	0.0000%	2,126,251.5556	0.0099%
33444	-	0.0000%	4,079,936.7683	0.0616%	-	0.0000%	221,184.1742	0.0047%	4,301,120.9425	0.0200%
33445	-	0.0000%	10,001,330.5429	0.1509%	-	0.0000%	539,021.0657	0.0114%	10,540,351.6086	0.0489%
33446	-	0.0000%	9,937,635.6306	0.1500%	-	0.0000%	435,090.2456	0.0092%	10,372,725.8762	0.0482%
33455	-	0.0000%	87,503,496.6883	1.3206%	-	0.0000%	52,228,478.7274	1.1020%	139,731,975.4158	0.6489%
33458	-	0.0000%	67,505,351.9616	1.0188%	-	0.0000%	42,033,946.0426	0.8869%	109,539,298.0042	0.5087%
33460	-	0.0000%	13,126,342.0253	0.1981%	-	0.0000%	1,702,667.2665	0.0359%	14,829,009.2918	0.0689%
33461	-	0.0000%	14,764,016.9708	0.2228%	-	0.0000%	2,026,138.3397	0.0428%	16,790,155.3105	0.0780%
33462	-	0.0000%	19,429,257.1086	0.2932%	-	0.0000%	2,151,423.3305	0.0454%	21,580,680.4390	0.1002%
33463	-	0.0000%	24,517,568.8990	0.3700%	-	0.0000%	3,079,003.3945	0.0650%	27,596,572.2935	0.1282%
33467	-	0.0000%	38,817,525.5879	0.5858%	-	0.0000%	4,813,428.5141	0.1016%	43,630,954.1020	0.2026%
33469	-	0.0000%	47,166,529.5077	0.7118%	-	0.0000%	23,442,958.8951	0.4946%	70,609,488.4028	0.3279%
33470	-	0.0000%	28,911,664.9880	0.4363%	-	0.0000%	8,036,085.7557	0.1696%	36,947,750.7437	0.1716%
33471	997,723.0431	0.0129%	2,081,252.3321	0.0314%	-	0.0000%	1,298,708.1367	0.0274%	4,377,683.5119	0.0203%
33476	88,647.8483	0.0011%	5,710,661.3479	0.0862%	-	0.0000%	2,249,494.8105	0.0475%	8,048,804.0067	0.0374%
33477	-	0.0000%	63,635,095.3984	0.9604%	-	0.0000%	26,876,682.7177	0.5671%	90,511,778.1161	0.4203%
33478	-	0.0000%	19,893,831.0046	0.3002%	-	0.0000%	13,584,231.0340	0.2866%	33,478,062.0386	0.1555%
33480	-	0.0000%	86,039,700.8932	1.2985%	-	0.0000%	13,597,100.2358	0.2869%	99,636,801.1290	0.4627%

ZIP Code	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
33483	-	0.0000%	7,885,969.6512	0.1190%	-	0.0000%	426,280.6298	0.0090%	8,312,250.2811	0.0386%
33484	-	0.0000%	8,004,794.9273	0.1208%	-	0.0000%	350,992.5968	0.0074%	8,355,787.5241	0.0388%
33486	-	0.0000%	3,090,243.3124	0.0466%	-	0.0000%	-	0.0000%	3,090,243.3124	0.0144%
33487	-	0.0000%	6,990,831.5871	0.1055%	-	0.0000%	127,967.7920	0.0027%	7,118,799.3791	0.0331%
33493	28,592.9128	0.0004%	386,014.5440	0.0058%	-	0.0000%	87,852.2129	0.0019%	502,459.6697	0.0023%
33496	-	0.0000%	9,249,469.0185	0.1396%	-	0.0000%	217,394.8045	0.0046%	9,466,863.8230	0.0440%
33498	-	0.0000%	3,141,236.4655	0.0474%	-	0.0000%	76,921.4465	0.0016%	3,218,157.9120	0.0149%
33510	129,957.1741	0.0017%	6,191,725.8979	0.0934%	-	0.0000%	6,603,572.8638	0.1393%	12,925,255.9358	0.0600%
33511	287,238.8633	0.0037%	11,454,949.5447	0.1729%	-	0.0000%	13,741,883.3437	0.2899%	25,484,071.7517	0.1183%
33513	-	0.0000%	6,494,996.5170	0.0980%	-	0.0000%	5,091,638.7592	0.1074%	11,586,635.2762	0.0538%
33514	11,550.1662	0.0001%	768,273.3071	0.0116%	-	0.0000%	884,915.8624	0.0187%	1,664,739.3357	0.0077%
33523	-	0.0000%	7,682,970.4054	0.1160%	-	0.0000%	4,672,240.3643	0.0986%	12,355,210.7697	0.0574%
33525	-	0.0000%	12,526,354.7303	0.1891%	-	0.0000%	8,963,639.1069	0.1891%	21,489,993.8372	0.0998%
33527	171,999.1358	0.0022%	3,241,911.5475	0.0489%	-	0.0000%	3,641,818.5999	0.0768%	7,055,729.2831	0.0328%
33534	49,608.3443	0.0006%	2,740,015.9878	0.0414%	-	0.0000%	3,198,665.9240	0.0675%	5,988,290.2560	0.0278%
33538	-	0.0000%	2,120,840.2626	0.0320%	-	0.0000%	2,483,585.4977	0.0524%	4,604,425.7603	0.0214%
33540	139,904.3114	0.0018%	7,187,374.1135	0.1085%	-	0.0000%	6,473,481.4777	0.1366%	13,800,759.9026	0.0641%
33541	265,466.6756	0.0034%	16,150,264.6926	0.2437%	-	0.0000%	14,488,872.3035	0.3057%	30,904,603.6718	0.1435%
33542	218,781.4831	0.0028%	12,046,592.1127	0.1818%	-	0.0000%	11,074,356.8374	0.2337%	23,339,730.4333	0.1084%
33543	-	0.0000%	11,466,817.6440	0.1731%	-	0.0000%	9,260,809.6564	0.1954%	20,727,627.3004	0.0963%
33544	-	0.0000%	8,381,367.3872	0.1265%	-	0.0000%	5,917,570.2732	0.1249%	14,298,937.6604	0.0664%
33547	674,524.4427	0.0087%	5,206,482.8142	0.0786%	-	0.0000%	7,312,237.2436	0.1543%	13,193,244.5005	0.0613%
33548	-	0.0000%	2,419,650.9955	0.0365%	-	0.0000%	1,950,964.1169	0.0412%	4,370,615.1124	0.0203%
33549	-	0.0000%	6,647,695.8976	0.1003%	-	0.0000%	5,469,944.1354	0.1154%	12,117,640.0330	0.0563%
33556	-	0.0000%	10,448,986.3825	0.1577%	-	0.0000%	7,147,822.0170	0.1508%	17,596,808.3996	0.0817%
33558	-	0.0000%	6,951,556.0559	0.1049%	-	0.0000%	5,136,545.6276	0.1084%	12,088,101.6835	0.0561%
33559	-	0.0000%	3,251,038.1601	0.0491%	-	0.0000%	2,601,716.9521	0.0549%	5,852,755.1121	0.0272%
33563	317,615.1603	0.0041%	3,715,537.7287	0.0561%	-	0.0000%	4,541,179.0920	0.0958%	8,574,331.9810	0.0398%
33565	452,433.3378	0.0058%	7,852,901.3997	0.1185%	-	0.0000%	8,727,648.8080	0.1842%	17,032,983.5456	0.0791%
33566	536,502.8455	0.0069%	5,726,030.7773	0.0864%	-	0.0000%	7,223,434.4655	0.1524%	13,485,968.0883	0.0626%
33567	365,840.4497	0.0047%	2,872,422.1439	0.0434%	-	0.0000%	3,890,702.9587	0.0821%	7,128,965.5524	0.0331%
33569	791,236.9313	0.0102%	16,408,661.9271	0.2476%	-	0.0000%	22,637,839.9481	0.4776%	39,837,738.8064	0.1850%
33570	570,709.3835	0.0074%	15,324,299.6245	0.2313%	-	0.0000%	8,674,322.0399	0.1830%	24,569,331.0478	0.1141%
33572	411,946.6386	0.0053%	12,614,645.5189	0.1904%	-	0.0000%	10,938,006.7592	0.2308%	23,964,598.9167	0.1113%
33573	581,791.3496	0.0075%	9,344,745.6072	0.1410%	-	0.0000%	6,512,577.8169	0.1374%	16,439,114.7737	0.0763%
33576	-	0.0000%	2,049,713.7323	0.0309%	-	0.0000%	1,246,761.2094	0.0263%	3,296,474.9417	0.0153%
33584	124,215.1218	0.0016%	5,701,833.8797	0.0861%	-	0.0000%	6,075,234.5150	0.1282%	11,901,283.5165	0.0553%
33585	-	0.0000%	651,996.4462	0.0098%	-	0.0000%	831,089.4126	0.0175%	1,483,085.8589	0.0069%

	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
ZIP Code	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
33592	-	0.0000%	2,793,991.2909	0.0422%	-	0.0000%	2,827,557.9291	0.0597%	5,621,549.2200	0.0261%
33594	1,133,846.6696	0.0146%	20,438,107.3609	0.3085%	-	0.0000%	25,089,122.7659	0.5294%	46,661,076.7963	0.2167%
33597	-	0.0000%	4,627,164.2011	0.0698%	-	0.0000%	3,965,579.4973	0.0837%	8,592,743.6984	0.0399%
33598	221,461.1642	0.0029%	2,414,796.9533	0.0364%	-	0.0000%	1,719,076.4174	0.0363%	4,355,334.5348	0.0202%
33602	-	0.0000%	3,521,244.2916	0.0531%	-	0.0000%	3,046,124.6673	0.0643%	6,567,368.9589	0.0305%
33603	-	0.0000%	4,592,397.1586	0.0693%	-	0.0000%	3,273,805.6919	0.0691%	7,866,202.8505	0.0365%
33604	-	0.0000%	6,558,061.7903	0.0990%	-	0.0000%	5,112,934.9372	0.1079%	11,670,996.7276	0.0542%
33605	-	0.0000%	2,317,866.7649	0.0350%	-	0.0000%	1,803,269.0628	0.0380%	4,121,135.8278	0.0191%
33606	-	0.0000%	7,538,920.1565	0.1138%	-	0.0000%	7,720,300.6870	0.1629%	15,259,220.8435	0.0709%
33607	-	0.0000%	4,745,940.4799	0.0716%	-	0.0000%	3,746,427.6877	0.0790%	8,492,368.1676	0.0394%
33609	-	0.0000%	9,350,271.6549	0.1411%	-	0.0000%	8,563,334.5589	0.1807%	17,913,606.2138	0.0832%
33610	-	0.0000%	4,803,382.7072	0.0725%	-	0.0000%	4,110,684.3675	0.0867%	8,914,067.0747	0.0414%
33611	-	0.0000%	14,422,894.3175	0.2177%	-	0.0000%	12,775,642.2616	0.2696%	27,198,536.5791	0.1263%
33612	-	0.0000%	6,092,275.4744	0.0919%	-	0.0000%	5,117,111.7209	0.1080%	11,209,387.1952	0.0521%
33613	-	0.0000%	6,317,528.1022	0.0953%	-	0.0000%	5,339,737.4230	0.1127%	11,657,265.5251	0.0541%
33614	-	0.0000%	9,284,830.7800	0.1401%	-	0.0000%	5,230,030.4538	0.1104%	14,514,861.2339	0.0674%
33615	-	0.0000%	13,957,986.2453	0.2107%	-	0.0000%	6,677,516.7603	0.1409%	20,635,503.0056	0.0958%
33616	-	0.0000%	3,568,807.4841	0.0539%	-	0.0000%	2,600,764.7575	0.0549%	6,169,572.2417	0.0287%
33617	-	0.0000%	8,411,769.7788	0.1270%	-	0.0000%	7,293,350.4002	0.1539%	15,705,120.1789	0.0729%
33618	-	0.0000%	8,577,081.1845	0.1294%	-	0.0000%	6,574,407.3015	0.1387%	15,151,488.4860	0.0704%
33619	-	0.0000%	5,433,152.9526	0.0820%	-	0.0000%	4,224,606.1118	0.0891%	9,657,759.0644	0.0449%
33624	-	0.0000%	12,471,734.0500	0.1882%	-	0.0000%	9,016,646.9167	0.1902%	21,488,380.9667	0.0998%
33625	-	0.0000%	6,804,008.4958	0.1027%	-	0.0000%	4,131,952.2619	0.0872%	10,935,960.7577	0.0508%
33626	-	0.0000%	9,997,804.2543	0.1509%	-	0.0000%	5,083,784.5809	0.1073%	15,081,588.8351	0.0700%
33629	-	0.0000%	17,981,225.3370	0.2714%	-	0.0000%	17,729,557.1232	0.3741%	35,710,782.4601	0.1658%
33634	-	0.0000%	6,486,820.7102	0.0979%	-	0.0000%	3,283,690.8500	0.0693%	9,770,511.5602	0.0454%
33635	-	0.0000%	5,484,891.7997	0.0828%	-	0.0000%	2,445,199.4314	0.0516%	7,930,091.2311	0.0368%
33637	-	0.0000%	2,352,895.1855	0.0355%	-	0.0000%	2,158,607.3599	0.0455%	4,511,502.5453	0.0210%
33647	-	0.0000%	16,833,715.9968	0.2541%	-	0.0000%	13,983,187.0812	0.2950%	30,816,903.0780	0.1431%
33701	-	0.0000%	3,354,932.4191	0.0506%	-	0.0000%	1,083,803.4745	0.0229%	4,438,735.8936	0.0206%
33702	-	0.0000%	11,458,195.6028	0.1729%	-	0.0000%	3,895,082.4966	0.0822%	15,353,278.0994	0.0713%
33703	-	0.0000%	10,695,403.6322	0.1614%	-	0.0000%	3,624,294.4918	0.0765%	14,319,698.1240	0.0665%
33704	-	0.0000%	6,899,837.3857	0.1041%	-	0.0000%	2,285,263.4995	0.0482%	9,185,100.8853	0.0427%
33705	-	0.0000%	6,022,421.4546	0.0909%	-	0.0000%	2,006,561.2148	0.0423%	8,028,982.6693	0.0373%
33706	-	0.0000%	18,604,741.9572	0.2808%	-	0.0000%	7,576,182.2928	0.1599%	26,180,924.2501	0.1216%
33707	-	0.0000%	14,543,083.0966	0.2195%	-	0.0000%	5,514,862.0761	0.1164%	20,057,945.1727	0.0931%
33708	-	0.0000%	15,753,172.7257	0.2378%	-	0.0000%	5,894,195.3085	0.1244%	21,647,368.0341	0.1005%

ZIP Code	Hurricane Charley: Personal and Commercial Residential Monetary Contribution ($)	Hurricane Charley: Percent of Losses (%)	Hurricane Frances: Personal and Commercial Residential Monetary Contribution ($)	Hurricane Frances: Percent of Losses (%)	Hurricane Ivan: Personal and Commercial Residential Monetary Contribution ($)	Hurricane Ivan: Percent of Losses (%)	Hurricane Jeanne: Personal and Commercial Residential Monetary Contribution ($)	Hurricane Jeanne: Percent of Losses (%)	Total: Personal and Commercial Residential Monetary Contribution ($)	Total: Percent of Losses (%)
33709	-	0.0000%	7,097,876.3840	0.1071%	-	0.0000%	2,175,080.8836	0.0459%	9,272,957.2677	0.0431%
33710	-	0.0000%	13,213,060.1481	0.1994%	-	0.0000%	4,498,996.5049	0.0949%	17,712,056.6531	0.0823%
33711	-	0.0000%	5,906,441.0361	0.0891%	-	0.0000%	2,240,005.4391	0.0473%	8,146,446.4752	0.0378%
33712	-	0.0000%	5,084,255.4999	0.0767%	-	0.0000%	1,820,708.4991	0.0384%	6,904,963.9990	0.0321%
33713	-	0.0000%	7,498,484.6569	0.1132%	-	0.0000%	2,462,466.7623	0.0520%	9,960,951.4192	0.0463%
33714	-	0.0000%	3,440,476.7378	0.0519%	-	0.0000%	1,101,554.4019	0.0232%	4,542,031.1397	0.0211%
33715	-	0.0000%	10,523,327.1780	0.1588%	-	0.0000%	4,555,224.6522	0.0961%	15,078,551.8302	0.0700%
33716	-	0.0000%	2,734,984.6357	0.0413%	-	0.0000%	1,015,270.3909	0.0214%	3,750,255.0266	0.0174%
33755	-	0.0000%	11,486,514.5331	0.1734%	-	0.0000%	7,197,381.4815	0.1519%	18,683,896.0145	0.0868%
33756	-	0.0000%	19,683,935.5717	0.2971%	-	0.0000%	11,103,161.5958	0.2343%	30,787,097.1675	0.1430%
33759	-	0.0000%	4,175,461.0568	0.0630%	-	0.0000%	2,767,428.0954	0.0584%	6,942,889.1521	0.0322%
33760	-	0.0000%	2,845,159.6027	0.0429%	-	0.0000%	1,123,214.8881	0.0237%	3,968,374.4908	0.0184%
33761	-	0.0000%	8,354,892.3410	0.1261%	-	0.0000%	6,404,480.2280	0.1351%	14,759,372.5690	0.0685%
33762	-	0.0000%	2,956,190.9417	0.0446%	-	0.0000%	1,008,222.7219	0.0213%	3,964,413.6637	0.0184%
33763	-	0.0000%	5,221,367.2248	0.0788%	-	0.0000%	3,818,573.6767	0.0806%	9,039,940.9015	0.0420%
33764	-	0.0000%	9,163,811.6902	0.1383%	-	0.0000%	5,059,560.7824	0.1068%	14,223,372.4726	0.0661%
33765	-	0.0000%	3,679,266.7900	0.0555%	-	0.0000%	2,463,153.4045	0.0520%	6,142,420.1946	0.0285%
33767	-	0.0000%	18,893,080.2063	0.2851%	-	0.0000%	9,029,358.8611	0.1905%	27,922,439.0674	0.1297%
33770	-	0.0000%	18,164,588.5914	0.2741%	-	0.0000%	8,879,109.6368	0.1873%	27,043,698.2282	0.1256%
33771	-	0.0000%	12,620,446.9244	0.1905%	-	0.0000%	6,095,980.3033	0.1286%	18,716,427.2277	0.0869%
33772	-	0.0000%	16,717,025.0653	0.2523%	-	0.0000%	6,232,900.2383	0.1315%	22,949,925.3035	0.1066%
33773	-	0.0000%	6,807,594.2269	0.1027%	-	0.0000%	2,740,257.7415	0.0578%	9,547,851.9684	0.0443%
33774	-	0.0000%	20,614,517.1193	0.3111%	-	0.0000%	8,411,761.9835	0.1775%	29,026,279.1028	0.1348%
33776	-	0.0000%	15,994,536.4991	0.2414%	-	0.0000%	6,293,682.8904	0.1328%	22,288,219.3895	0.1035%
33777	-	0.0000%	7,629,485.2445	0.1151%	-	0.0000%	2,626,298.1726	0.0554%	10,255,783.4171	0.0476%
33778	-	0.0000%	11,265,241.1719	0.1700%	-	0.0000%	4,867,171.4003	0.1027%	16,132,412.5723	0.0749%
33781	-	0.0000%	5,179,398.2614	0.0782%	-	0.0000%	1,606,441.8445	0.0339%	6,785,840.1058	0.0315%
33782	-	0.0000%	6,072,413.6276	0.0916%	-	0.0000%	1,989,757.8406	0.0420%	8,062,171.4681	0.0374%
33785	-	0.0000%	13,046,022.3512	0.1969%	-	0.0000%	5,075,042.8633	0.1071%	18,121,065.2144	0.0842%
33786	-	0.0000%	4,783,772.1784	0.0722%	-	0.0000%	1,989,717.7373	0.0420%	6,773,489.9156	0.0315%
33801	4,690,468.4123	0.0605%	14,134,976.8166	0.2133%	-	0.0000%	17,867,931.5011	0.3770%	36,693,376.7300	0.1704%
33803	3,834,412.6937	0.0494%	13,462,725.4854	0.2032%	-	0.0000%	17,283,583.7455	0.3647%	34,580,721.9245	0.1606%
33805	1,232,404.7210	0.0159%	6,163,637.2648	0.0930%	-	0.0000%	7,940,634.8462	0.1675%	15,336,676.8320	0.0712%
33809	2,320,606.6890	0.0299%	15,174,571.3830	0.2290%	-	0.0000%	18,350,948.7262	0.3872%	35,846,126.7983	0.1665%
33810	2,657,706.3384	0.0343%	22,103,867.8144	0.3336%	-	0.0000%	27,032,062.2172	0.5704%	51,793,636.3701	0.2405%
33811	1,603,379.9163	0.0207%	6,937,701.3293	0.1047%	-	0.0000%	8,761,428.4084	0.1849%	17,302,509.6541	0.0804%
33812	1,379,160.1993	0.0178%	2,309,918.3194	0.0349%	-	0.0000%	3,167,532.4564	0.0668%	6,856,610.9751	0.0318%
33813	7,329,876.3640	0.0945%	18,057,194.6048	0.2725%	-	0.0000%	23,883,839.7713	0.5039%	49,270,910.7402	0.2288%

ZIP Code	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
33815	696,141.0394	0.0090%	3,663,524.3883	0.0553%	-	0.0000%	4,766,443.2689	0.1006%	9,126,108.6965	0.0424%
33823	21,153,123.5362	0.2728%	18,205,682.3938	0.2748%	-	0.0000%	23,450,415.3880	0.4948%	62,809,221.3181	0.2917%
33825	22,727,746.5639	0.2931%	11,631,854.7444	0.1756%	-	0.0000%	14,141,055.7910	0.2984%	48,500,657.0992	0.2252%
33827	8,552,120.7162	0.1103%	1,926,967.6406	0.0291%	-	0.0000%	2,724,664.0417	0.0575%	13,203,752.3985	0.0613%
33830	21,577,787.1235	0.2783%	10,192,523.1258	0.1538%	-	0.0000%	14,773,814.2908	0.3117%	46,544,124.5401	0.2161%
33834	8,529,845.4544	0.1100%	1,418,604.0057	0.0214%	-	0.0000%	1,822,208.4526	0.0384%	11,770,657.9127	0.0547%
33837	27,032,610.6196	0.3486%	20,727,677.5582	0.3128%	-	0.0000%	25,487,049.3996	0.5378%	73,247,337.5773	0.3402%
33838	4,739,893.9618	0.0611%	1,932,641.6205	0.0292%	-	0.0000%	2,960,268.4566	0.0625%	9,632,804.0388	0.0447%
33839	2,497,358.9706	0.0322%	1,050,668.9292	0.0159%	-	0.0000%	1,485,121.7352	0.0313%	5,033,149.6350	0.0234%
33841	15,014,695.6863	0.1936%	3,076,103.8793	0.0464%	-	0.0000%	4,166,120.7867	0.0879%	22,256,920.3523	0.1034%
33843	18,151,484.6147	0.2341%	7,237,768.7195	0.1092%	-	0.0000%	9,509,305.5451	0.2006%	34,898,558.8793	0.1621%
33844	51,151,625.2608	0.6597%	31,025,011.1731	0.4682%	-	0.0000%	44,794,210.0265	0.9451%	126,970,846.4603	0.5896%
33849	22,730.2059	0.0003%	497,550.8594	0.0075%	-	0.0000%	524,129.4280	0.0111%	1,044,410.4933	0.0049%
33850	7,769,324.1387	0.1002%	5,500,398.3969	0.0830%	-	0.0000%	7,418,224.4024	0.1565%	20,687,946.9380	0.0961%
33852	8,747,274.7672	0.1128%	14,457,169.4727	0.2182%	-	0.0000%	16,021,523.5457	0.3380%	39,225,967.7856	0.1822%
33853	30,477,553.3536	0.3930%	7,971,032.9027	0.1203%	-	0.0000%	11,846,579.2844	0.2500%	50,295,165.5407	0.2336%
33857	732,772.0533	0.0095%	2,550,674.0171	0.0385%	-	0.0000%	2,491,610.2828	0.0526%	5,775,056.3532	0.0268%
33859	24,614,178.3280	0.3174%	7,604,659.3142	0.1148%	-	0.0000%	11,082,958.3423	0.2338%	43,301,795.9845	0.2011%
33860	2,341,912.2500	0.0302%	7,336,871.2861	0.1107%	-	0.0000%	9,715,496.6257	0.2050%	19,394,280.1619	0.0901%
33865	2,109,366.9579	0.0272%	281,082.4250	0.0042%	-	0.0000%	246,499.7492	0.0052%	2,636,949.1321	0.0122%
33868	2,650,928.2831	0.0342%	10,251,668.0982	0.1547%	-	0.0000%	12,622,934.2067	0.2663%	25,525,530.5879	0.1185%
33870	9,748,438.0183	0.1257%	9,228,479.7769	0.1393%	-	0.0000%	11,097,237.0681	0.2341%	30,074,154.8633	0.1397%
33872	23,528,941.1434	0.3034%	15,355,257.6243	0.2317%	-	0.0000%	18,178,642.8257	0.3836%	57,062,841.5934	0.2650%
33873	33,590,934.2396	0.4332%	3,565,023.4573	0.0538%	-	0.0000%	4,708,062.1220	0.0993%	41,864,019.8188	0.1944%
33875	6,840,789.0940	0.0882%	6,535,213.5606	0.0986%	-	0.0000%	7,128,849.7546	0.1504%	20,504,852.4092	0.0952%
33876	2,093,027.1882	0.0270%	3,054,210.3129	0.0461%	-	0.0000%	3,467,449.9493	0.0732%	8,614,687.4504	0.0400%
33880	35,125,060.3483	0.4530%	18,102,095.5428	0.2732%	-	0.0000%	23,957,969.7845	0.5055%	77,185,125.6756	0.3584%
33881	41,186,178.1632	0.5311%	24,169,292.5775	0.3648%	-	0.0000%	33,258,503.7010	0.7017%	98,613,974.4418	0.4580%
33884	61,574,585.4211	0.7941%	23,026,491.8875	0.3475%	-	0.0000%	34,188,405.0564	0.7214%	118,789,482.3650	0.5517%
33890	16,011,398.1618	0.2065%	1,835,737.0028	0.0277%	-	0.0000%	2,231,365.1528	0.0471%	20,078,500.3174	0.0932%
33896	8,999,597.1867	0.1161%	6,237,917.5625	0.0941%	-	0.0000%	6,281,514.6912	0.1325%	21,519,029.4404	0.0999%
33897	14,290,063.5366	0.1843%	23,593,308.9161	0.3561%	-	0.0000%	22,723,916.6665	0.4795%	60,607,289.1192	0.2815%
33898	47,181,498.2977	0.6085%	13,502,765.0532	0.2038%	-	0.0000%	20,751,428.9946	0.4378%	81,435,692.3456	0.3782%
33901	15,198,381.7674	0.1960%	274,648.3193	0.0041%	-	0.0000%	-	0.0000%	15,473,030.0867	0.0719%
33903	59,471,483.1979	0.7670%	1,336,670.9273	0.0202%	-	0.0000%	-	0.0000%	60,808,154.1251	0.2824%
33904	95,900,158.2407	1.2368%	455,104.5578	0.0069%	-	0.0000%	-	0.0000%	96,355,262.7985	0.4475%
33905	15,789,062.6845	0.2036%	856,016.9569	0.0129%	-	0.0000%	-	0.0000%	16,645,079.6415	0.0773%
33907	14,683,832.5106	0.1894%	213,406.8386	0.0032%	-	0.0000%	-	0.0000%	14,897,239.3492	0.0692%

ZIP Code	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
33908	127,312,579.4957	1.6419%	2,012,824.4358	0.0304%	-	0.0000%	-	0.0000%	129,325,403.9315	0.6006%
33909	32,347,278.3036	0.4172%	424,194.4583	0.0064%	-	0.0000%	-	0.0000%	32,771,472.7619	0.1522%
33912	27,347,332.2007	0.3527%	419,601.9649	0.0063%	-	0.0000%	-	0.0000%	27,766,934.1656	0.1289%
33913	8,248,716.0789	0.1064%	175,866.9479	0.0027%	-	0.0000%	-	0.0000%	8,424,583.0269	0.0391%
33914	191,190,922.2560	2.4657%	1,104,873.3318	0.0167%	-	0.0000%	-	0.0000%	192,295,795.5878	0.8930%
33916	5,525,882.0947	0.0713%	152,396.6642	0.0023%	-	0.0000%	-	0.0000%	5,678,278.7589	0.0264%
33917	50,703,424.0712	0.6539%	1,584,205.5163	0.0239%	-	0.0000%	-	0.0000%	52,287,629.5875	0.2428%
33919	45,601,118.5394	0.5881%	446,382.9298	0.0067%	-	0.0000%	-	0.0000%	46,047,501.4692	0.2138%
33920	2,602,320.1087	0.0336%	324,559.0435	0.0049%	-	0.0000%	73,871.2947	0.0016%	3,000,750.4469	0.0139%
33921	332,512,967.8128	4.2882%	2,739,492.2463	0.0413%	-	0.0000%	1,128,543.0791	0.0238%	336,381,003.1381	1.5621%
33922	211,247,502.3601	2.7243%	608,111.8387	0.0092%	-	0.0000%	165,883.1056	0.0035%	212,021,497.3044	0.9846%
33924	238,419,435.7370	3.0747%	895,923.2244	0.0135%	-	0.0000%	315,804.2963	0.0067%	239,631,163.2577	1.1128%
33928	17,544,981.3280	0.2263%	640,371.0264	0.0097%	-	0.0000%	-	0.0000%	18,185,352.3544	0.0845%
33931	84,075,676.2880	1.0843%	1,055,621.7566	0.0159%	-	0.0000%	81,479.7151	0.0017%	85,212,777.7596	0.3957%
33935	4,020,048.7182	0.0518%	1,411,902.8218	0.0213%	-	0.0000%	652,174.6714	0.0138%	6,084,126.2115	0.0283%
33936	7,262,482.8493	0.0937%	625,090.5163	0.0094%	-	0.0000%	-	0.0000%	7,887,573.3655	0.0366%
33946	12,359,944.7638	0.1594%	1,409,285.8552	0.0213%	-	0.0000%	594,717.9063	0.0125%	14,363,948.5253	0.0667%
33947	14,007,386.9658	0.1806%	1,530,758.8671	0.0231%	-	0.0000%	612,808.5352	0.0129%	16,150,954.3681	0.0750%
33948	112,473,415.0798	1.4505%	1,348,910.1895	0.0204%	-	0.0000%	337,904.7330	0.0071%	114,160,230.0022	0.5302%
33950	765,438,450.0656	9.8713%	6,224,247.4207	0.0939%	-	0.0000%	2,665,943.0438	0.0563%	774,328,640.5301	3.5960%
33952	239,951,946.0225	3.0945%	2,560,587.4809	0.0386%	-	0.0000%	689,384.9909	0.0145%	243,201,918.4944	1.1294%
33953	25,715,457.7509	0.3316%	519,955.4735	0.0078%	-	0.0000%	95,090.6301	0.0020%	26,330,503.8545	0.1223%
33954	62,803,319.9034	0.8099%	793,038.3125	0.0120%	-	0.0000%	210,314.0972	0.0044%	63,806,672.3131	0.2963%
33955	204,367,662.2807	2.6356%	2,503,506.8483	0.0378%	-	0.0000%	1,066,246.8607	0.0225%	207,937,415.9896	0.9657%
33956	119,991,453.2645	1.5474%	655,597.8654	0.0099%	-	0.0000%	161,269.9908	0.0034%	120,808,321.1207	0.5610%
33957	533,567,967.4673	6.8810%	1,626,839.9058	0.0246%	-	0.0000%	216,774.7867	0.0046%	535,411,582.1598	2.4864%
33960	306,596.7034	0.0040%	457,694.8207	0.0069%	-	0.0000%	439,711.5259	0.0093%	1,204,003.0501	0.0056%
33966	3,156,849.3505	0.0407%	89,690.3859	0.0014%	-	0.0000%	-	0.0000%	3,246,539.7365	0.0151%
33967	5,625,841.4457	0.0726%	26,553.6197	0.0004%	-	0.0000%	-	0.0000%	5,652,395.0655	0.0262%
33971	8,785,621.9686	0.1133%	558,136.0980	0.0084%	-	0.0000%	-	0.0000%	9,343,758.0666	0.0434%
33972	3,729,641.1961	0.0481%	366,786.2555	0.0055%	-	0.0000%	33,843.3340	0.0007%	4,130,270.7856	0.0192%
33980	119,574,789.0339	1.5421%	1,530,174.5514	0.0231%	-	0.0000%	458,705.5554	0.0097%	121,563,669.1408	0.5645%
33981	41,283,911.1678	0.5324%	684,141.7009	0.0103%	-	0.0000%	84,310.9967	0.0018%	42,052,363.8655	0.1953%
33982	181,555,689.3533	2.3414%	1,586,258.0386	0.0239%	-	0.0000%	589,933.6984	0.0124%	183,731,881.0904	0.8532%
33983	172,850,672.7854	2.2291%	1,529,389.0389	0.0231%	-	0.0000%	597,465.0020	0.0126%	174,977,526.8263	0.8126%
33990	62,602,233.0497	0.8073%	602,730.2745	0.0091%	-	0.0000%	-	0.0000%	63,204,963.3242	0.2935%
33991	60,028,935.3220	0.7742%	487,947.8926	0.0074%	-	0.0000%	-	0.0000%	60,516,883.2145	0.2810%
33993	97,313,209.9235	1.2550%	854,905.1777	0.0129%	-	0.0000%	187,397.8669	0.0040%	98,355,512.9681	0.4568%

ZIP Code	Hurricane Charley Personal and Commercial Residential Monetary Contribution ($)	Hurricane Charley Percent of Losses (%)	Hurricane Frances Personal and Commercial Residential Monetary Contribution ($)	Hurricane Frances Percent of Losses (%)	Hurricane Ivan Personal and Commercial Residential Monetary Contribution ($)	Hurricane Ivan Percent of Losses (%)	Hurricane Jeanne Personal and Commercial Residential Monetary Contribution ($)	Hurricane Jeanne Percent of Losses (%)	Total Personal and Commercial Residential Monetary Contribution ($)	Total Percent of Losses (%)
34102	34,193,662.4036	0.4410%	1,790,122.7369	0.0270%	-	0.0000%	255,608.1670	0.0054%	36,239,393.3075	0.1683%
34103	33,717,644.7683	0.4348%	1,964,806.9783	0.0297%	-	0.0000%	304,649.4992	0.0064%	35,987,101.2458	0.1671%
34104	8,117,342.3754	0.1047%	-	0.0000%	-	0.0000%	-	0.0000%	8,117,342.3754	0.0377%
34105	12,484,440.5775	0.1610%	773,046.5322	0.0117%	-	0.0000%	-	0.0000%	13,257,487.1097	0.0616%
34108	48,747,675.6793	0.6287%	3,169,141.7852	0.0478%	-	0.0000%	510,676.4222	0.0108%	52,427,493.8867	0.2435%
34109	15,147,325.6760	0.1953%	996,001.8275	0.0150%	-	0.0000%	-	0.0000%	16,143,327.5035	0.0750%
34110	26,947,762.2280	0.3475%	1,963,293.2416	0.0296%	-	0.0000%	322,971.1515	0.0068%	29,234,026.6211	0.1358%
34112	15,846,425.0126	0.2044%	653,421.9445	0.0099%	-	0.0000%	-	0.0000%	16,499,846.9571	0.0766%
34113	7,422,812.1285	0.0957%	-	0.0000%	-	0.0000%	-	0.0000%	7,422,812.1285	0.0345%
34114	4,790,155.9810	0.0618%	-	0.0000%	-	0.0000%	-	0.0000%	4,790,155.9810	0.0222%
34116	3,840,668.3852	0.0495%	-	0.0000%	-	0.0000%	-	0.0000%	3,840,668.3852	0.0178%
34117	1,868,143.0588	0.0241%	-	0.0000%	-	0.0000%	-	0.0000%	1,868,143.0588	0.0087%
34119	10,149,844.8881	0.1309%	-	0.0000%	-	0.0000%	-	0.0000%	10,149,844.8881	0.0471%
34120	3,909,890.0834	0.0504%	-	0.0000%	-	0.0000%	-	0.0000%	3,909,890.0834	0.0182%
34134	52,206,303.6493	0.6733%	3,178,538.1720	0.0480%	-	0.0000%	697,346.1822	0.0147%	56,082,188.0035	0.2604%
34135	26,215,713.8787	0.3381%	1,626,442.1246	0.0245%	-	0.0000%	-	0.0000%	27,842,156.0033	0.1293%
34142	540,613.9678	0.0070%	27,639.7645	0.0004%	-	0.0000%	-	0.0000%	568,253.7323	0.0026%
34145	30,517,262.5647	0.3936%	672,299.5723	0.0101%	-	0.0000%	-	0.0000%	31,189,562.1370	0.1448%
34201	235,223.2768	0.0030%	1,150,512.2872	0.0174%	-	0.0000%	428,338.8174	0.0090%	1,814,074.3814	0.0084%
34202	1,201,658.0988	0.0155%	4,640,703.9700	0.0700%	-	0.0000%	1,763,710.7808	0.0372%	7,606,072.8496	0.0353%
34203	547,637.9805	0.0071%	6,822,997.4993	0.1030%	-	0.0000%	2,574,523.0306	0.0543%	9,945,158.5103	0.0462%
34205	378,720.1888	0.0049%	7,785,424.2148	0.1175%	-	0.0000%	3,045,387.9709	0.0643%	11,209,532.3744	0.0521%
34207	385,749.4181	0.0050%	7,385,610.6163	0.1115%	-	0.0000%	3,001,415.8571	0.0633%	10,772,775.8915	0.0500%
34208	348,395.0942	0.0045%	5,306,158.0799	0.0801%	-	0.0000%	1,999,134.0320	0.0422%	7,653,687.2061	0.0355%
34209	934,553.7919	0.0121%	21,817,685.1665	0.3293%	-	0.0000%	8,972,023.5343	0.1893%	31,724,262.4926	0.1473%
34210	327,984.4907	0.0042%	7,071,741.0826	0.1067%	-	0.0000%	2,945,952.9085	0.0622%	10,345,678.4818	0.0480%
34211	166,377.3378	0.0021%	740,085.3406	0.0112%	-	0.0000%	293,003.4906	0.0062%	1,199,466.1690	0.0056%
34212	477,640.7612	0.0062%	3,349,436.5490	0.0506%	-	0.0000%	1,339,668.0714	0.0283%	5,166,745.3816	0.0240%
34215	26,727.3524	0.0003%	676,137.1287	0.0102%	-	0.0000%	284,067.6241	0.0060%	986,932.1052	0.0046%
34217	445,856.4031	0.0057%	12,381,052.2839	0.1869%	-	0.0000%	5,128,026.7883	0.1082%	17,954,935.4754	0.0834%
34219	511,818.5294	0.0066%	5,801,609.4170	0.0876%	-	0.0000%	2,408,001.8189	0.0508%	8,721,429.7652	0.0405%
34221	871,331.6955	0.0112%	23,518,141.2440	0.3549%	-	0.0000%	10,466,075.1306	0.2208%	34,855,548.0700	0.1619%
34222	333,753.7000	0.0043%	6,299,670.0930	0.0951%	-	0.0000%	2,738,130.6849	0.0578%	9,371,554.4779	0.0435%
34223	10,144,732.2975	0.1308%	6,536,094.8598	0.0986%	-	0.0000%	2,975,693.5752	0.0628%	19,656,520.7325	0.0913%
34224	19,741,056.3009	0.2546%	3,991,828.5359	0.0602%	-	0.0000%	1,733,141.5499	0.0366%	25,466,026.3867	0.1183%
34228	530,547.0767	0.0068%	13,884,408.8908	0.2095%	-	0.0000%	6,194,513.6722	0.1307%	20,609,469.6396	0.0957%
34229	1,021,191.0827	0.0132%	5,045,310.8423	0.0761%	-	0.0000%	2,351,339.0208	0.0496%	8,417,840.9457	0.0391%
34231	1,497,522.4679	0.0193%	13,877,981.1842	0.2094%	-	0.0000%	6,232,150.7830	0.1315%	21,607,654.4351	0.1003%

ZIP Code	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
34232	1,088,814.1009	0.0140%	5,417,725.8450	0.0818%	-	0.0000%	2,231,486.0909	0.0471%	8,738,026.0368	0.0406%
34233	879,701.2971	0.0113%	3,812,034.6714	0.0575%	-	0.0000%	1,561,146.4296	0.0329%	6,252,882.3981	0.0290%
34234	307,454.6840	0.0040%	4,594,654.7841	0.0693%	-	0.0000%	2,082,920.6320	0.0439%	6,985,030.1000	0.0324%
34235	513,431.6707	0.0066%	3,135,553.0371	0.0473%	-	0.0000%	1,339,912.3454	0.0283%	4,988,897.0532	0.0232%
34236	505,386.0822	0.0065%	7,292,711.4667	0.1101%	-	0.0000%	3,312,730.3010	0.0699%	11,110,827.8499	0.0516%
34237	286,133.8539	0.0037%	2,862,015.2266	0.0432%	-	0.0000%	1,267,145.4987	0.0267%	4,415,294.5793	0.0205%
34238	1,481,063.5181	0.0191%	7,112,388.2072	0.1073%	-	0.0000%	3,029,533.8153	0.0639%	11,622,985.5406	0.0540%
34239	563,850.5551	0.0073%	6,077,362.8868	0.0917%	-	0.0000%	2,733,251.5886	0.0577%	9,374,465.0305	0.0435%
34240	1,258,913.8076	0.0162%	2,318,612.8805	0.0350%	-	0.0000%	847,248.1336	0.0179%	4,424,774.8217	0.0205%
34241	1,536,501.5188	0.0198%	2,555,570.2720	0.0386%	-	0.0000%	882,885.9822	0.0186%	4,974,957.7730	0.0231%
34242	1,201,245.5366	0.0155%	13,172,499.2467	0.1988%	-	0.0000%	5,935,521.2389	0.1252%	20,309,266.0222	0.0943%
34243	637,222.9706	0.0082%	6,401,403.3791	0.0966%	-	0.0000%	2,713,357.5519	0.0573%	9,751,983.9016	0.0453%
34251	1,600,887.4178	0.0206%	1,890,767.0123	0.0285%	-	0.0000%	951,463.3034	0.0201%	4,443,117.7335	0.0206%
34266	214,042,149.6867	2.7603%	7,698,874.2743	0.1162%	-	0.0000%	5,583,776.3543	0.1178%	227,324,800.3152	1.0557%
34269	50,636,641.9964	0.6530%	702,603.8672	0.0106%	-	0.0000%	357,289.5729	0.0075%	51,696,535.4365	0.2401%
34275	3,054,046.3709	0.0394%	8,751,147.5118	0.1321%	-	0.0000%	3,964,588.3474	0.0837%	15,769,782.2300	0.0732%
34285	3,550,350.9977	0.0458%	8,231,393.9348	0.1242%	-	0.0000%	3,658,305.3912	0.0772%	15,440,050.3238	0.0717%
34286	61,291,468.5400	0.7904%	1,253,869.2851	0.0189%	-	0.0000%	319,213.2062	0.0067%	62,864,551.0313	0.2919%
34287	40,766,007.2659	0.5257%	2,630,841.8769	0.0397%	-	0.0000%	616,717.7688	0.0130%	44,013,566.9116	0.2044%
34288	32,623,211.1470	0.4207%	567,676.2956	0.0086%	-	0.0000%	198,543.7033	0.0042%	33,389,431.1458	0.1551%
34289	4,593,436.0111	0.0592%	98,646.7234	0.0015%	-	0.0000%	35,356.7248	0.0007%	4,727,439.4593	0.0220%
34292	3,490,522.5114	0.0450%	3,315,800.9757	0.0500%	-	0.0000%	1,278,549.5131	0.0270%	8,084,873.0001	0.0375%
34293	7,341,389.4998	0.0947%	8,890,003.1539	0.1342%	-	0.0000%	3,973,053.2047	0.0838%	20,204,445.8583	0.0938%
34420	-	0.0000%	3,202,217.4457	0.0483%	-	0.0000%	7,173,962.6438	0.1514%	10,376,180.0895	0.0482%
34428	-	0.0000%	3,245,888.9877	0.0490%	-	0.0000%	2,098,291.8277	0.0443%	5,344,180.8154	0.0248%
34429	-	0.0000%	4,551,930.1409	0.0687%	-	0.0000%	2,595,276.3006	0.0548%	7,147,206.4416	0.0332%
34431	-	0.0000%	1,963,427.1698	0.0296%	-	0.0000%	1,972,145.8697	0.0416%	3,935,573.0394	0.0183%
34432	-	0.0000%	3,412,421.0248	0.0515%	-	0.0000%	4,394,495.3088	0.0927%	7,806,916.3336	0.0363%
34433	-	0.0000%	2,119,916.1203	0.0320%	-	0.0000%	1,532,551.1684	0.0323%	3,652,467.2886	0.0170%
34434	-	0.0000%	1,761,887.2342	0.0266%	-	0.0000%	1,451,688.8298	0.0306%	3,213,576.0640	0.0149%
34436	-	0.0000%	4,396,306.0779	0.0664%	-	0.0000%	2,824,865.8764	0.0596%	7,221,171.9543	0.0335%
34442	-	0.0000%	6,405,181.7382	0.0967%	-	0.0000%	4,769,991.4806	0.1006%	11,175,173.2188	0.0519%
34446	-	0.0000%	10,428,628.9683	0.1574%	-	0.0000%	4,393,945.2322	0.0927%	14,822,574.2005	0.0688%
34448	-	0.0000%	6,686,488.7663	0.1009%	-	0.0000%	3,381,452.0709	0.0713%	10,067,940.8372	0.0468%
34449	-	0.0000%	1,004,308.1193	0.0152%	-	0.0000%	622,098.9342	0.0131%	1,626,407.0535	0.0076%
34450	-	0.0000%	4,790,349.9036	0.0723%	-	0.0000%	3,676,527.6164	0.0776%	8,466,877.5200	0.0393%
34452	-	0.0000%	4,433,121.0019	0.0669%	-	0.0000%	2,615,338.2677	0.0552%	7,048,459.2696	0.0327%
34453	-	0.0000%	3,343,269.0304	0.0505%	-	0.0000%	2,407,046.2908	0.0508%	5,750,315.3212	0.0267%

ZIP Code	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
34461	-	0.0000%	4,285,058.0358	0.0647%	-	0.0000%	2,718,844.8979	0.0574%	7,003,902.9338	0.0325%
34465	-	0.0000%	5,092,166.5079	0.0769%	-	0.0000%	3,445,571.9118	0.0727%	8,537,738.4197	0.0396%
34470	-	0.0000%	1,563,379.9206	0.0236%	-	0.0000%	5,489,294.2081	0.1158%	7,052,674.1287	0.0328%
34471	-	0.0000%	3,133,721.6167	0.0473%	-	0.0000%	9,113,146.5774	0.1923%	12,246,868.1940	0.0569%
34472	-	0.0000%	2,933,964.7810	0.0443%	-	0.0000%	8,728,093.6380	0.1842%	11,662,058.4190	0.0542%
34473	-	0.0000%	2,591,411.5406	0.0391%	-	0.0000%	4,221,544.0173	0.0891%	6,812,955.5579	0.0316%
34474	-	0.0000%	2,626,942.1748	0.0396%	-	0.0000%	6,495,575.5674	0.1371%	9,122,517.7423	0.0424%
34475	-	0.0000%	661,118.4055	0.0100%	-	0.0000%	1,964,872.6140	0.0415%	2,625,991.0194	0.0122%
34476	-	0.0000%	4,340,199.5572	0.0655%	-	0.0000%	7,766,774.7585	0.1639%	12,106,974.3156	0.0562%
34479	-	0.0000%	908,815.6346	0.0137%	-	0.0000%	3,409,004.7058	0.0719%	4,317,820.3404	0.0201%
34480	-	0.0000%	2,084,307.3288	0.0315%	-	0.0000%	5,699,457.1789	0.1203%	7,783,764.5077	0.0361%
34481	-	0.0000%	3,241,718.4869	0.0489%	-	0.0000%	5,239,831.4134	0.1106%	8,481,549.9003	0.0394%
34482	-	0.0000%	2,406,835.1990	0.0363%	-	0.0000%	7,010,435.5515	0.1479%	9,417,270.7506	0.0437%
34484	-	0.0000%	856,550.1168	0.0129%	-	0.0000%	1,536,873.1249	0.0324%	2,393,423.2417	0.0111%
34488	-	0.0000%	1,121,094.8443	0.0169%	-	0.0000%	3,174,273.0854	0.0670%	4,295,367.9298	0.0199%
34491	-	0.0000%	8,516,366.0815	0.1285%	-	0.0000%	16,833,911.5941	0.3552%	25,350,277.6755	0.1177%
34498	-	0.0000%	370,479.7352	0.0056%	-	0.0000%	351,660.1020	0.0074%	722,139.8372	0.0034%
34601	-	0.0000%	11,642,072.8558	0.1757%	-	0.0000%	5,733,818.5746	0.1210%	17,375,891.4304	0.0807%
34602	-	0.0000%	4,697,956.0871	0.0709%	-	0.0000%	2,248,107.0592	0.0474%	6,946,063.1463	0.0323%
34604	-	0.0000%	3,718,280.3381	0.0561%	-	0.0000%	1,890,270.5962	0.0399%	5,608,550.9342	0.0260%
34606	-	0.0000%	11,360,672.4821	0.1715%	-	0.0000%	10,086,107.0052	0.2128%	21,446,779.4873	0.0996%
34607	-	0.0000%	5,512,128.8353	0.0832%	-	0.0000%	6,962,970.7877	0.1469%	12,475,099.6229	0.0579%
34608	-	0.0000%	12,050,454.0043	0.1819%	-	0.0000%	6,377,158.0100	0.1346%	18,427,612.0143	0.0856%
34609	-	0.0000%	14,809,899.9099	0.2235%	-	0.0000%	7,409,387.6071	0.1563%	22,219,287.5170	0.1032%
34610	-	0.0000%	6,044,907.3699	0.0912%	-	0.0000%	3,349,848.6355	0.0707%	9,394,756.0054	0.0436%
34613	-	0.0000%	17,888,630.7599	0.2700%	-	0.0000%	8,174,502.9943	0.1725%	26,063,133.7542	0.1210%
34614	-	0.0000%	3,095,056.5718	0.0467%	-	0.0000%	1,327,465.9706	0.0280%	4,422,522.5424	0.0205%
34637	-	0.0000%	1,670,413.3154	0.0252%	-	0.0000%	960,532.8227	0.0203%	2,630,946.1381	0.0122%
34638	-	0.0000%	4,327,517.8469	0.0653%	-	0.0000%	2,600,500.8029	0.0549%	6,928,018.6499	0.0322%
34639	-	0.0000%	9,246,304.3837	0.1395%	-	0.0000%	6,914,235.1142	0.1459%	16,160,539.4979	0.0750%
34652	-	0.0000%	10,723,270.5456	0.1618%	-	0.0000%	15,602,325.4595	0.3292%	26,325,596.0052	0.1223%
34653	-	0.0000%	9,091,723.2115	0.1372%	-	0.0000%	13,928,094.0695	0.2939%	23,019,817.2810	0.1069%
34654	-	0.0000%	7,130,041.4024	0.1076%	-	0.0000%	5,323,716.3704	0.1123%	12,453,757.7728	0.0578%
34655	-	0.0000%	12,914,401.4369	0.1949%	-	0.0000%	10,419,871.0143	0.2199%	23,334,272.4512	0.1084%
34667	-	0.0000%	15,995,734.2300	0.2414%	-	0.0000%	23,180,371.9077	0.4891%	39,176,106.1377	0.1819%
34668	-	0.0000%	14,050,235.9432	0.2120%	-	0.0000%	21,951,175.1375	0.4632%	36,001,411.0807	0.1672%
34669	-	0.0000%	4,721,919.1718	0.0713%	-	0.0000%	3,817,880.0783	0.0806%	8,539,799.2501	0.0397%
34677	-	0.0000%	7,561,400.0321	0.1141%	-	0.0000%	4,564,658.2064	0.0963%	12,126,058.2385	0.0563%

ZIP Code	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
34683	-	0.0000%	23,119,554.8032	0.3489%	-	0.0000%	20,205,405.1179	0.4263%	43,324,959.9211	0.2012%
34684	-	0.0000%	10,909,650.8497	0.1647%	-	0.0000%	9,516,685.5206	0.2008%	20,426,336.3703	0.0949%
34685	-	0.0000%	6,680,013.2221	0.1008%	-	0.0000%	5,173,080.7570	0.1092%	11,853,093.9791	0.0550%
34688	-	0.0000%	3,661,826.0517	0.0553%	-	0.0000%	2,772,234.6452	0.0585%	6,434,060.6968	0.0299%
34689	-	0.0000%	19,285,805.7157	0.2911%	-	0.0000%	15,906,881.1536	0.3356%	35,192,686.8694	0.1634%
34690	-	0.0000%	5,115,251.7053	0.0772%	-	0.0000%	5,965,571.0065	0.1259%	11,080,822.7118	0.0515%
34691	-	0.0000%	10,631,681.4775	0.1605%	-	0.0000%	9,924,446.6542	0.2094%	20,556,128.1316	0.0955%
34695	-	0.0000%	6,500,701.0036	0.0981%	-	0.0000%	4,120,252.7217	0.0869%	10,620,953.7252	0.0493%
34698	-	0.0000%	25,920,583.8095	0.3912%	-	0.0000%	18,473,086.2836	0.3898%	44,393,670.0931	0.2062%
34705	370,383.7643	0.0048%	2,648,729.7003	0.0400%	-	0.0000%	2,765,522.3115	0.0584%	5,784,635.7761	0.0269%
34711	7,245,434.2907	0.0934%	44,590,930.5600	0.6730%	-	0.0000%	40,802,695.0667	0.8609%	92,639,059.9175	0.4302%
34714	5,238,228.5576	0.0676%	8,717,864.7952	0.1316%	-	0.0000%	7,565,275.2621	0.1596%	21,521,368.6150	0.0999%
34715	969,898.7368	0.0125%	8,784,542.9645	0.1326%	-	0.0000%	7,641,924.4247	0.1612%	17,396,366.1260	0.0808%
34731	167,820.2997	0.0022%	6,081,693.8779	0.0918%	-	0.0000%	8,442,696.5622	0.1781%	14,692,210.7398	0.0682%
34734	3,626,464.8695	0.0468%	1,923,286.0054	0.0290%	-	0.0000%	1,682,149.3916	0.0355%	7,231,900.2665	0.0336%
34736	523,862.9848	0.0068%	8,722,810.2020	0.1316%	-	0.0000%	9,230,205.8284	0.1948%	18,476,879.0152	0.0858%
34737	261,137.1096	0.0034%	1,993,870.0642	0.0301%	-	0.0000%	2,263,807.9542	0.0478%	4,518,815.1280	0.0210%
34739	390,445.9668	0.0050%	2,092,581.5770	0.0316%	-	0.0000%	2,500,644.9655	0.0528%	4,983,672.5093	0.0231%
34741	29,305,759.0068	0.3779%	19,105,093.5496	0.2883%	-	0.0000%	13,860,442.0608	0.2925%	62,271,294.6172	0.2892%
34743	45,370,680.2813	0.5851%	23,132,719.8406	0.3491%	-	0.0000%	15,909,183.3515	0.3357%	84,412,583.4734	0.3920%
34744	73,403,871.9996	0.9466%	35,420,202.4321	0.5346%	-	0.0000%	25,463,059.5445	0.5373%	134,287,133.9761	0.6236%
34746	78,146,028.3888	1.0078%	50,953,153.9467	0.7690%	-	0.0000%	37,029,060.4154	0.7813%	166,128,242.7509	0.7715%
34747	27,922,735.9428	0.3601%	25,745,070.1867	0.3886%	-	0.0000%	21,400,607.3568	0.4515%	75,068,413.4863	0.3486%
34748	1,082,148.4745	0.0140%	28,317,022.4530	0.4274%	-	0.0000%	32,954,714.9396	0.6953%	62,353,885.8671	0.2896%
34753	85,189.8216	0.0011%	1,763,210.0136	0.0266%	-	0.0000%	1,915,675.0609	0.0404%	3,764,074.8961	0.0175%
34756	1,015,021.0208	0.0131%	3,485,772.7660	0.0526%	-	0.0000%	2,948,457.3586	0.0622%	7,449,251.1454	0.0346%
34758	47,727,017.8120	0.6155%	28,504,501.0705	0.4302%	-	0.0000%	26,133,042.9406	0.5514%	102,364,561.8231	0.4754%
34759	47,214,982.1857	0.6089%	18,703,599.6926	0.2823%	-	0.0000%	24,299,402.9950	0.5127%	90,217,984.8732	0.4190%
34760	618,414.9180	0.0080%	470,479.3623	0.0071%	-	0.0000%	448,047.0035	0.0095%	1,536,941.2838	0.0071%
34761	27,412,107.9492	0.3535%	12,032,228.1333	0.1816%	-	0.0000%	10,805,119.4658	0.2280%	50,249,455.5483	0.2334%
34762	17,242.6489	0.0002%	449,139.1973	0.0068%	-	0.0000%	512,988.1383	0.0108%	979,369.9846	0.0045%
34769	24,409,419.0578	0.3148%	17,619,806.4746	0.2659%	-	0.0000%	12,526,928.3001	0.2643%	54,556,153.8324	0.2534%
34771	10,009,909.7107	0.1291%	12,135,134.8131	0.1831%	-	0.0000%	8,103,029.1375	0.1710%	30,248,073.6614	0.1405%
34772	17,472,218.2223	0.2253%	19,913,167.8395	0.3005%	-	0.0000%	14,252,600.4516	0.3007%	51,637,986.5134	0.2398%
34773	860,781.2464	0.0111%	3,120,321.5910	0.0471%	-	0.0000%	2,125,079.5100	0.0448%	6,106,182.3473	0.0284%
34785	-	0.0000%	6,320,453.8458	0.0954%	-	0.0000%	9,552,499.5883	0.2016%	15,872,953.4340	0.0737%
34786	32,593,441.8496	0.4203%	27,674,849.2214	0.4177%	-	0.0000%	23,343,810.2451	0.4925%	83,612,101.3161	0.3883%
34787	28,258,214.0490	0.3644%	22,307,461.6619	0.3367%	-	0.0000%	20,404,739.9614	0.4305%	70,970,415.6723	0.3296%

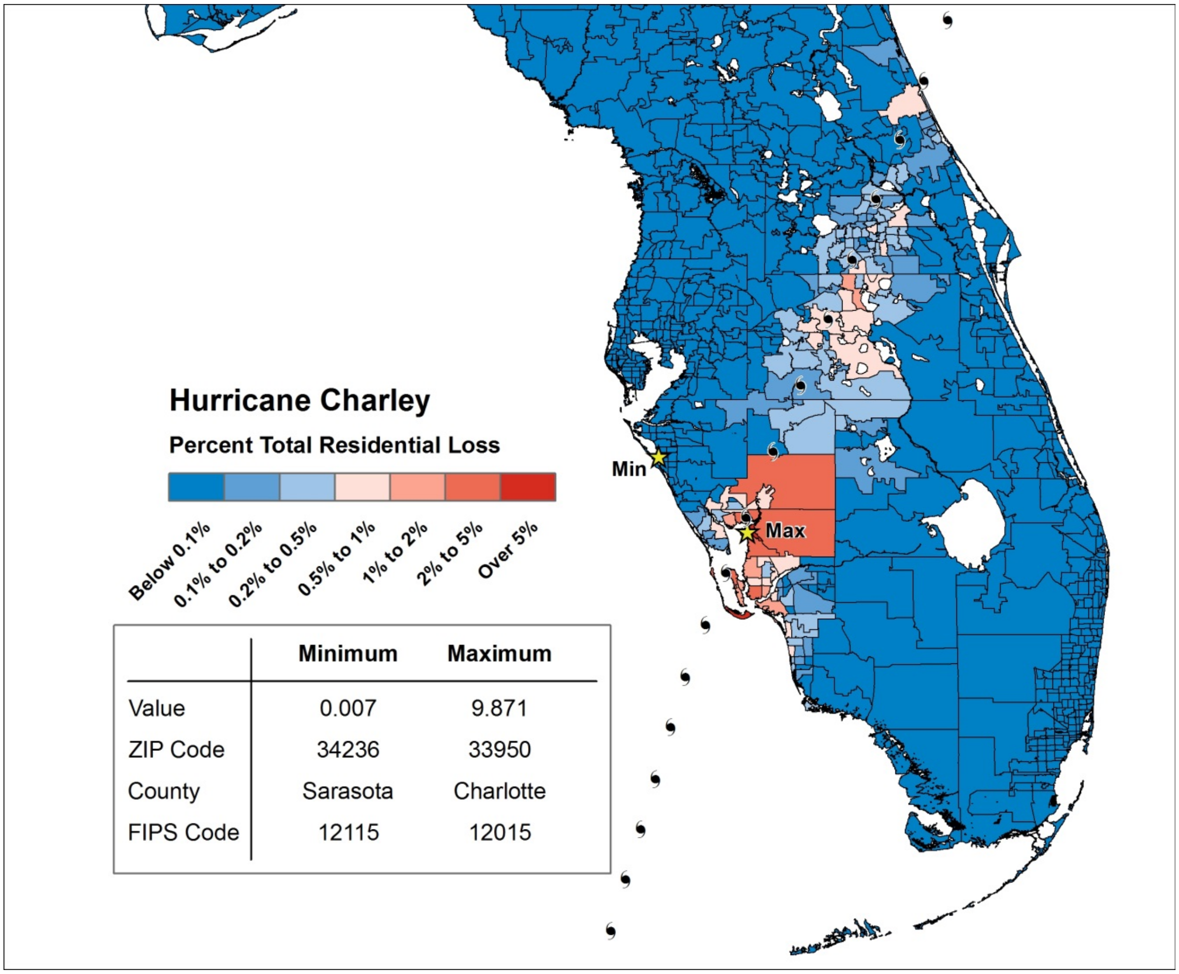
	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
ZIP Code	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
34788	1,026,179.0023	0.0132%	12,524,082.4789	0.1890%	-	0.0000%	18,740,631.5698	0.3954%	32,290,893.0511	0.1500%
34797	79,268.3512	0.0010%	974,616.3243	0.0147%	-	0.0000%	1,143,517.6948	0.0241%	2,197,402.3703	0.0102%
34945	166,820.1917	0.0022%	6,399,903.1720	0.0966%	-	0.0000%	6,307,455.6415	0.1331%	12,874,179.0052	0.0598%
34946	79,269.1976	0.0010%	13,477,690.2453	0.2034%	-	0.0000%	13,221,654.1797	0.2790%	26,778,613.6226	0.1244%
34947	184,462.6906	0.0024%	22,334,988.6988	0.3371%	-	0.0000%	21,223,998.5736	0.4478%	43,743,449.9630	0.2031%
34949	319,222.2178	0.0041%	71,772,654.9384	1.0832%	-	0.0000%	72,650,152.7993	1.5329%	144,742,029.9554	0.6722%
34950	94,732.6343	0.0012%	19,141,836.6674	0.2889%	-	0.0000%	18,024,514.6391	0.3803%	37,261,083.9408	0.1730%
34951	755,045.4827	0.0097%	52,813,679.0500	0.7971%	-	0.0000%	52,216,058.6811	1.1017%	105,784,783.2138	0.4913%
34952	577,647.0614	0.0074%	100,885,469.3439	1.5226%	-	0.0000%	91,514,579.5283	1.9309%	192,977,695.9336	0.8962%
34953	872,171.9811	0.0112%	43,129,244.9307	0.6509%	-	0.0000%	43,348,797.6375	0.9146%	87,350,214.5493	0.4057%
34956	124,016.2599	0.0016%	6,213,034.4284	0.0938%	-	0.0000%	4,597,341.8961	0.0970%	10,934,392.5844	0.0508%
34957	-	0.0000%	58,582,512.0610	0.8841%	-	0.0000%	44,684,378.4549	0.9428%	103,266,890.5159	0.4796%
34972	1,026,987.6437	0.0132%	12,914,497.8761	0.1949%	-	0.0000%	12,470,493.9157	0.2631%	26,411,979.4355	0.1227%
34974	5,488,634.7797	0.0708%	35,597,506.3445	0.5372%	-	0.0000%	33,818,619.0571	0.7136%	74,904,760.1814	0.3479%
34981	43,859.3554	0.0006%	5,083,404.1004	0.0767%	-	0.0000%	4,729,481.8474	0.0998%	9,856,745.3032	0.0458%
34982	265,334.8147	0.0034%	50,224,174.4294	0.7580%	-	0.0000%	46,489,512.5918	0.9809%	96,979,021.8359	0.4504%
34983	545,501.7249	0.0070%	39,594,213.1778	0.5976%	-	0.0000%	40,224,599.9486	0.8487%	80,364,314.8512	0.3732%
34984	189,965.1711	0.0024%	14,504,640.4421	0.2189%	-	0.0000%	15,283,442.0927	0.3225%	29,978,047.7059	0.1392%
34986	539,310.9527	0.0070%	26,029,471.1147	0.3928%	-	0.0000%	24,886,090.6968	0.5251%	51,454,872.7642	0.2390%
34987	129,426.9922	0.0017%	4,645,425.5431	0.0701%	-	0.0000%	4,258,378.2736	0.0899%	9,033,230.8090	0.0420%
34990	406,714.1783	0.0052%	47,751,608.8439	0.7207%	-	0.0000%	43,980,213.8295	0.9280%	92,138,536.8517	0.4279%
34994	-	0.0000%	23,591,589.1034	0.3561%	-	0.0000%	18,706,020.3294	0.3947%	42,297,609.4327	0.1964%
34996	-	0.0000%	54,710,652.0568	0.8257%	-	0.0000%	39,588,095.9625	0.8353%	94,298,748.0193	0.4379%
34997	-	0.0000%	80,845,543.5373	1.2201%	-	0.0000%	62,861,321.6816	1.3263%	143,706,865.2189	0.6674%

B. *Provide maps color-coded by ZIP Code depicting the percentage of total residential losses from each hurricane, Hurricane Charley (2004), Hurricane Frances (2004), Hurricane Ivan (2004), and Hurricane Jeanne (2004) and for the cumulative losses using the following interval coding:*

Red Over	*5%*
Light Red	*2% to 5%*
Pink	*1% to 2%*
Light Pink	*0.5% to 1%*
Light Blue	*0.2% to 0.5%*
Medium Blue	*0.1% to 0.2%*
Blue Below	*0.1%*

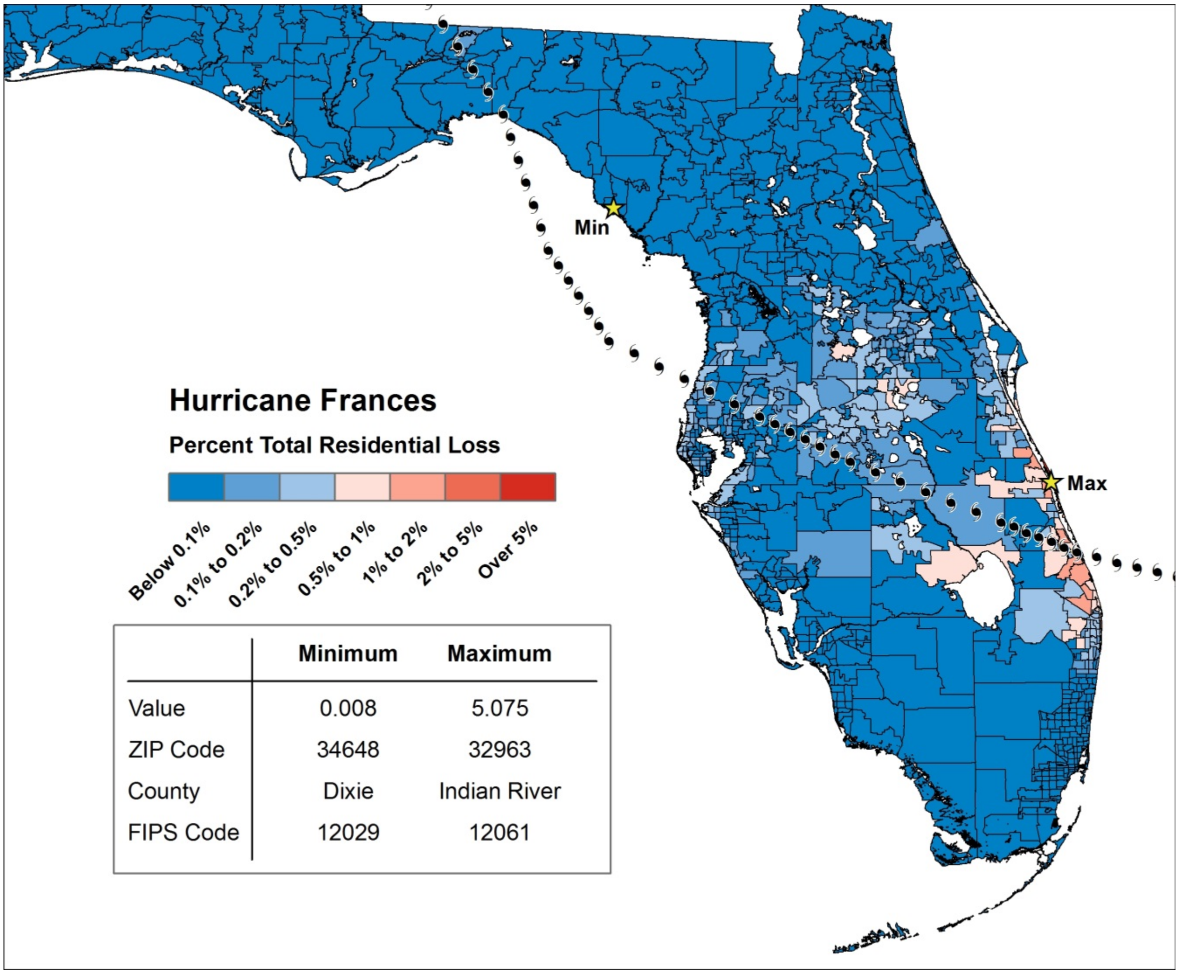
The relevant storm track should be plotted on each map.

The maps in Figure 86 to Figure 90 depict the percentage of gross, zero deductible losses from each specified event and in total for all events.



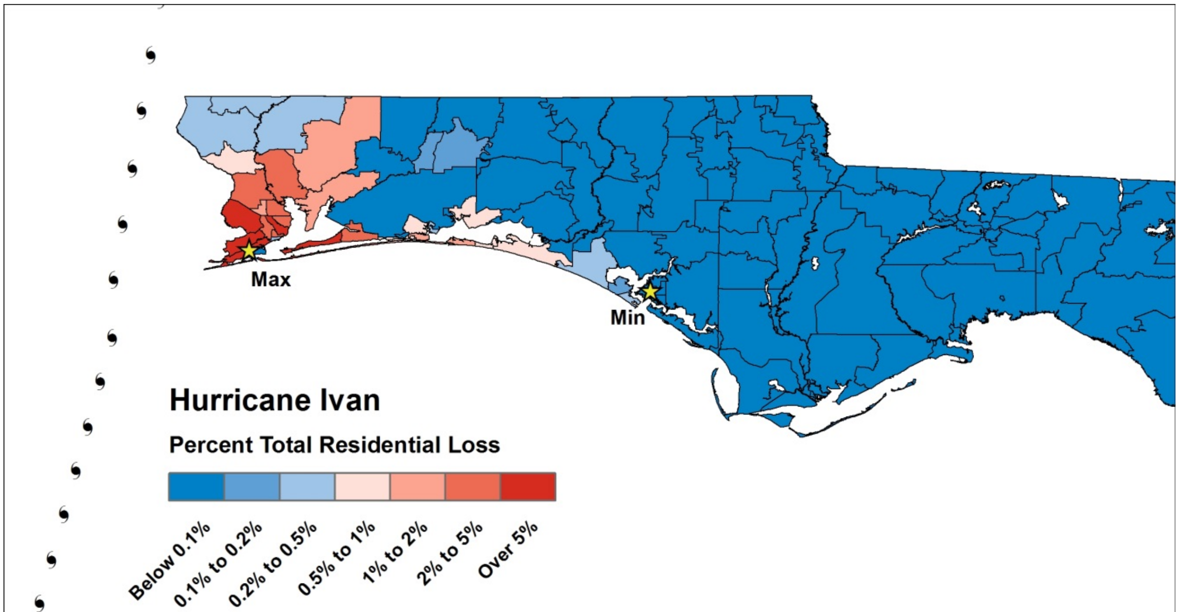
	Minimum	Maximum
Value	0.007	9.871
ZIP Code	34236	33950
County	Sarasota	Charlotte
FIPS Code	12115	12015

Figure 86. Percentage of Total Residential Loss from Hurricane Charley (2004)



	Minimum	Maximum
Value	0.008	5.075
ZIP Code	34648	32963
County	Dixie	Indian River
FIPS Code	12029	12061

Figure 87. Percentage of Total Residential Loss from Hurricane Frances (2004)



	Minimum	Maximum
Value	0.026	25.146
ZIP Code	32405	32507
County	Bay	Escambia
FIPS Code	12005	12033

Figure 88. Percentage of Total Residential Loss from Hurricane Ivan (2004)

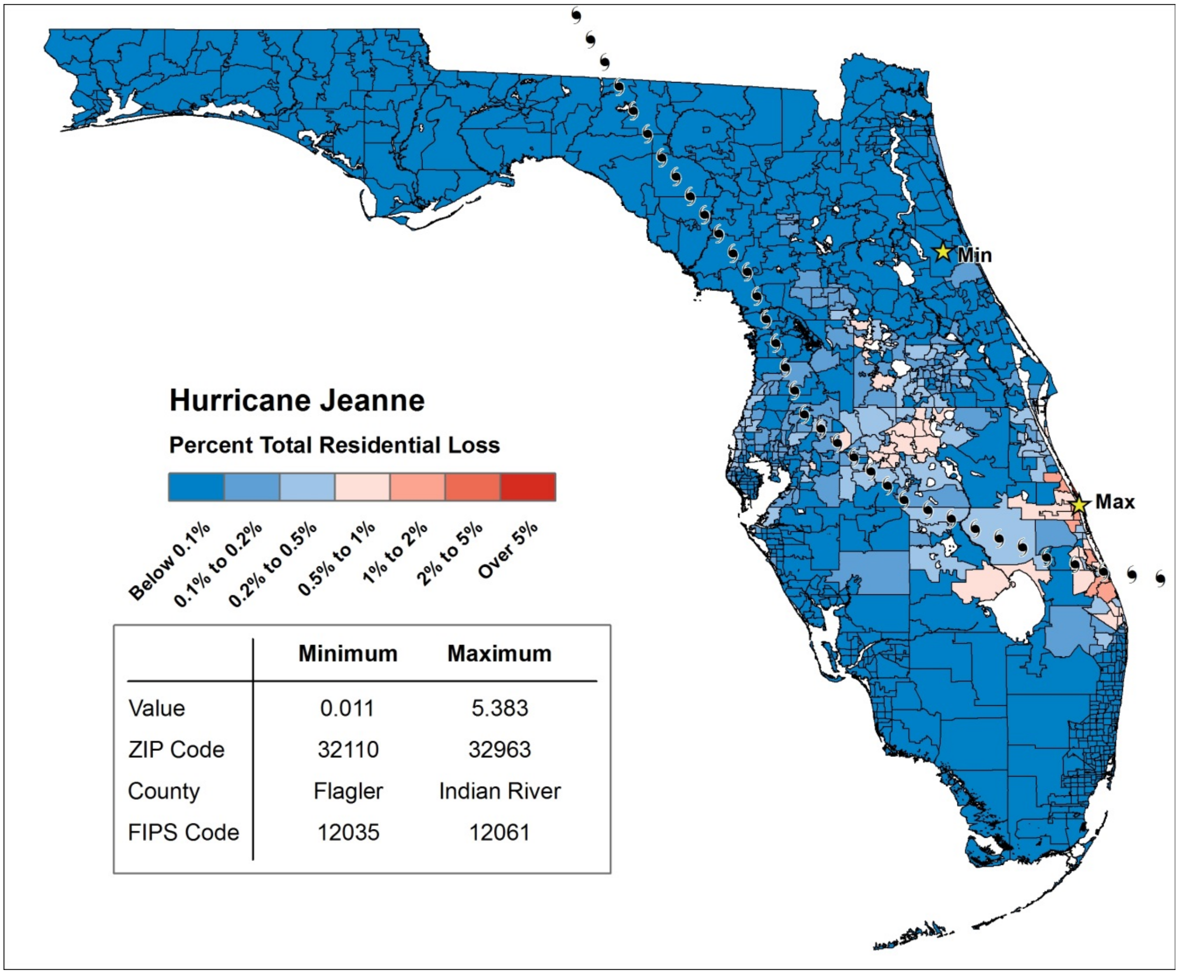


Figure 89. Percentage of Total Residential Loss from Hurricane Jeanne (2004)

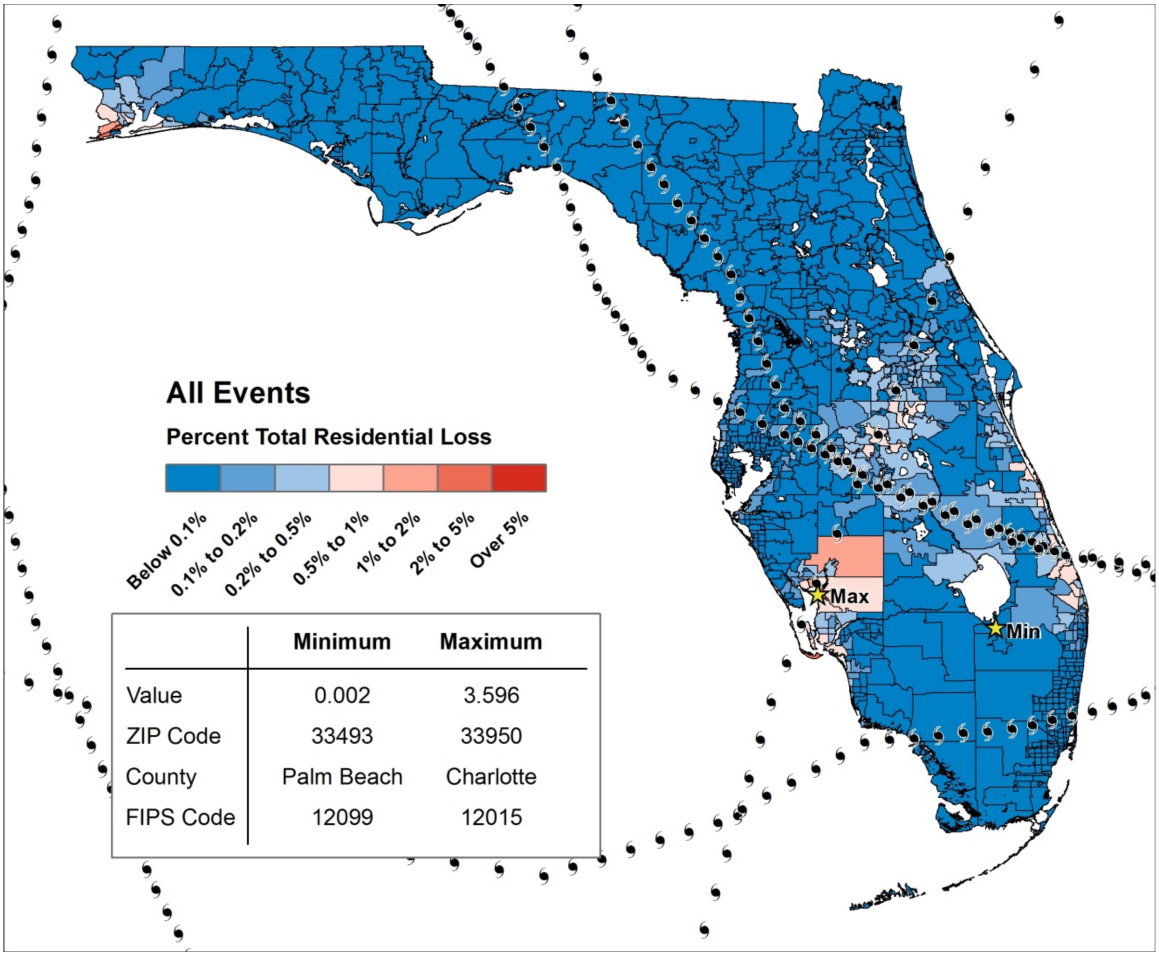


Figure 90. Percentage of Total Residential Loss from All Storms (2004)

C. Provide this form in Excel format. The file name shall include the abbreviated name of the modeling organization, the standards year, and the form name. Form A-3A (2004 Hurricane Season Losses, 2007 FHCF Exposure Data) shall also be included in a submission appendix.

A hard copy of Form A-3A is included in this submission appendix and is also provided in Excel format.

Standard A-6, Disclosure 3

Form A-3B: 2004 Hurricane Season Losses (2012 FHCF Exposure Data)

A. *Provide the percentage of residential zero deductible losses, rounded to four decimal places, and the monetary contribution from Hurricane Charley (2004), Hurricane Frances (2004), Hurricane Ivan (2004), and Hurricane Jeanne (2004) for each affected ZIP Code, individually and in total. Include all ZIP Codes where losses are equal to or greater than $500,000.*
Use the 2012 Florida Hurricane Catastrophe Fund's aggregate personal and commercial residential exposure data found in the file named "hlpm2012c.exe."
Rather than using directly a specified published windfield, the winds underlying the loss cost calculations must be produced by the model being evaluated and should be the same hurricane parameters as used in completing Form A-2 (Base Hurricane Storm Set Statewide Losses).

The 2012 FHCF aggregate exposure data has been used. The percentage of personal and commercial residential losses from Hurricane Charley (2004), Hurricane Frances (2004), Hurricane Ivan (2004) and Hurricane Jeanne (2004) for each affected ZIP Code is provided in Table 53. Note that all ZIP Codes where the total (i.e. all four events) losses are equal to or greater than $500,000 have been included. Zero deductible, gross modeled losses have been used in the creation of this form.

Table 53. Percentage of Total Residential Zero Deductible Losses From 2004 Storms

	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
ZIP Code	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
32003	-	0.0000%	-	0.0000%	-	0.0000%	2,827,711.7697	0.0609%	2,827,711.7697	0.0138%
32008	-	0.0000%	223,917.7660	0.0035%	-	0.0000%	738,203.9683	0.0159%	962,121.7343	0.0047%
32024	-	0.0000%	-	0.0000%	-	0.0000%	4,252,954.0608	0.0916%	4,252,954.0608	0.0207%
32025	-	0.0000%	-	0.0000%	-	0.0000%	3,114,311.4021	0.0671%	3,114,311.4021	0.0152%
32034	-	0.0000%	-	0.0000%	-	0.0000%	4,326,114.6769	0.0932%	4,326,114.6769	0.0211%
32038	-	0.0000%	39,990.5205	0.0006%	-	0.0000%	1,766,139.5854	0.0380%	1,806,130.1059	0.0088%
32040	-	0.0000%	-	0.0000%	-	0.0000%	650,953.1228	0.0140%	650,953.1228	0.0032%
32043	-	0.0000%	-	0.0000%	-	0.0000%	1,764,107.1148	0.0380%	1,764,107.1148	0.0086%
32052	-	0.0000%	-	0.0000%	-	0.0000%	692,122.3561	0.0149%	692,122.3561	0.0034%
32053	-	0.0000%	58,039.7228	0.0009%	-	0.0000%	475,959.7045	0.0102%	533,999.4273	0.0026%
32054	-	0.0000%	-	0.0000%	-	0.0000%	1,799,376.6192	0.0387%	1,799,376.6192	0.0088%
32055	-	0.0000%	-	0.0000%	-	0.0000%	2,387,157.5835	0.0514%	2,387,157.5835	0.0116%
32060	-	0.0000%	680,454.6598	0.0105%	-	0.0000%	3,353,987.4095	0.0722%	4,034,442.0693	0.0196%
32062	-	0.0000%	112,914.4512	0.0017%	-	0.0000%	397,776.5500	0.0086%	510,691.0012	0.0025%
32063	-	0.0000%	-	0.0000%	-	0.0000%	860,561.6476	0.0185%	860,561.6476	0.0042%
32064	-	0.0000%	79,122.8293	0.0012%	-	0.0000%	547,266.2180	0.0118%	626,389.0473	0.0031%
32065	-	0.0000%	-	0.0000%	-	0.0000%	2,159,785.8458	0.0465%	2,159,785.8458	0.0105%
32066	-	0.0000%	462,960.9602	0.0072%	-	0.0000%	439,042.5337	0.0095%	902,003.4939	0.0044%
32068	-	0.0000%	-	0.0000%	-	0.0000%	4,200,872.1064	0.0905%	4,200,872.1064	0.0205%
32071	-	0.0000%	147,885.2282	0.0023%	-	0.0000%	582,018.2471	0.0125%	729,903.4753	0.0036%
32073	-	0.0000%	-	0.0000%	-	0.0000%	3,755,627.6359	0.0809%	3,755,627.6359	0.0183%
32080	2,402,475.8756	0.0337%	4,409,059.0965	0.0683%	-	0.0000%	6,965,162.5538	0.1500%	13,776,697.5259	0.0671%
32082	805,199.9860	0.0113%	2,239,434.6886	0.0347%	-	0.0000%	10,229,918.8651	0.2203%	13,274,553.5396	0.0647%
32084	699,620.2971	0.0098%	1,120,591.7248	0.0174%	-	0.0000%	2,172,185.5588	0.0468%	3,992,397.5807	0.0194%
32086	867,757.1472	0.0122%	1,371,248.4767	0.0212%	-	0.0000%	2,296,369.2336	0.0495%	4,535,374.8575	0.0221%

ZIP Code	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
32091	-	0.0000%	-	0.0000%	-	0.0000%	1,947,144.5813	0.0419%	1,947,144.5813	0.0095%
32092	-	0.0000%	-	0.0000%	-	0.0000%	1,680,956.5958	0.0362%	1,680,956.5958	0.0082%
32094	-	0.0000%	14,958.9454	0.0002%	-	0.0000%	619,834.9522	0.0133%	634,793.8977	0.0031%
32095	134,568.1763	0.0019%	272,750.6556	0.0042%	-	0.0000%	703,453.9468	0.0151%	1,110,772.7787	0.0054%
32102	284,303.9736	0.0040%	463,261.8696	0.0072%	-	0.0000%	720,424.7089	0.0155%	1,467,990.5520	0.0071%
32110	342,433.0750	0.0048%	-	0.0000%	-	0.0000%	423,472.3889	0.0091%	765,905.4639	0.0037%
32112	120,211.2375	0.0017%	471,078.1622	0.0073%	-	0.0000%	1,042,284.5844	0.0224%	1,633,573.9842	0.0080%
32113	-	0.0000%	342,102.5692	0.0053%	-	0.0000%	2,076,563.6744	0.0447%	2,418,666.2436	0.0118%
32114	8,290,973.5858	0.1162%	2,477,269.5645	0.0384%	-	0.0000%	1,466,901.7895	0.0316%	12,235,144.9398	0.0596%
32117	11,068,809.8411	0.1551%	2,887,053.7775	0.0447%	-	0.0000%	1,823,105.1610	0.0393%	15,778,968.7796	0.0768%
32118	24,049,185.4756	0.3369%	5,525,444.1474	0.0856%	-	0.0000%	3,518,993.3655	0.0758%	33,093,622.9885	0.1612%
32119	12,711,951.3969	0.1781%	4,726,568.8920	0.0732%	-	0.0000%	2,735,389.7972	0.0589%	20,173,910.0861	0.0983%
32124	819,412.1594	0.0115%	176,246.5314	0.0027%	-	0.0000%	195,165.4082	0.0042%	1,190,824.0990	0.0058%
32127	20,443,218.8971	0.2864%	8,380,470.3371	0.1299%	-	0.0000%	4,492,431.0869	0.0967%	33,316,120.3210	0.1623%
32128	9,525,379.2662	0.1335%	2,050,752.9396	0.0318%	-	0.0000%	1,523,870.9614	0.0328%	13,100,003.1672	0.0638%
32129	11,633,875.5363	0.1630%	4,602,405.3160	0.0713%	-	0.0000%	2,759,434.6690	0.0594%	18,995,715.5214	0.0925%
32130	638,979.2436	0.0090%	352,998.2873	0.0055%	-	0.0000%	480,949.6351	0.0104%	1,472,927.1660	0.0072%
32132	2,539,446.3936	0.0356%	2,247,680.7906	0.0348%	-	0.0000%	1,114,809.0993	0.0240%	5,901,936.2835	0.0287%
32134	-	0.0000%	408,893.2066	0.0063%	-	0.0000%	1,804,155.3956	0.0389%	2,213,048.6022	0.0108%
32136	5,631,196.5474	0.0789%	2,894,012.7662	0.0448%	-	0.0000%	2,342,486.0975	0.0504%	10,867,695.4111	0.0529%
32137	9,229,546.5890	0.1293%	4,697,810.5871	0.0728%	-	0.0000%	4,427,264.8786	0.0953%	18,354,622.0547	0.0894%
32139	24,419.8636	0.0003%	200,312.7617	0.0031%	-	0.0000%	806,734.7482	0.0174%	1,031,467.3735	0.0050%
32141	7,449,098.0347	0.1044%	8,148,632.7132	0.1263%	-	0.0000%	4,058,709.9282	0.0874%	19,656,440.6761	0.0957%
32148	-	0.0000%	-	0.0000%	-	0.0000%	1,686,333.6824	0.0363%	1,686,333.6824	0.0082%
32159	528,561.9748	0.0074%	22,297,752.2885	0.3455%	-	0.0000%	37,015,516.5148	0.7971%	59,841,830.7781	0.2914%
32162	-	0.0000%	18,103,591.4994	0.2805%	-	0.0000%	32,531,029.1398	0.7005%	50,634,620.6392	0.2466%
32164	3,686,609.5519	0.0517%	970,743.4059	0.0150%	-	0.0000%	1,450,651.8818	0.0312%	6,108,004.8396	0.0297%
32168	12,683,087.9058	0.1777%	3,745,717.7992	0.0580%	-	0.0000%	2,123,163.8408	0.0457%	18,551,969.5458	0.0904%
32169	7,109,052.9593	0.0996%	8,534,549.9244	0.1323%	-	0.0000%	4,413,987.8278	0.0951%	20,057,590.7115	0.0977%

	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
ZIP Code	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
32174	39,248,003.2112	0.5499%	8,212,731.7254	0.1273%	-	0.0000%	5,930,450.4413	0.1277%	53,391,185.3778	0.2600%
32176	17,473,475.6972	0.2448%	5,984,272.4182	0.0927%	-	0.0000%	4,197,612.0231	0.0904%	27,655,360.1384	0.1347%
32177	-	0.0000%	-	0.0000%	-	0.0000%	2,244,449.1100	0.0483%	2,244,449.1100	0.0109%
32179	-	0.0000%	1,305,958.0184	0.0202%	-	0.0000%	3,455,910.1611	0.0744%	4,761,868.1795	0.0232%
32180	158,020.4493	0.0022%	195,034.2495	0.0030%	-	0.0000%	319,629.3420	0.0069%	672,684.0408	0.0033%
32181	-	0.0000%	211,326.1452	0.0033%	-	0.0000%	473,522.6604	0.0102%	684,848.8056	0.0033%
32189	-	0.0000%	219,665.2285	0.0034%	-	0.0000%	1,212,628.1344	0.0261%	1,432,293.3629	0.0070%
32195	-	0.0000%	1,116,533.5276	0.0173%	-	0.0000%	2,080,078.6737	0.0448%	3,196,612.2012	0.0156%
32205	-	0.0000%	-	0.0000%	-	0.0000%	2,065,557.4354	0.0445%	2,065,557.4354	0.0101%
32207	-	0.0000%	-	0.0000%	-	0.0000%	1,425,431.2454	0.0307%	1,425,431.2454	0.0069%
32208	-	0.0000%	-	0.0000%	-	0.0000%	751,088.7870	0.0162%	751,088.7870	0.0037%
32209	-	0.0000%	-	0.0000%	-	0.0000%	626,841.6872	0.0135%	626,841.6872	0.0031%
32210	-	0.0000%	-	0.0000%	-	0.0000%	3,994,387.2045	0.0860%	3,994,387.2045	0.0195%
32211	-	0.0000%	-	0.0000%	-	0.0000%	593,372.0202	0.0128%	593,372.0202	0.0029%
32216	-	0.0000%	-	0.0000%	-	0.0000%	880,865.9586	0.0190%	880,865.9586	0.0043%
32217	-	0.0000%	-	0.0000%	-	0.0000%	883,577.0362	0.0190%	883,577.0362	0.0043%
32218	-	0.0000%	-	0.0000%	-	0.0000%	1,545,065.9374	0.0333%	1,545,065.9374	0.0075%
32220	-	0.0000%	-	0.0000%	-	0.0000%	626,236.2629	0.0135%	626,236.2629	0.0030%
32221	-	0.0000%	-	0.0000%	-	0.0000%	1,347,642.2906	0.0290%	1,347,642.2906	0.0066%
32222	-	0.0000%	-	0.0000%	-	0.0000%	536,213.2172	0.0115%	536,213.2172	0.0026%
32223	-	0.0000%	-	0.0000%	-	0.0000%	1,826,537.5255	0.0393%	1,826,537.5255	0.0089%
32224	-	0.0000%	-	0.0000%	-	0.0000%	1,187,495.4246	0.0256%	1,187,495.4246	0.0058%
32225	-	0.0000%	-	0.0000%	-	0.0000%	1,635,334.5844	0.0352%	1,635,334.5844	0.0080%
32233	-	0.0000%	-	0.0000%	-	0.0000%	2,675,160.6854	0.0576%	2,675,160.6854	0.0130%
32244	-	0.0000%	-	0.0000%	-	0.0000%	3,818,253.3725	0.0822%	3,818,253.3725	0.0186%
32246	-	0.0000%	-	0.0000%	-	0.0000%	1,011,828.6622	0.0218%	1,011,828.6622	0.0049%
32250	91,317.4658	0.0013%	165,267.2566	0.0026%	-	0.0000%	3,447,829.2328	0.0742%	3,704,413.9553	0.0180%
32256	-	0.0000%	-	0.0000%	-	0.0000%	1,116,319.5920	0.0240%	1,116,319.5920	0.0054%
32257	-	0.0000%	-	0.0000%	-	0.0000%	1,663,028.2174	0.0358%	1,663,028.2174	0.0081%

	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
ZIP Code	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
32258	-	0.0000%	-	0.0000%	-	0.0000%	1,109,297.0516	0.0239%	1,109,297.0516	0.0054%
32259	-	0.0000%	-	0.0000%	-	0.0000%	2,662,132.2668	0.0573%	2,662,132.2668	0.0130%
32266	-	0.0000%	122,019.4796	0.0019%	-	0.0000%	1,334,479.7808	0.0287%	1,456,499.2604	0.0071%
32277	-	0.0000%	-	0.0000%	-	0.0000%	657,453.6737	0.0142%	657,453.6737	0.0032%
32301	-	0.0000%	2,704,202.4024	0.0419%	-	0.0000%	-	0.0000%	2,704,202.4024	0.0132%
32303	-	0.0000%	5,580,816.1525	0.0865%	-	0.0000%	-	0.0000%	5,580,816.1525	0.0272%
32304	-	0.0000%	1,690,690.8400	0.0262%	-	0.0000%	-	0.0000%	1,690,690.8400	0.0082%
32305	-	0.0000%	1,711,817.3145	0.0265%	-	0.0000%	-	0.0000%	1,711,817.3145	0.0083%
32308	-	0.0000%	4,290,795.6042	0.0665%	-	0.0000%	-	0.0000%	4,290,795.6042	0.0209%
32309	-	0.0000%	7,581,175.0894	0.1175%	-	0.0000%	131,366.0420	0.0028%	7,712,541.1314	0.0376%
32310	-	0.0000%	1,318,953.0750	0.0204%	-	0.0000%	-	0.0000%	1,318,953.0750	0.0064%
32311	-	0.0000%	2,735,078.7444	0.0424%	-	0.0000%	118,399.4775	0.0025%	2,853,478.2219	0.0139%
32312	-	0.0000%	8,216,401.4031	0.1273%	-	0.0000%	-	0.0000%	8,216,401.4031	0.0400%
32317	-	0.0000%	3,015,602.0728	0.0467%	-	0.0000%	122,831.1443	0.0026%	3,138,433.2170	0.0153%
32327	-	0.0000%	2,437,011.6503	0.0378%	-	0.0000%	-	0.0000%	2,437,011.6503	0.0119%
32331	-	0.0000%	1,001,206.3812	0.0155%	-	0.0000%	215,242.0120	0.0046%	1,216,448.3932	0.0059%
32333	-	0.0000%	1,639,369.3195	0.0254%	-	0.0000%	-	0.0000%	1,639,369.3195	0.0080%
32340	-	0.0000%	1,161,776.7734	0.0180%	-	0.0000%	724,030.0035	0.0156%	1,885,806.7769	0.0092%
32344	-	0.0000%	3,218,178.0448	0.0499%	-	0.0000%	499,500.2027	0.0108%	3,717,678.2476	0.0181%
32347	-	0.0000%	2,087,551.1966	0.0323%	-	0.0000%	302,531.6322	0.0065%	2,390,082.8288	0.0116%
32348	-	0.0000%	1,766,917.4754	0.0274%	-	0.0000%	270,201.7177	0.0058%	2,037,119.1931	0.0099%
32351	-	0.0000%	1,353,177.4008	0.0210%	-	0.0000%	-	0.0000%	1,353,177.4008	0.0066%
32352	-	0.0000%	531,030.2142	0.0082%	-	0.0000%	-	0.0000%	531,030.2142	0.0026%
32359	-	0.0000%	1,321,966.5879	0.0205%	-	0.0000%	261,708.3138	0.0056%	1,583,674.9018	0.0077%
32401	-	0.0000%	-	0.0000%	918,615.7549	0.0400%	-	0.0000%	918,615.7549	0.0045%
32405	-	0.0000%	-	0.0000%	652,335.5019	0.0284%	-	0.0000%	652,335.5019	0.0032%
32407	-	0.0000%	-	0.0000%	2,251,063.0217	0.0979%	-	0.0000%	2,251,063.0217	0.0110%
32408	-	0.0000%	-	0.0000%	4,550,873.0005	0.1980%	-	0.0000%	4,550,873.0005	0.0222%
32413	-	0.0000%	-	0.0000%	7,437,951.3311	0.3236%	-	0.0000%	7,437,951.3311	0.0362%

	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
ZIP Code	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
32433	-	0.0000%	-	0.0000%	798,988.9826	0.0348%	-	0.0000%	798,988.9826	0.0039%
32439	-	0.0000%	-	0.0000%	1,093,158.1105	0.0476%	-	0.0000%	1,093,158.1105	0.0053%
32446	-	0.0000%	626,497.6612	0.0097%	-	0.0000%	-	0.0000%	626,497.6612	0.0031%
32459	-	0.0000%	-	0.0000%	14,921,390.2034	0.6493%	-	0.0000%	14,921,390.2034	0.0727%
32501	-	0.0000%	-	0.0000%	56,612,212.7294	2.4633%	-	0.0000%	56,612,212.7294	0.2757%
32502	-	0.0000%	-	0.0000%	14,876,857.5416	0.6473%	-	0.0000%	14,876,857.5416	0.0725%
32503	-	0.0000%	-	0.0000%	154,098,862.8176	6.7052%	-	0.0000%	154,098,862.8176	0.7505%
32504	-	0.0000%	-	0.0000%	106,690,996.9446	4.6424%	-	0.0000%	106,690,996.9446	0.5196%
32505	-	0.0000%	-	0.0000%	75,049,642.1504	3.2656%	-	0.0000%	75,049,642.1504	0.3655%
32506	-	0.0000%	-	0.0000%	222,194,024.6279	9.6682%	-	0.0000%	222,194,024.6279	1.0822%
32507	-	0.0000%	-	0.0000%	543,195,105.2816	23.6357%	-	0.0000%	543,195,105.2816	2.6455%
32508	-	0.0000%	-	0.0000%	1,300,490.0278	0.0566%	-	0.0000%	1,300,490.0278	0.0063%
32514	-	0.0000%	-	0.0000%	107,237,867.2987	4.6662%	-	0.0000%	107,237,867.2987	0.5223%
32526	-	0.0000%	-	0.0000%	136,831,288.3006	5.9539%	-	0.0000%	136,831,288.3006	0.6664%
32531	-	0.0000%	-	0.0000%	1,352,060.3973	0.0588%	-	0.0000%	1,352,060.3973	0.0066%
32533	-	0.0000%	-	0.0000%	97,022,789.8603	4.2217%	-	0.0000%	97,022,789.8603	0.4725%
32534	-	0.0000%	-	0.0000%	35,550,484.2744	1.5469%	-	0.0000%	35,550,484.2744	0.1731%
32535	-	0.0000%	-	0.0000%	7,242,572.9934	0.3151%	-	0.0000%	7,242,572.9934	0.0353%
32536	-	0.0000%	-	0.0000%	3,321,098.7934	0.1445%	-	0.0000%	3,321,098.7934	0.0162%
32539	-	0.0000%	-	0.0000%	3,207,865.5124	0.1396%	-	0.0000%	3,207,865.5124	0.0156%
32541	-	0.0000%	-	0.0000%	28,223,080.2268	1.2281%	-	0.0000%	28,223,080.2268	0.1375%
32547	-	0.0000%	-	0.0000%	23,830,721.0168	1.0369%	-	0.0000%	23,830,721.0168	0.1161%
32548	-	0.0000%	-	0.0000%	26,342,156.2335	1.1462%	-	0.0000%	26,342,156.2335	0.1283%
32550	-	0.0000%	-	0.0000%	13,947,255.5825	0.6069%	-	0.0000%	13,947,255.5825	0.0679%
32561	-	0.0000%	-	0.0000%	163,993,581.9911	7.1358%	-	0.0000%	163,993,581.9911	0.7987%
32563	-	0.0000%	-	0.0000%	129,018,579.2567	5.6139%	-	0.0000%	129,018,579.2567	0.6284%
32564	-	0.0000%	-	0.0000%	697,091.2806	0.0303%	-	0.0000%	697,091.2806	0.0034%
32565	-	0.0000%	-	0.0000%	9,303,526.4671	0.4048%	-	0.0000%	9,303,526.4671	0.0453%
32566	-	0.0000%	-	0.0000%	98,777,932.1022	4.2981%	-	0.0000%	98,777,932.1022	0.4811%

ZIP Code	Hurricane Charley Personal and Commercial Residential Monetary Contribution ($)	Hurricane Charley Percent of Losses (%)	Hurricane Frances Personal and Commercial Residential Monetary Contribution ($)	Hurricane Frances Percent of Losses (%)	Hurricane Ivan Personal and Commercial Residential Monetary Contribution ($)	Hurricane Ivan Percent of Losses (%)	Hurricane Jeanne Personal and Commercial Residential Monetary Contribution ($)	Hurricane Jeanne Percent of Losses (%)	Total Personal and Commercial Residential Monetary Contribution ($)	Total Percent of Losses (%)
32568	-	0.0000%	-	0.0000%	5,961,044.9090	0.2594%	-	0.0000%	5,961,044.9090	0.0290%
32569	-	0.0000%	-	0.0000%	22,017,054.2370	0.9580%	-	0.0000%	22,017,054.2370	0.1072%
32570	-	0.0000%	-	0.0000%	31,361,104.7536	1.3646%	-	0.0000%	31,361,104.7536	0.1527%
32571	-	0.0000%	-	0.0000%	73,423,602.8389	3.1948%	-	0.0000%	73,423,602.8389	0.3576%
32577	-	0.0000%	-	0.0000%	15,328,904.9333	0.6670%	-	0.0000%	15,328,904.9333	0.0747%
32578	-	0.0000%	-	0.0000%	14,273,724.8676	0.6211%	-	0.0000%	14,273,724.8676	0.0695%
32579	-	0.0000%	-	0.0000%	11,029,449.1264	0.4799%	-	0.0000%	11,029,449.1264	0.0537%
32580	-	0.0000%	-	0.0000%	1,391,063.1672	0.0605%	-	0.0000%	1,391,063.1672	0.0068%
32583	-	0.0000%	-	0.0000%	29,637,866.3046	1.2896%	-	0.0000%	29,637,866.3046	0.1443%
32601	-	0.0000%	223,428.4190	0.0035%	-	0.0000%	2,652,593.8692	0.0571%	2,876,022.2882	0.0140%
32603	-	0.0000%	41,142.4642	0.0006%	-	0.0000%	551,152.6884	0.0119%	592,295.1526	0.0029%
32605	-	0.0000%	522,789.3723	0.0081%	-	0.0000%	7,492,077.3467	0.1613%	8,014,866.7190	0.0390%
32606	-	0.0000%	450,895.6984	0.0070%	-	0.0000%	5,725,126.6681	0.1233%	6,176,022.3665	0.0301%
32607	-	0.0000%	450,894.4831	0.0070%	-	0.0000%	5,262,568.3575	0.1133%	5,713,462.8406	0.0278%
32608	-	0.0000%	870,000.9048	0.0135%	-	0.0000%	8,105,914.1477	0.1746%	8,975,915.0525	0.0437%
32609	-	0.0000%	195,616.9169	0.0030%	-	0.0000%	2,893,974.0821	0.0623%	3,089,590.9990	0.0150%
32615	-	0.0000%	112,578.2705	0.0017%	-	0.0000%	3,797,109.2197	0.0818%	3,909,687.4902	0.0190%
32617	-	0.0000%	271,923.9335	0.0042%	-	0.0000%	1,310,999.7818	0.0282%	1,582,923.7153	0.0077%
32618	-	0.0000%	261,163.5785	0.0040%	-	0.0000%	1,565,477.9254	0.0337%	1,826,641.5039	0.0089%
32619	-	0.0000%	302,743.9259	0.0047%	-	0.0000%	524,621.6526	0.0113%	827,365.5784	0.0040%
32621	-	0.0000%	437,447.2984	0.0068%	-	0.0000%	687,672.5210	0.0148%	1,125,119.8194	0.0055%
32625	-	0.0000%	3,691,977.4616	0.0572%	-	0.0000%	596,660.8758	0.0128%	4,288,638.3374	0.0209%
32626	-	0.0000%	1,449,727.9416	0.0225%	-	0.0000%	960,187.0064	0.0207%	2,409,914.9480	0.0117%
32628	-	0.0000%	482,616.2068	0.0075%	-	0.0000%	120,475.3728	0.0026%	603,091.5797	0.0029%
32640	-	0.0000%	251,965.2416	0.0039%	-	0.0000%	2,468,269.4613	0.0532%	2,720,234.7028	0.0132%
32641	-	0.0000%	125,282.7942	0.0019%	-	0.0000%	1,637,540.0995	0.0353%	1,762,822.8938	0.0086%
32643	-	0.0000%	137,980.0089	0.0021%	-	0.0000%	2,538,912.4433	0.0547%	2,676,892.4522	0.0130%
32653	-	0.0000%	207,358.2422	0.0032%	-	0.0000%	4,616,151.1131	0.0994%	4,823,509.3553	0.0235%
32656	-	0.0000%	-	0.0000%	-	0.0000%	2,424,752.6584	0.0522%	2,424,752.6584	0.0118%

	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
ZIP Code	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
32666	-	0.0000%	46,675.1366	0.0007%	-	0.0000%	1,453,047.3474	0.0313%	1,499,722.4840	0.0073%
32667	-	0.0000%	277,897.9322	0.0043%	-	0.0000%	1,882,615.9827	0.0405%	2,160,513.9149	0.0105%
32668	-	0.0000%	966,294.2864	0.0150%	-	0.0000%	1,518,102.6364	0.0327%	2,484,396.9229	0.0121%
32669	-	0.0000%	366,802.4274	0.0057%	-	0.0000%	2,848,099.1509	0.0613%	3,214,901.5783	0.0157%
32680	-	0.0000%	1,587,498.4730	0.0246%	-	0.0000%	749,518.8335	0.0161%	2,337,017.3065	0.0114%
32686	-	0.0000%	482,350.7221	0.0075%	-	0.0000%	1,953,838.7822	0.0421%	2,436,189.5043	0.0119%
32693	-	0.0000%	1,147,549.1600	0.0178%	-	0.0000%	1,180,753.4744	0.0254%	2,328,302.6344	0.0113%
32696	-	0.0000%	775,702.3479	0.0120%	-	0.0000%	2,419,464.9317	0.0521%	3,195,167.2796	0.0156%
32701	9,561,949.3140	0.1340%	4,911,686.5459	0.0761%	-	0.0000%	3,892,378.6405	0.0838%	18,366,014.5005	0.0894%
32702	90,579.4964	0.0013%	498,450.9281	0.0077%	-	0.0000%	844,999.0774	0.0182%	1,434,029.5019	0.0070%
32703	14,186,547.5715	0.1988%	10,421,095.6155	0.1615%	-	0.0000%	9,314,770.7986	0.2006%	33,922,413.9856	0.1652%
32707	21,176,919.7730	0.2967%	8,996,001.3332	0.1394%	-	0.0000%	6,744,825.2573	0.1452%	36,917,746.3635	0.1798%
32708	34,696,800.5828	0.4861%	13,273,233.1234	0.2057%	-	0.0000%	9,790,139.3595	0.2108%	57,760,173.0657	0.2813%
32709	783,816.4989	0.0110%	778,663.2135	0.0121%	-	0.0000%	456,442.8650	0.0098%	2,018,922.5775	0.0098%
32712	13,315,594.9453	0.1866%	12,922,809.9895	0.2003%	-	0.0000%	14,110,568.1459	0.3039%	40,348,973.0807	0.1965%
32713	10,089,685.3286	0.1414%	4,945,082.5994	0.0766%	-	0.0000%	4,714,765.3816	0.1015%	19,749,533.3095	0.0962%
32714	13,968,041.4750	0.1957%	8,340,545.0295	0.1292%	-	0.0000%	6,793,002.6842	0.1463%	29,101,589.1887	0.1417%
32720	5,767,762.6287	0.0808%	2,824,064.9323	0.0438%	-	0.0000%	3,091,905.9412	0.0666%	11,683,733.5022	0.0569%
32724	7,864,976.8503	0.1102%	3,254,801.2934	0.0504%	-	0.0000%	3,529,633.3855	0.0760%	14,649,411.5292	0.0713%
32725	19,940,618.4335	0.2794%	5,906,423.9273	0.0915%	-	0.0000%	6,302,042.0967	0.1357%	32,149,084.4576	0.1566%
32726	1,225,414.4400	0.0172%	5,943,010.5068	0.0921%	-	0.0000%	8,272,303.6153	0.1781%	15,440,728.5621	0.0752%
32730	2,593,881.9352	0.0363%	1,181,778.6436	0.0183%	-	0.0000%	898,302.9043	0.0193%	4,673,963.4832	0.0228%
32732	6,977,339.9952	0.0978%	1,615,047.1114	0.0250%	-	0.0000%	1,133,177.4779	0.0244%	9,725,564.5845	0.0474%
32735	189,495.3532	0.0027%	1,945,133.9177	0.0301%	-	0.0000%	3,116,513.7432	0.0671%	5,251,143.0141	0.0256%
32736	1,415,211.5329	0.0198%	2,233,933.1334	0.0346%	-	0.0000%	3,026,226.5659	0.0652%	6,675,371.2322	0.0325%
32738	22,238,503.4043	0.3116%	4,509,165.6933	0.0699%	-	0.0000%	4,196,577.3199	0.0904%	30,944,246.4176	0.1507%
32744	1,342,347.6957	0.0188%	412,261.1349	0.0064%	-	0.0000%	420,711.4983	0.0091%	2,175,320.3290	0.0106%
32746	24,499,831.7187	0.3433%	13,272,768.0879	0.2057%	-	0.0000%	10,823,460.2182	0.2331%	48,596,060.0248	0.2367%
32750	14,061,930.6148	0.1970%	7,263,516.8128	0.1126%	-	0.0000%	5,782,491.3209	0.1245%	27,107,938.7486	0.1320%

ZIP Code	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
32751	19,887,604.7262	0.2786%	9,224,555.2849	0.1429%	-	0.0000%	6,994,910.8388	0.1506%	36,107,070.8499	0.1759%
32754	2,649,816.1107	0.0371%	3,726,201.4696	0.0577%	-	0.0000%	1,867,624.6765	0.0402%	8,243,642.2568	0.0401%
32757	2,428,063.3943	0.0340%	8,214,136.1636	0.1273%	-	0.0000%	10,245,676.5701	0.2206%	20,887,876.1280	0.1017%
32759	885,471.4640	0.0124%	1,314,943.2063	0.0204%	-	0.0000%	654,961.4745	0.0141%	2,855,376.1447	0.0139%
32763	6,717,745.2782	0.0941%	2,537,732.8867	0.0393%	-	0.0000%	2,691,869.9370	0.0580%	11,947,348.1019	0.0582%
32764	3,452,176.3545	0.0484%	654,618.6397	0.0101%	-	0.0000%	556,441.1244	0.0120%	4,663,236.1186	0.0227%
32765	54,628,485.9200	0.7654%	16,891,081.5747	0.2618%	-	0.0000%	11,324,387.8420	0.2439%	82,843,955.3367	0.4035%
32766	12,861,759.9190	0.1802%	4,248,936.3120	0.0658%	-	0.0000%	2,663,431.0488	0.0574%	19,774,127.2798	0.0963%
32767	249,113.5424	0.0035%	394,786.2683	0.0061%	-	0.0000%	542,293.4386	0.0117%	1,186,193.2493	0.0058%
32771	18,052,765.4752	0.2529%	8,848,472.2823	0.1371%	-	0.0000%	7,252,365.2609	0.1562%	34,153,603.0184	0.1663%
32773	10,724,148.1535	0.1503%	4,638,353.9267	0.0719%	-	0.0000%	3,596,118.1278	0.0774%	18,958,620.2080	0.0923%
32776	2,572,173.0005	0.0360%	2,307,838.7880	0.0358%	-	0.0000%	2,728,320.3684	0.0588%	7,608,332.1569	0.0371%
32778	1,973,328.4389	0.0276%	11,350,814.5938	0.1759%	-	0.0000%	15,278,217.3163	0.3290%	28,602,360.3490	0.1393%
32779	23,682,466.7855	0.3318%	15,790,847.3694	0.2447%	-	0.0000%	13,635,578.2525	0.2936%	53,108,892.4074	0.2587%
32780	5,476,507.1449	0.0767%	12,403,351.3379	0.1922%	-	0.0000%	5,737,659.4496	0.1236%	23,617,517.9324	0.1150%
32784	230,147.4472	0.0032%	2,339,858.7475	0.0363%	-	0.0000%	3,909,157.6345	0.0842%	6,479,163.8292	0.0316%
32789	42,968,956.0958	0.6020%	17,081,736.2109	0.2647%	-	0.0000%	12,684,983.4470	0.2732%	72,735,675.7536	0.3542%
32792	28,982,135.3563	0.4061%	10,917,350.9682	0.1692%	-	0.0000%	7,880,541.1012	0.1697%	47,780,027.4258	0.2327%
32796	3,565,080.1090	0.0499%	6,266,517.0231	0.0971%	-	0.0000%	3,141,529.0472	0.0676%	12,973,126.1793	0.0632%
32798	2,516,527.4724	0.0353%	3,684,061.1782	0.0571%	-	0.0000%	5,401,152.1970	0.1163%	11,601,740.8476	0.0565%
32801	9,728,808.0798	0.1363%	3,989,601.1116	0.0618%	-	0.0000%	2,888,320.1911	0.0622%	16,606,729.3825	0.0809%
32803	25,252,246.8910	0.3538%	8,735,602.4373	0.1354%	-	0.0000%	6,313,659.5219	0.1360%	40,301,508.8502	0.1963%
32804	24,747,674.8598	0.3467%	9,546,296.5480	0.1479%	-	0.0000%	7,179,031.4139	0.1546%	41,473,002.8217	0.2020%
32805	7,747,249.0952	0.1085%	3,631,124.1152	0.0563%	-	0.0000%	2,656,074.9133	0.0572%	14,034,448.1237	0.0684%
32806	30,257,609.1972	0.4239%	12,403,352.9943	0.1922%	-	0.0000%	8,717,136.8868	0.1877%	51,378,099.0782	0.2502%
32807	19,150,896.1552	0.2683%	5,931,206.0290	0.0919%	-	0.0000%	4,137,081.3347	0.0891%	29,219,183.5190	0.1423%
32808	17,301,591.0179	0.2424%	8,136,005.7700	0.1261%	-	0.0000%	6,467,999.9576	0.1393%	31,905,596.7455	0.1554%
32809	15,917,248.3997	0.2230%	7,580,968.3060	0.1175%	-	0.0000%	5,388,287.4429	0.1160%	28,886,504.1486	0.1407%
32810	13,760,839.6959	0.1928%	7,046,054.4205	0.1092%	-	0.0000%	5,629,437.0107	0.1212%	26,436,331.1270	0.1288%

	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
ZIP Code	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
32811	8,298,149.0599	0.1163%	4,475,683.0836	0.0694%	-	0.0000%	3,451,669.4051	0.0743%	16,225,501.5487	0.0790%
32812	31,602,704.6360	0.4428%	12,068,829.7457	0.1870%	-	0.0000%	8,373,989.6461	0.1803%	52,045,524.0278	0.2535%
32814	6,245,720.6945	0.0875%	2,257,719.0432	0.0350%	-	0.0000%	1,632,054.1979	0.0351%	10,135,493.9356	0.0494%
32816	1,465,937.1922	0.0205%	397,534.9837	0.0062%	-	0.0000%	257,853.1640	0.0056%	2,121,325.3399	0.0103%
32817	24,877,826.7745	0.3486%	7,909,753.1106	0.1226%	-	0.0000%	5,282,279.9587	0.1137%	38,069,859.8438	0.1854%
32818	21,259,395.8327	0.2979%	10,998,226.6365	0.1704%	-	0.0000%	9,255,087.6178	0.1993%	41,512,710.0871	0.2022%
32819	28,410,313.7516	0.3980%	18,366,367.7681	0.2846%	-	0.0000%	14,354,146.7346	0.3091%	61,130,828.2544	0.2977%
32820	3,287,526.4845	0.0461%	2,149,086.1235	0.0333%	-	0.0000%	1,344,520.1774	0.0290%	6,781,132.7854	0.0330%
32821	10,316,265.6755	0.1445%	7,028,181.5660	0.1089%	-	0.0000%	5,279,956.6583	0.1137%	22,624,403.8998	0.1102%
32822	39,765,527.3970	0.5571%	12,813,495.3299	0.1986%	-	0.0000%	8,838,243.6275	0.1903%	61,417,266.3544	0.2991%
32824	37,884,973.4195	0.5308%	18,608,641.7449	0.2884%	-	0.0000%	12,830,691.9229	0.2763%	69,324,307.0873	0.3376%
32825	36,322,553.4530	0.5089%	14,024,970.2422	0.2173%	-	0.0000%	9,396,677.2836	0.2023%	59,744,200.9788	0.2910%
32826	17,891,661.8898	0.2507%	6,358,996.7853	0.0985%	-	0.0000%	4,082,281.7160	0.0879%	28,332,940.3912	0.1380%
32827	13,513,808.6572	0.1893%	4,853,424.6218	0.0752%	-	0.0000%	3,337,318.6768	0.0719%	21,704,551.9559	0.1057%
32828	32,697,051.6722	0.4581%	15,735,840.1705	0.2438%	-	0.0000%	9,986,958.3890	0.2151%	58,419,850.2318	0.2845%
32829	14,599,742.4539	0.2046%	5,367,379.1282	0.0832%	-	0.0000%	3,634,803.0147	0.0783%	23,601,924.5968	0.1149%
32832	13,652,655.8088	0.1913%	7,047,260.2882	0.1092%	-	0.0000%	4,699,173.5806	0.1012%	25,399,089.6775	0.1237%
32833	3,346,394.1332	0.0469%	2,894,381.5472	0.0449%	-	0.0000%	1,773,005.8362	0.0382%	8,013,781.5166	0.0390%
32835	21,029,545.9430	0.2946%	12,976,793.7490	0.2011%	-	0.0000%	10,590,215.6376	0.2281%	44,596,555.3297	0.2172%
32836	21,212,097.3205	0.2972%	16,019,956.8106	0.2483%	-	0.0000%	12,443,312.8652	0.2680%	49,675,366.9963	0.2419%
32837	43,979,881.2925	0.6162%	25,620,510.4675	0.3970%	-	0.0000%	18,338,345.1945	0.3949%	87,938,736.9545	0.4283%
32839	12,995,015.9479	0.1821%	6,444,486.6049	0.0999%	-	0.0000%	4,695,213.9578	0.1011%	24,134,716.5106	0.1175%
32901	966,601.5060	0.0135%	26,777,550.9598	0.4150%	-	0.0000%	11,654,644.2308	0.2510%	39,398,796.6966	0.1919%
32903	1,333,877.8281	0.0187%	44,168,865.3427	0.6845%	-	0.0000%	18,135,012.5586	0.3905%	63,637,755.7294	0.3099%
32904	2,258,501.0086	0.0316%	28,840,981.6423	0.4469%	-	0.0000%	13,779,060.3008	0.2967%	44,878,542.9516	0.2186%
32905	1,098,940.4024	0.0154%	37,118,912.6889	0.5752%	-	0.0000%	16,230,399.2483	0.3495%	54,448,252.3396	0.2652%
32907	2,719,225.2402	0.0381%	35,234,531.1150	0.5460%	-	0.0000%	18,367,456.0213	0.3955%	56,321,212.3765	0.2743%
32908	582,852.4674	0.0082%	7,846,725.0221	0.1216%	-	0.0000%	4,488,666.8480	0.0967%	12,918,244.3375	0.0629%
32909	1,571,348.1978	0.0220%	26,461,155.5131	0.4101%	-	0.0000%	14,251,660.6605	0.3069%	42,284,164.3714	0.2059%

	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
ZIP Code	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
32920	1,849,614.5813	0.0259%	12,214,827.0085	0.1893%	-	0.0000%	5,379,130.0969	0.1158%	19,443,571.6867	0.0947%
32922	874,258.4997	0.0122%	3,678,293.3822	0.0570%	-	0.0000%	1,668,398.0356	0.0359%	6,220,949.9174	0.0303%
32926	3,315,707.2635	0.0465%	9,872,328.2080	0.1530%	-	0.0000%	4,675,175.7394	0.1007%	17,863,211.2110	0.0870%
32927	3,084,995.4405	0.0432%	7,984,423.6076	0.1237%	-	0.0000%	3,752,404.0959	0.0808%	14,821,823.1440	0.0722%
32931	3,510,858.3471	0.0492%	30,138,271.0564	0.4670%	-	0.0000%	12,737,052.7343	0.2743%	46,386,182.1378	0.2259%
32934	1,932,701.3870	0.0271%	17,820,327.9329	0.2762%	-	0.0000%	8,130,145.7941	0.1751%	27,883,175.1140	0.1358%
32935	2,290,749.3322	0.0321%	35,074,347.6542	0.5435%	-	0.0000%	14,773,620.7843	0.3181%	52,138,717.7707	0.2539%
32937	2,847,242.0233	0.0399%	64,160,325.8990	0.9943%	-	0.0000%	26,122,248.5965	0.5625%	93,129,816.5188	0.4536%
32940	4,016,107.0960	0.0563%	33,513,278.0845	0.5193%	-	0.0000%	14,564,467.0951	0.3136%	52,093,852.2756	0.2537%
32948	144,570.7176	0.0020%	4,045,826.8448	0.0627%	-	0.0000%	3,337,650.4353	0.0719%	7,528,047.9976	0.0367%
32949	118,176.8790	0.0017%	7,953,524.0176	0.1233%	-	0.0000%	3,547,167.4328	0.0764%	11,618,868.3294	0.0566%
32950	283,008.7685	0.0040%	12,363,873.6116	0.1916%	-	0.0000%	5,337,018.3797	0.1149%	17,983,900.7598	0.0876%
32951	1,042,944.5824	0.0146%	56,152,315.5263	0.8702%	-	0.0000%	23,493,918.9553	0.5059%	80,689,179.0640	0.3930%
32952	3,145,857.3271	0.0441%	22,197,092.7061	0.3440%	-	0.0000%	9,706,572.9968	0.2090%	35,049,523.0300	0.1707%
32953	3,026,001.4612	0.0424%	13,866,400.3337	0.2149%	-	0.0000%	6,349,999.1445	0.1367%	23,242,400.9394	0.1132%
32955	4,154,328.2139	0.0582%	26,075,244.4342	0.4041%	-	0.0000%	11,511,130.0871	0.2479%	41,740,702.7352	0.2033%
32958	1,092,013.3414	0.0153%	113,849,837.7325	1.7643%	-	0.0000%	59,485,951.8087	1.2810%	174,427,802.8826	0.8495%
32960	547,861.0713	0.0077%	73,739,622.5533	1.1427%	-	0.0000%	73,946,635.5005	1.5924%	148,234,119.1251	0.7219%
32962	611,068.9116	0.0086%	76,295,747.6928	1.1823%	-	0.0000%	80,303,318.2532	1.7293%	157,210,134.8576	0.7657%
32963	1,511,661.1550	0.0212%	294,489,783.6655	4.5635%	-	0.0000%	221,539,928.3417	4.7706%	517,541,373.1621	2.5206%
32966	956,186.9177	0.0134%	35,654,082.8716	0.5525%	-	0.0000%	37,558,761.1080	0.8088%	74,169,030.8973	0.3612%
32967	542,489.1367	0.0076%	43,313,487.3077	0.6712%	-	0.0000%	34,152,575.6268	0.7354%	78,008,552.0713	0.3799%
32968	495,282.4277	0.0069%	27,805,912.8305	0.4309%	-	0.0000%	30,732,055.9374	0.6618%	59,033,251.1956	0.2875%
32976	2,095,518.2410	0.0294%	122,340,672.3819	1.8958%	-	0.0000%	63,702,612.4263	1.3718%	188,138,803.0492	0.9163%
33040	4,953,134.7283	0.0694%	-	0.0000%	-	0.0000%	-	0.0000%	4,953,134.7283	0.0241%
33042	927,191.3599	0.0130%	-	0.0000%	-	0.0000%	-	0.0000%	927,191.3599	0.0045%
33050	592,011.9002	0.0083%	-	0.0000%	-	0.0000%	-	0.0000%	592,011.9002	0.0029%
33062	-	0.0000%	1,202,607.3765	0.0186%	-	0.0000%	-	0.0000%	1,202,607.3765	0.0059%
33063	-	0.0000%	807,515.1906	0.0125%	-	0.0000%	-	0.0000%	807,515.1906	0.0039%

ZIP Code	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
33064	-	0.0000%	2,235,979.7731	0.0346%	-	0.0000%	-	0.0000%	2,235,979.7731	0.0109%
33065	-	0.0000%	766,169.0288	0.0119%	-	0.0000%	-	0.0000%	766,169.0288	0.0037%
33066	-	0.0000%	510,705.1708	0.0079%	-	0.0000%	-	0.0000%	510,705.1708	0.0025%
33067	-	0.0000%	1,672,122.9903	0.0259%	-	0.0000%	-	0.0000%	1,672,122.9903	0.0081%
33073	-	0.0000%	1,185,266.4493	0.0184%	-	0.0000%	-	0.0000%	1,185,266.4493	0.0058%
33076	-	0.0000%	1,226,316.3891	0.0190%	-	0.0000%	-	0.0000%	1,226,316.3891	0.0060%
33308	-	0.0000%	604,551.2831	0.0094%	-	0.0000%	-	0.0000%	604,551.2831	0.0029%
33401	-	0.0000%	19,559,968.2537	0.3031%	-	0.0000%	3,977,150.8551	0.0856%	23,537,119.1088	0.1146%
33403	-	0.0000%	10,103,251.8639	0.1566%	-	0.0000%	3,295,221.3034	0.0710%	13,398,473.1673	0.0653%
33404	-	0.0000%	28,137,354.5996	0.4360%	-	0.0000%	8,167,407.3239	0.1759%	36,304,761.9236	0.1768%
33405	-	0.0000%	14,509,211.0402	0.2248%	-	0.0000%	2,388,078.0633	0.0514%	16,897,289.1035	0.0823%
33406	-	0.0000%	14,040,091.3598	0.2176%	-	0.0000%	2,251,040.8538	0.0485%	16,291,132.2136	0.0793%
33407	-	0.0000%	20,831,581.4721	0.3228%	-	0.0000%	5,038,216.1061	0.1085%	25,869,797.5782	0.1260%
33408	-	0.0000%	51,518,088.7741	0.7983%	-	0.0000%	18,277,220.4436	0.3936%	69,795,309.2177	0.3399%
33409	-	0.0000%	18,156,849.0135	0.2814%	-	0.0000%	3,851,610.3876	0.0829%	22,008,459.4011	0.1072%
33410	-	0.0000%	61,230,315.2624	0.9488%	-	0.0000%	25,488,344.1044	0.5489%	86,718,659.3667	0.4223%
33411	-	0.0000%	59,570,733.8015	0.9231%	-	0.0000%	12,943,206.0393	0.2787%	72,513,939.8407	0.3532%
33412	-	0.0000%	25,190,967.3636	0.3904%	-	0.0000%	8,280,831.8811	0.1783%	33,471,799.2447	0.1630%
33413	-	0.0000%	8,392,568.6218	0.1301%	-	0.0000%	1,461,092.1334	0.0315%	9,853,660.7553	0.0480%
33414	-	0.0000%	53,131,001.1894	0.8233%	-	0.0000%	9,138,299.3389	0.1968%	62,269,300.5283	0.3033%
33415	-	0.0000%	19,431,107.4209	0.3011%	-	0.0000%	3,150,926.4953	0.0679%	22,582,033.9162	0.1100%
33417	-	0.0000%	24,258,167.6510	0.3759%	-	0.0000%	5,042,431.8189	0.1086%	29,300,599.4699	0.1427%
33418	-	0.0000%	93,256,214.0457	1.4451%	-	0.0000%	39,716,637.2485	0.8553%	132,972,851.2941	0.6476%
33426	-	0.0000%	7,557,743.5666	0.1171%	-	0.0000%	573,081.1872	0.0123%	8,130,824.7539	0.0396%
33428	-	0.0000%	3,765,052.8280	0.0583%	-	0.0000%	-	0.0000%	3,765,052.8280	0.0183%
33430	139,654.1365	0.0020%	2,672,167.4404	0.0414%	-	0.0000%	681,313.5101	0.0147%	3,493,135.0870	0.0170%
33431	-	0.0000%	3,545,139.7018	0.0549%	-	0.0000%	-	0.0000%	3,545,139.7018	0.0173%
33432	-	0.0000%	3,920,927.5675	0.0608%	-	0.0000%	-	0.0000%	3,920,927.5675	0.0191%
33433	-	0.0000%	5,909,667.1808	0.0916%	-	0.0000%	-	0.0000%	5,909,667.1808	0.0288%

ZIP Code	Hurricane Charley: Personal and Commercial Residential Monetary Contribution ($)	Hurricane Charley: Percent of Losses (%)	Hurricane Frances: Personal and Commercial Residential Monetary Contribution ($)	Hurricane Frances: Percent of Losses (%)	Hurricane Ivan: Personal and Commercial Residential Monetary Contribution ($)	Hurricane Ivan: Percent of Losses (%)	Hurricane Jeanne: Personal and Commercial Residential Monetary Contribution ($)	Hurricane Jeanne: Percent of Losses (%)	Total: Personal and Commercial Residential Monetary Contribution ($)	Total: Percent of Losses (%)
33434	-	0.0000%	5,332,066.8047	0.0826%	-	0.0000%	102,789.7517	0.0022%	5,434,856.5563	0.0265%
33435	-	0.0000%	12,796,344.6650	0.1983%	-	0.0000%	884,890.5150	0.0191%	13,681,235.1800	0.0666%
33436	-	0.0000%	25,430,384.5665	0.3941%	-	0.0000%	2,215,853.5506	0.0477%	27,646,238.1171	0.1346%
33437	-	0.0000%	20,435,286.3466	0.3167%	-	0.0000%	1,577,638.6284	0.0340%	22,012,924.9750	0.1072%
33438	19,562.8879	0.0003%	1,351,101.2927	0.0209%	-	0.0000%	693,709.6603	0.0149%	2,064,373.8410	0.0101%
33440	870,661.7090	0.0122%	2,776,625.4457	0.0430%	-	0.0000%	1,083,590.8997	0.0233%	4,730,878.0544	0.0230%
33441	-	0.0000%	1,520,164.1905	0.0236%	-	0.0000%	-	0.0000%	1,520,164.1905	0.0074%
33442	-	0.0000%	2,086,978.2321	0.0323%	-	0.0000%	-	0.0000%	2,086,978.2321	0.0102%
33444	-	0.0000%	4,227,095.9139	0.0655%	-	0.0000%	231,404.4496	0.0050%	4,458,500.3635	0.0217%
33445	-	0.0000%	9,618,991.4814	0.1491%	-	0.0000%	525,380.2812	0.0113%	10,144,371.7626	0.0494%
33446	-	0.0000%	9,750,811.8776	0.1511%	-	0.0000%	433,022.2202	0.0093%	10,183,834.0978	0.0496%
33449	-	0.0000%	6,559,810.1806	0.1017%	-	0.0000%	915,998.8952	0.0197%	7,475,809.0758	0.0364%
33455	-	0.0000%	78,373,401.5346	1.2145%	-	0.0000%	46,719,108.2330	1.0061%	125,092,509.7675	0.6092%
33458	-	0.0000%	67,250,115.4656	1.0421%	-	0.0000%	41,641,464.0442	0.8967%	108,891,579.5098	0.5303%
33460	-	0.0000%	11,947,818.7439	0.1851%	-	0.0000%	1,564,631.2659	0.0337%	13,512,450.0098	0.0658%
33461	-	0.0000%	14,634,335.0731	0.2268%	-	0.0000%	2,021,731.7823	0.0435%	16,656,066.8553	0.0811%
33462	-	0.0000%	17,055,829.5473	0.2643%	-	0.0000%	1,916,225.9719	0.0413%	18,972,055.5192	0.0924%
33463	-	0.0000%	22,800,259.1787	0.3533%	-	0.0000%	2,886,071.2646	0.0621%	25,686,330.4433	0.1251%
33467	-	0.0000%	33,619,820.2448	0.5210%	-	0.0000%	4,210,566.4399	0.0907%	37,830,386.6847	0.1842%
33469	-	0.0000%	44,349,399.0813	0.6873%	-	0.0000%	21,969,923.8355	0.4731%	66,319,322.9167	0.3230%
33470	-	0.0000%	27,823,681.8178	0.4312%	-	0.0000%	7,794,007.2741	0.1678%	35,617,689.0919	0.1735%
33471	911,190.3072	0.0128%	1,900,975.3431	0.0295%	-	0.0000%	1,185,417.1839	0.0255%	3,997,582.8342	0.0195%
33472	-	0.0000%	8,661,919.7680	0.1342%	-	0.0000%	831,169.6588	0.0179%	9,493,089.4268	0.0462%
33473	-	0.0000%	1,903,161.1131	0.0295%	-	0.0000%	169,255.4172	0.0036%	2,072,416.5303	0.0101%
33476	75,071.1538	0.0011%	4,777,571.9435	0.0740%	-	0.0000%	1,876,577.8155	0.0404%	6,729,220.9128	0.0328%
33477	-	0.0000%	66,003,227.5514	1.0228%	-	0.0000%	27,855,344.5559	0.5998%	93,858,572.1073	0.4571%
33478	-	0.0000%	20,200,358.4527	0.3130%	-	0.0000%	13,696,251.6779	0.2949%	33,896,610.1306	0.1651%
33480	-	0.0000%	70,540,866.7343	1.0931%	-	0.0000%	11,328,106.2827	0.2439%	81,868,973.0170	0.3987%
33483	-	0.0000%	7,062,127.3106	0.1094%	-	0.0000%	389,139.3738	0.0084%	7,451,266.6844	0.0363%

ZIP Code	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
33484	-	0.0000%	8,738,103.3400	0.1354%	-	0.0000%	388,544.5268	0.0084%	9,126,647.8668	0.0444%
33486	-	0.0000%	3,261,470.7449	0.0505%	-	0.0000%	-	0.0000%	3,261,470.7449	0.0159%
33487	-	0.0000%	6,142,417.2572	0.0952%	-	0.0000%	115,724.0605	0.0025%	6,258,141.3177	0.0305%
33496	-	0.0000%	9,679,475.9418	0.1500%	-	0.0000%	233,342.3317	0.0050%	9,912,818.2735	0.0483%
33498	-	0.0000%	3,238,930.8887	0.0502%	-	0.0000%	80,827.5848	0.0017%	3,319,758.4735	0.0162%
33510	137,055.3805	0.0019%	6,418,430.0788	0.0995%	-	0.0000%	6,843,875.1004	0.1474%	13,399,360.5597	0.0653%
33511	287,635.8270	0.0040%	11,306,194.6003	0.1752%	-	0.0000%	13,554,931.4674	0.2919%	25,148,761.8946	0.1225%
33513	-	0.0000%	6,290,478.1059	0.0975%	-	0.0000%	4,939,784.9122	0.1064%	11,230,263.0181	0.0547%
33514	10,646.9893	0.0001%	710,777.7597	0.0110%	-	0.0000%	821,127.4483	0.0177%	1,542,552.1973	0.0075%
33523	-	0.0000%	8,123,096.7260	0.1259%	-	0.0000%	4,953,904.6826	0.1067%	13,077,001.4086	0.0637%
33525	-	0.0000%	11,023,728.4690	0.1708%	-	0.0000%	7,912,125.4821	0.1704%	18,935,853.9510	0.0922%
33527	176,965.8900	0.0025%	3,315,016.9309	0.0514%	-	0.0000%	3,724,930.7660	0.0802%	7,216,913.5870	0.0351%
33534	46,238.5261	0.0006%	2,538,445.2191	0.0393%	-	0.0000%	2,961,646.2814	0.0638%	5,546,330.0266	0.0270%
33538	-	0.0000%	2,171,691.8519	0.0337%	-	0.0000%	2,535,961.0810	0.0546%	4,707,652.9329	0.0229%
33540	133,466.2084	0.0019%	6,815,537.1312	0.1056%	-	0.0000%	6,145,356.6273	0.1323%	13,094,359.9668	0.0638%
33541	259,313.3439	0.0036%	15,727,706.8587	0.2437%	-	0.0000%	14,140,524.3446	0.3045%	30,127,544.5472	0.1467%
33542	262,722.0165	0.0037%	14,368,107.4475	0.2227%	-	0.0000%	13,217,519.7258	0.2846%	27,848,349.1898	0.1356%
33543	-	0.0000%	9,847,218.1253	0.1526%	-	0.0000%	7,958,084.8212	0.1714%	17,805,302.9465	0.0867%
33544	-	0.0000%	8,072,706.4490	0.1251%	-	0.0000%	5,717,416.2907	0.1231%	13,790,122.7397	0.0672%
33545	-	0.0000%	3,953,272.6454	0.0613%	-	0.0000%	2,760,241.6276	0.0594%	6,713,514.2730	0.0327%
33547	761,617.1590	0.0107%	5,787,241.1354	0.0897%	-	0.0000%	8,118,219.9097	0.1748%	14,667,078.2041	0.0714%
33548	-	0.0000%	2,809,547.3916	0.0435%	-	0.0000%	2,267,487.5729	0.0488%	5,077,034.9645	0.0247%
33549	-	0.0000%	5,792,147.4192	0.0898%	-	0.0000%	4,771,175.7573	0.1027%	10,563,323.1764	0.0514%
33556	-	0.0000%	10,983,069.9700	0.1702%	-	0.0000%	7,528,034.0077	0.1621%	18,511,103.9777	0.0902%
33558	-	0.0000%	7,385,068.8768	0.1144%	-	0.0000%	5,464,999.0008	0.1177%	12,850,067.8776	0.0626%
33559	-	0.0000%	3,571,362.1689	0.0553%	-	0.0000%	2,860,958.1173	0.0616%	6,432,320.2862	0.0313%
33563	369,365.2411	0.0052%	4,280,204.4293	0.0663%	-	0.0000%	5,229,518.5383	0.1126%	9,879,088.2087	0.0481%
33565	410,964.1703	0.0058%	7,150,864.5742	0.1108%	-	0.0000%	7,941,374.7536	0.1710%	15,503,203.4981	0.0755%
33566	511,032.6431	0.0072%	5,397,179.9008	0.0836%	-	0.0000%	6,804,668.9744	0.1465%	12,712,881.5183	0.0619%

ZIP Code	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
33567	287,902.7833	0.0040%	2,233,076.8700	0.0346%	-	0.0000%	3,019,022.9984	0.0650%	5,540,002.6517	0.0270%
33569	399,214.8549	0.0056%	8,208,684.2384	0.1272%	-	0.0000%	11,299,815.5521	0.2433%	19,907,714.6454	0.0970%
33570	595,970.8369	0.0083%	15,609,187.8634	0.2419%	-	0.0000%	8,867,082.6726	0.1909%	25,072,241.3729	0.1221%
33572	452,184.5703	0.0063%	13,410,187.3808	0.2078%	-	0.0000%	11,634,705.5857	0.2505%	25,497,077.5368	0.1242%
33573	639,410.1296	0.0090%	9,946,116.2627	0.1541%	-	0.0000%	6,940,648.0527	0.1495%	17,526,174.4451	0.0854%
33576	-	0.0000%	2,169,472.2865	0.0336%	-	0.0000%	1,322,586.2421	0.0285%	3,492,058.5286	0.0170%
33578	80,344.8261	0.0011%	7,428,695.0949	0.1151%	-	0.0000%	9,654,984.3988	0.2079%	17,164,024.3197	0.0836%
33579	273,889.0134	0.0038%	3,939,628.0199	0.0610%	-	0.0000%	4,655,357.8804	0.1002%	8,868,874.9138	0.0432%
33584	126,382.6309	0.0018%	5,755,185.5080	0.0892%	-	0.0000%	6,131,818.2280	0.1320%	12,013,386.3669	0.0585%
33585	-	0.0000%	649,673.2397	0.0101%	-	0.0000%	828,326.6917	0.0178%	1,477,999.9313	0.0072%
33592	-	0.0000%	2,778,149.9244	0.0431%	-	0.0000%	2,811,756.5943	0.0605%	5,589,906.5186	0.0272%
33594	623,655.4128	0.0087%	11,118,387.7371	0.1723%	-	0.0000%	13,622,663.1609	0.2934%	25,364,706.3109	0.1235%
33596	662,010.6338	0.0093%	8,789,194.4291	0.1362%	-	0.0000%	11,579,796.1471	0.2494%	21,031,001.2100	0.1024%
33597	-	0.0000%	4,468,685.9466	0.0692%	-	0.0000%	3,833,548.1972	0.0826%	8,302,234.1438	0.0404%
33598	219,553.6162	0.0031%	2,327,446.3450	0.0361%	-	0.0000%	1,660,682.4041	0.0358%	4,207,682.3653	0.0205%
33602	-	0.0000%	3,947,518.1860	0.0612%	-	0.0000%	3,417,974.0754	0.0736%	7,365,492.2614	0.0359%
33603	-	0.0000%	4,349,372.1196	0.0674%	-	0.0000%	3,102,782.9569	0.0668%	7,452,155.0765	0.0363%
33604	-	0.0000%	6,134,078.5520	0.0951%	-	0.0000%	4,785,078.9802	0.1030%	10,919,157.5323	0.0532%
33605	-	0.0000%	2,108,037.2794	0.0327%	-	0.0000%	1,640,856.4663	0.0353%	3,748,893.7457	0.0183%
33606	-	0.0000%	7,698,961.5875	0.1193%	-	0.0000%	7,873,461.3441	0.1695%	15,572,422.9316	0.0758%
33607	-	0.0000%	4,410,654.8260	0.0683%	-	0.0000%	3,485,430.0765	0.0751%	7,896,084.9025	0.0385%
33609	-	0.0000%	9,812,004.4491	0.1521%	-	0.0000%	8,986,059.6865	0.1935%	18,798,064.1355	0.0916%
33610	-	0.0000%	4,249,633.8601	0.0659%	-	0.0000%	3,639,066.2630	0.0784%	7,888,700.1232	0.0384%
33611	-	0.0000%	13,989,818.8111	0.2168%	-	0.0000%	12,388,082.1600	0.2668%	26,377,900.9711	0.1285%
33612	-	0.0000%	5,456,023.4235	0.0845%	-	0.0000%	4,584,858.4900	0.0987%	10,040,881.9134	0.0489%
33613	-	0.0000%	5,985,467.5182	0.0928%	-	0.0000%	5,061,235.5299	0.1090%	11,046,703.0481	0.0538%
33614	-	0.0000%	7,956,698.2777	0.1233%	-	0.0000%	4,489,901.1995	0.0967%	12,446,599.4772	0.0606%
33615	-	0.0000%	13,619,749.2243	0.2111%	-	0.0000%	6,533,967.7523	0.1407%	20,153,716.9766	0.0982%
33616	-	0.0000%	4,053,182.3437	0.0628%	-	0.0000%	2,956,642.5695	0.0637%	7,009,824.9132	0.0341%

ZIP Code	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
33617	-	0.0000%	7,293,703.7976	0.1130%	-	0.0000%	6,325,178.9685	0.1362%	13,618,882.7661	0.0663%
33618	-	0.0000%	9,138,301.7770	0.1416%	-	0.0000%	7,011,389.3066	0.1510%	16,149,691.0836	0.0787%
33619	-	0.0000%	4,932,531.8685	0.0764%	-	0.0000%	3,840,021.4748	0.0827%	8,772,553.3433	0.0427%
33624	-	0.0000%	12,162,255.7998	0.1885%	-	0.0000%	8,801,423.7128	0.1895%	20,963,679.5126	0.1021%
33625	-	0.0000%	6,859,343.5578	0.1063%	-	0.0000%	4,173,143.9409	0.0899%	11,032,487.4986	0.0537%
33626	-	0.0000%	10,080,263.3648	0.1562%	-	0.0000%	5,137,952.6140	0.1106%	15,218,215.9789	0.0741%
33629	-	0.0000%	18,116,581.6994	0.2807%	-	0.0000%	17,843,834.7425	0.3842%	35,960,416.4419	0.1751%
33634	-	0.0000%	6,412,085.5888	0.0994%	-	0.0000%	3,254,691.9587	0.0701%	9,666,777.5475	0.0471%
33635	-	0.0000%	5,044,663.1948	0.0782%	-	0.0000%	2,256,886.6453	0.0486%	7,301,549.8400	0.0356%
33637	-	0.0000%	2,222,099.6488	0.0344%	-	0.0000%	2,039,382.5171	0.0439%	4,261,482.1659	0.0208%
33647	-	0.0000%	18,062,106.8279	0.2799%	-	0.0000%	15,012,926.1304	0.3233%	33,075,032.9583	0.1611%
33701	-	0.0000%	3,102,445.4510	0.0481%	-	0.0000%	1,012,355.1151	0.0218%	4,114,800.5661	0.0200%
33702	-	0.0000%	11,711,613.8574	0.1815%	-	0.0000%	4,009,166.7797	0.0863%	15,720,780.6371	0.0766%
33703	-	0.0000%	10,763,695.1116	0.1668%	-	0.0000%	3,671,965.1152	0.0791%	14,435,660.2268	0.0703%
33704	-	0.0000%	6,979,621.0653	0.1082%	-	0.0000%	2,335,297.5476	0.0503%	9,314,918.6129	0.0454%
33705	-	0.0000%	5,870,625.7295	0.0910%	-	0.0000%	1,969,946.0758	0.0424%	7,840,571.8053	0.0382%
33706	-	0.0000%	17,469,355.1002	0.2707%	-	0.0000%	7,145,700.0725	0.1539%	24,615,055.1727	0.1199%
33707	-	0.0000%	13,700,652.7276	0.2123%	-	0.0000%	5,219,938.3604	0.1124%	18,920,591.0880	0.0921%
33708	-	0.0000%	14,660,045.7678	0.2272%	-	0.0000%	5,498,190.8057	0.1184%	20,158,236.5736	0.0982%
33709	-	0.0000%	7,471,532.3456	0.1158%	-	0.0000%	2,303,103.8328	0.0496%	9,774,636.1784	0.0476%
33710	-	0.0000%	12,831,914.7773	0.1988%	-	0.0000%	4,396,686.2746	0.0947%	17,228,601.0518	0.0839%
33711	-	0.0000%	5,140,232.3747	0.0797%	-	0.0000%	1,957,767.6463	0.0422%	7,098,000.0210	0.0346%
33712	-	0.0000%	4,698,853.3167	0.0728%	-	0.0000%	1,691,730.5273	0.0364%	6,390,583.8441	0.0311%
33713	-	0.0000%	7,044,013.0113	0.1092%	-	0.0000%	2,326,438.4519	0.0501%	9,370,451.4632	0.0456%
33714	-	0.0000%	3,165,067.1835	0.0490%	-	0.0000%	1,015,063.6208	0.0219%	4,180,130.8043	0.0204%
33715	-	0.0000%	11,097,262.8506	0.1720%	-	0.0000%	4,818,740.0347	0.1038%	15,916,002.8853	0.0775%
33716	-	0.0000%	2,145,670.0645	0.0333%	-	0.0000%	805,363.7409	0.0173%	2,951,033.8054	0.0144%
33755	-	0.0000%	11,263,629.3547	0.1745%	-	0.0000%	7,075,286.4228	0.1524%	18,338,915.7775	0.0893%
33756	-	0.0000%	18,771,779.5211	0.2909%	-	0.0000%	10,628,542.0528	0.2289%	29,400,321.5739	0.1432%

	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
ZIP Code	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
33759	-	0.0000%	4,146,787.1169	0.0643%	-	0.0000%	2,750,611.4112	0.0592%	6,897,398.5281	0.0336%
33760	-	0.0000%	2,695,170.2377	0.0418%	-	0.0000%	1,066,293.6771	0.0230%	3,761,463.9148	0.0183%
33761	-	0.0000%	8,759,217.8716	0.1357%	-	0.0000%	6,717,494.6058	0.1447%	15,476,712.4773	0.0754%
33762	-	0.0000%	3,364,003.0338	0.0521%	-	0.0000%	1,155,805.1713	0.0249%	4,519,808.2051	0.0220%
33763	-	0.0000%	5,302,132.5716	0.0822%	-	0.0000%	3,878,491.6881	0.0835%	9,180,624.2597	0.0447%
33764	-	0.0000%	9,475,379.0457	0.1468%	-	0.0000%	5,240,206.5008	0.1128%	14,715,585.5465	0.0717%
33765	-	0.0000%	3,502,644.0990	0.0543%	-	0.0000%	2,347,780.4996	0.0506%	5,850,424.5986	0.0285%
33767	-	0.0000%	14,430,915.2981	0.2236%	-	0.0000%	6,924,189.3186	0.1491%	21,355,104.6167	0.1040%
33770	-	0.0000%	18,631,391.9247	0.2887%	-	0.0000%	9,160,179.0034	0.1973%	27,791,570.9280	0.1354%
33771	-	0.0000%	12,356,426.1032	0.1915%	-	0.0000%	5,990,297.4998	0.1290%	18,346,723.6030	0.0894%
33772	-	0.0000%	17,099,722.8511	0.2650%	-	0.0000%	6,418,043.3072	0.1382%	23,517,766.1583	0.1145%
33773	-	0.0000%	6,881,890.8318	0.1066%	-	0.0000%	2,779,707.5721	0.0599%	9,661,598.4039	0.0471%
33774	-	0.0000%	21,461,579.8786	0.3326%	-	0.0000%	8,810,030.0912	0.1897%	30,271,609.9698	0.1474%
33776	-	0.0000%	16,387,324.3442	0.2539%	-	0.0000%	6,481,550.0425	0.1396%	22,868,874.3867	0.1114%
33777	-	0.0000%	7,779,766.4312	0.1206%	-	0.0000%	2,696,600.3973	0.0581%	10,476,366.8285	0.0510%
33778	-	0.0000%	11,561,848.4568	0.1792%	-	0.0000%	5,037,398.0689	0.1085%	16,599,246.5257	0.0808%
33781	-	0.0000%	5,153,702.1854	0.0799%	-	0.0000%	1,601,213.7283	0.0345%	6,754,915.9138	0.0329%
33782	-	0.0000%	5,902,178.2256	0.0915%	-	0.0000%	1,943,812.4665	0.0419%	7,845,990.6921	0.0382%
33785	-	0.0000%	12,118,626.9573	0.1878%	-	0.0000%	4,742,272.1540	0.1021%	16,860,899.1114	0.0821%
33786	-	0.0000%	4,956,697.6028	0.0768%	-	0.0000%	2,089,781.6657	0.0450%	7,046,479.2686	0.0343%
33801	4,472,015.6712	0.0627%	13,450,014.6306	0.2084%	-	0.0000%	16,945,507.8258	0.3649%	34,867,538.1276	0.1698%
33803	4,083,380.6888	0.0572%	14,292,057.9826	0.2215%	-	0.0000%	18,287,326.6730	0.3938%	36,662,765.3445	0.1786%
33805	1,324,710.7277	0.0186%	6,619,254.6512	0.1026%	-	0.0000%	8,487,777.2072	0.1828%	16,431,742.5861	0.0800%
33809	2,246,447.6357	0.0315%	14,619,175.8614	0.2265%	-	0.0000%	17,673,876.6842	0.3806%	34,539,500.1813	0.1682%
33810	2,731,718.9445	0.0383%	22,535,797.5325	0.3492%	-	0.0000%	27,522,934.6867	0.5927%	52,790,451.1638	0.2571%
33811	1,744,270.2367	0.0244%	7,514,966.9172	0.1165%	-	0.0000%	9,474,122.8935	0.2040%	18,733,360.0474	0.0912%
33812	2,972,657.9067	0.0416%	4,996,370.7944	0.0774%	-	0.0000%	6,827,514.3353	0.1470%	14,796,543.0365	0.0721%
33813	7,065,011.7239	0.0990%	17,387,994.9798	0.2695%	-	0.0000%	22,959,881.5112	0.4944%	47,412,888.2150	0.2309%
33815	656,360.8130	0.0092%	3,458,236.7758	0.0536%	-	0.0000%	4,483,267.3238	0.0965%	8,597,864.9126	0.0419%

	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
ZIP Code	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
33823	19,938,492.4033	0.2794%	17,088,479.4146	0.2648%	-	0.0000%	22,030,280.6613	0.4744%	59,057,252.4792	0.2876%
33825	23,350,253.2967	0.3272%	12,135,340.2341	0.1881%	-	0.0000%	14,701,527.0472	0.3166%	50,187,120.5780	0.2444%
33827	8,902,102.0831	0.1247%	2,008,599.5815	0.0311%	-	0.0000%	2,842,452.8883	0.0612%	13,753,154.5529	0.0670%
33830	23,591,151.8288	0.3305%	11,375,936.9104	0.1763%	-	0.0000%	16,414,272.5270	0.3535%	51,381,361.2661	0.2502%
33834	7,554,539.4886	0.1058%	1,238,611.5197	0.0192%	-	0.0000%	1,590,609.0223	0.0343%	10,383,760.0306	0.0506%
33837	25,277,067.0988	0.3541%	19,848,627.6041	0.3076%	-	0.0000%	24,376,100.1515	0.5249%	69,501,794.8545	0.3385%
33838	4,744,286.6081	0.0665%	1,999,173.7607	0.0310%	-	0.0000%	3,043,722.0300	0.0655%	9,787,182.3987	0.0477%
33839	2,710,786.9654	0.0380%	1,159,436.9190	0.0180%	-	0.0000%	1,635,539.8610	0.0352%	5,505,763.7454	0.0268%
33841	14,703,445.3275	0.2060%	2,979,402.1014	0.0462%	-	0.0000%	4,035,920.1938	0.0869%	21,718,767.6227	0.1058%
33843	17,197,516.8260	0.2409%	6,851,932.4441	0.1062%	-	0.0000%	8,998,717.6325	0.1938%	33,048,166.9026	0.1610%
33844	50,918,286.1027	0.7134%	31,467,447.6698	0.4876%	-	0.0000%	45,298,185.2683	0.9755%	127,683,919.0409	0.6219%
33849	18,708.1573	0.0003%	404,697.9539	0.0063%	-	0.0000%	427,355.3032	0.0092%	850,761.4144	0.0041%
33850	8,571,060.8208	0.1201%	6,131,421.6917	0.0950%	-	0.0000%	8,248,001.1597	0.1776%	22,950,483.6722	0.1118%
33852	9,064,078.1608	0.1270%	14,997,137.6032	0.2324%	-	0.0000%	16,557,497.9009	0.3565%	40,618,713.6649	0.1978%
33853	23,500,860.2056	0.3293%	6,098,900.1593	0.0945%	-	0.0000%	9,077,829.0868	0.1955%	38,677,589.4517	0.1884%
33857	693,580.5315	0.0097%	2,395,334.0893	0.0371%	-	0.0000%	2,341,329.8378	0.0504%	5,430,244.4586	0.0264%
33859	25,981,728.7452	0.3640%	8,116,914.2323	0.1258%	-	0.0000%	11,794,811.6476	0.2540%	45,893,454.6251	0.2235%
33860	2,298,613.7123	0.0322%	7,170,021.2231	0.1111%	-	0.0000%	9,470,670.5020	0.2039%	18,939,305.4373	0.0922%
33865	1,951,257.9869	0.0273%	251,354.8984	0.0039%	-	0.0000%	220,778.7376	0.0048%	2,423,391.6229	0.0118%
33868	2,478,316.1336	0.0347%	9,512,111.1520	0.1474%	-	0.0000%	11,703,852.2371	0.2520%	23,694,279.5227	0.1154%
33870	10,993,621.3453	0.1540%	10,543,909.3448	0.1634%	-	0.0000%	12,592,832.2794	0.2712%	34,130,362.9695	0.1662%
33872	16,864,995.5636	0.2363%	10,941,832.1788	0.1696%	-	0.0000%	12,960,884.7910	0.2791%	40,767,712.5333	0.1986%
33873	33,040,147.2975	0.4629%	3,477,378.6459	0.0539%	-	0.0000%	4,588,819.3919	0.0988%	41,106,345.3353	0.2002%
33875	7,569,983.7939	0.1061%	7,201,906.6829	0.1116%	-	0.0000%	7,860,776.1042	0.1693%	22,632,666.5809	0.1102%
33876	3,216,383.9602	0.0451%	4,727,446.9888	0.0733%	-	0.0000%	5,312,675.4888	0.1144%	13,256,506.4378	0.0646%
33880	35,418,865.7518	0.4962%	18,524,110.8568	0.2871%	-	0.0000%	24,449,491.5252	0.5265%	78,392,468.1339	0.3818%
33881	41,338,332.8585	0.5792%	24,443,605.9749	0.3788%	-	0.0000%	33,563,000.2780	0.7227%	99,344,939.1114	0.4838%
33884	64,243,078.5064	0.9001%	24,821,254.3281	0.3846%	-	0.0000%	36,655,150.2612	0.7893%	125,719,483.0958	0.6123%
33890	15,455,945.0515	0.2165%	1,745,556.7981	0.0270%	-	0.0000%	2,119,630.1619	0.0456%	19,321,132.0116	0.0941%

ZIP Code	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
33896	9,773,309.1351	0.1369%	6,993,966.0561	0.1084%	-	0.0000%	7,042,113.0422	0.1516%	23,809,388.2333	0.1160%
33897	11,405,825.4787	0.1598%	18,835,955.8708	0.2919%	-	0.0000%	18,152,225.0135	0.3909%	48,394,006.3629	0.2357%
33898	53,740,466.5013	0.7529%	15,409,442.1165	0.2388%	-	0.0000%	23,657,563.2566	0.5094%	92,807,471.8745	0.4520%
33901	12,385,606.4441	0.1735%	231,877.0408	0.0036%	-	0.0000%	-	0.0000%	12,617,483.4849	0.0615%
33903	61,552,086.7142	0.8624%	1,460,003.5528	0.0226%	-	0.0000%	-	0.0000%	63,012,090.2670	0.3069%
33904	86,463,819.0236	1.2114%	440,640.3229	0.0068%	-	0.0000%	-	0.0000%	86,904,459.3465	0.4233%
33905	13,778,511.4626	0.1930%	783,236.0017	0.0121%	-	0.0000%	-	0.0000%	14,561,747.4643	0.0709%
33907	13,111,170.8351	0.1837%	196,935.4495	0.0031%	-	0.0000%	-	0.0000%	13,308,106.2845	0.0648%
33908	119,033,182.6909	1.6677%	2,060,306.4347	0.0319%	-	0.0000%	-	0.0000%	121,093,489.1256	0.5898%
33909	30,888,367.2781	0.4328%	446,351.9846	0.0069%	-	0.0000%	-	0.0000%	31,334,719.2627	0.1526%
33912	19,322,773.4179	0.2707%	319,075.6110	0.0049%	-	0.0000%	-	0.0000%	19,641,849.0289	0.0957%
33913	8,333,458.7087	0.1168%	184,991.4462	0.0029%	-	0.0000%	-	0.0000%	8,518,450.1548	0.0415%
33914	170,418,028.5599	2.3877%	1,108,207.9495	0.0172%	-	0.0000%	-	0.0000%	171,526,236.5094	0.8354%
33916	4,530,012.2596	0.0635%	135,967.8871	0.0021%	-	0.0000%	-	0.0000%	4,665,980.1467	0.0227%
33917	45,334,202.7827	0.6352%	1,452,483.6225	0.0225%	-	0.0000%	-	0.0000%	46,786,686.4052	0.2279%
33919	43,319,760.4898	0.6069%	443,197.2832	0.0069%	-	0.0000%	-	0.0000%	43,762,957.7730	0.2131%
33920	2,407,368.0821	0.0337%	310,802.2498	0.0048%	-	0.0000%	70,942.5136	0.0015%	2,789,112.8455	0.0136%
33921	323,233,722.7081	4.5287%	2,841,849.5697	0.0440%	-	0.0000%	1,182,954.6429	0.0255%	327,258,526.9207	1.5938%
33922	193,776,684.4928	2.7149%	568,185.9334	0.0088%	-	0.0000%	155,300.7319	0.0033%	194,500,171.1581	0.9473%
33924	186,810,098.3478	2.6173%	760,473.4854	0.0118%	-	0.0000%	272,782.9105	0.0059%	187,843,354.7437	0.9149%
33928	17,064,159.2340	0.2391%	644,275.4259	0.0100%	-	0.0000%	-	0.0000%	17,708,434.6599	0.0862%
33931	74,248,338.5590	1.0403%	945,227.2934	0.0146%	-	0.0000%	75,380.1071	0.0016%	75,268,945.9595	0.3666%
33935	3,332,152.0698	0.0467%	1,167,744.8392	0.0181%	-	0.0000%	544,281.2402	0.0117%	5,044,178.1492	0.0246%
33936	5,252,036.0825	0.0736%	443,639.0689	0.0069%	-	0.0000%	-	0.0000%	5,695,675.1514	0.0277%
33946	12,133,337.8464	0.1700%	1,482,721.0453	0.0230%	-	0.0000%	631,429.6706	0.0136%	14,247,488.5623	0.0694%
33947	12,985,509.4796	0.1819%	1,516,233.4283	0.0235%	-	0.0000%	612,408.9578	0.0132%	15,114,151.8657	0.0736%
33948	100,198,358.7776	1.4038%	1,291,421.2385	0.0200%	-	0.0000%	326,006.1723	0.0070%	101,815,786.1883	0.4959%
33950	641,201,426.2187	8.9836%	5,448,625.0870	0.0844%	-	0.0000%	2,339,048.3452	0.0504%	648,989,099.6509	3.1608%
33952	208,010,713.9292	2.9144%	2,313,292.7035	0.0358%	-	0.0000%	627,669.7859	0.0135%	210,951,676.4186	1.0274%

ZIP Code	Hurricane Charley Personal and Commercial Residential Monetary Contribution ($)	Hurricane Charley Percent of Losses (%)	Hurricane Frances Personal and Commercial Residential Monetary Contribution ($)	Hurricane Frances Percent of Losses (%)	Hurricane Ivan Personal and Commercial Residential Monetary Contribution ($)	Hurricane Ivan Percent of Losses (%)	Hurricane Jeanne Personal and Commercial Residential Monetary Contribution ($)	Hurricane Jeanne Percent of Losses (%)	Total Personal and Commercial Residential Monetary Contribution ($)	Total Percent of Losses (%)
33953	23,851,862.1671	0.3342%	520,134.4826	0.0081%	-	0.0000%	94,549.3373	0.0020%	24,466,545.9871	0.1192%
33954	57,586,842.7188	0.8068%	788,215.5501	0.0122%	-	0.0000%	215,162.6303	0.0046%	58,590,220.8992	0.2854%
33955	171,289,312.8274	2.3999%	2,327,506.3421	0.0361%	-	0.0000%	994,691.0614	0.0214%	174,611,510.2309	0.8504%
33956	108,679,637.0313	1.5227%	698,358.0436	0.0108%	-	0.0000%	171,100.9364	0.0037%	109,549,096.0113	0.5335%
33957	495,553,387.8702	6.9430%	1,589,012.8696	0.0246%	-	0.0000%	212,310.9333	0.0046%	497,354,711.6732	2.4223%
33960	248,360.0907	0.0035%	369,352.7297	0.0057%	-	0.0000%	355,187.7348	0.0076%	972,900.5551	0.0047%
33966	5,389,837.6897	0.0755%	160,318.5626	0.0025%	-	0.0000%	-	0.0000%	5,550,156.2523	0.0270%
33967	11,838,757.1446	0.1659%	58,885.2743	0.0009%	-	0.0000%	-	0.0000%	11,897,642.4189	0.0579%
33971	5,024,577.8781	0.0704%	328,173.0301	0.0051%	-	0.0000%	-	0.0000%	5,352,750.9082	0.0261%
33972	2,537,772.9387	0.0356%	269,316.3651	0.0042%	-	0.0000%	26,402.7151	0.0006%	2,833,492.0190	0.0138%
33973	1,226,288.1021	0.0172%	56,939.1539	0.0009%	-	0.0000%	-	0.0000%	1,283,227.2559	0.0062%
33974	1,718,928.0674	0.0241%	134,967.5132	0.0021%	-	0.0000%	-	0.0000%	1,853,895.5806	0.0090%
33976	1,796,081.5420	0.0252%	98,968.8506	0.0015%	-	0.0000%	-	0.0000%	1,895,050.3926	0.0092%
33980	111,828,777.5336	1.5668%	1,477,848.9488	0.0229%	-	0.0000%	446,538.5165	0.0096%	113,753,164.9989	0.5540%
33981	36,152,223.5801	0.5065%	659,444.2782	0.0102%	-	0.0000%	82,005.7193	0.0018%	36,893,673.5776	0.1797%
33982	137,940,177.6096	1.9326%	1,157,499.3739	0.0179%	-	0.0000%	434,694.0019	0.0094%	139,532,370.9854	0.6796%
33983	160,077,221.9730	2.2428%	1,529,556.9456	0.0237%	-	0.0000%	604,342.3511	0.0130%	162,211,121.2698	0.7900%
33990	56,046,197.6248	0.7852%	593,572.6626	0.0092%	-	0.0000%	-	0.0000%	56,639,770.2874	0.2759%
33991	57,472,957.2132	0.8052%	531,662.3625	0.0082%	-	0.0000%	-	0.0000%	58,004,619.5757	0.2825%
33993	89,913,705.8725	1.2597%	922,464.3562	0.0143%	-	0.0000%	202,875.2772	0.0044%	91,039,045.5060	0.4434%
34102	27,388,561.0368	0.3837%	1,549,047.3016	0.0240%	-	0.0000%	222,666.8549	0.0048%	29,160,275.1932	0.1420%
34103	25,938,080.5487	0.3634%	1,551,766.8655	0.0240%	-	0.0000%	237,958.6876	0.0051%	27,727,806.1018	0.1350%
34104	8,234,078.5088	0.1154%	-	0.0000%	-	0.0000%	-	0.0000%	8,234,078.5088	0.0401%
34105	13,261,460.2498	0.1858%	883,735.6937	0.0137%	-	0.0000%	-	0.0000%	14,145,195.9435	0.0689%
34108	40,672,858.7164	0.5699%	2,776,837.9700	0.0430%	-	0.0000%	445,355.2233	0.0096%	43,895,051.9097	0.2138%
34109	13,923,201.4713	0.1951%	973,958.7395	0.0151%	-	0.0000%	-	0.0000%	14,897,160.2108	0.0726%
34110	26,187,266.2518	0.3669%	2,014,699.8104	0.0312%	-	0.0000%	333,812.7290	0.0072%	28,535,778.7912	0.1390%
34112	15,621,908.1948	0.2189%	659,821.5702	0.0102%	-	0.0000%	-	0.0000%	16,281,729.7650	0.0793%
34113	7,618,502.1149	0.1067%	-	0.0000%	-	0.0000%	-	0.0000%	7,618,502.1149	0.0371%

	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
ZIP Code	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
34114	4,820,770.8036	0.0675%	-	0.0000%	-	0.0000%	-	0.0000%	4,820,770.8036	0.0235%
34116	3,425,168.6926	0.0480%	-	0.0000%	-	0.0000%	-	0.0000%	3,425,168.6926	0.0167%
34117	1,711,359.3750	0.0240%	-	0.0000%	-	0.0000%	-	0.0000%	1,711,359.3750	0.0083%
34119	9,567,466.1473	0.1340%	-	0.0000%	-	0.0000%	-	0.0000%	9,567,466.1473	0.0466%
34120	3,959,304.1291	0.0555%	-	0.0000%	-	0.0000%	-	0.0000%	3,959,304.1291	0.0193%
34134	47,406,507.0294	0.6642%	3,055,240.5159	0.0473%	-	0.0000%	669,106.7988	0.0144%	51,130,854.3440	0.2490%
34135	25,621,373.1405	0.3590%	1,647,027.4937	0.0255%	-	0.0000%	-	0.0000%	27,268,400.6342	0.1328%
34142	554,776.9491	0.0078%	28,582.4588	0.0004%	-	0.0000%	-	0.0000%	583,359.4078	0.0028%
34145	24,792,768.2448	0.3474%	574,602.9063	0.0089%	-	0.0000%	-	0.0000%	25,367,371.1511	0.1235%
34201	237,672.3257	0.0033%	1,114,349.9217	0.0173%	-	0.0000%	418,786.7602	0.0090%	1,770,809.0076	0.0086%
34202	1,246,824.0596	0.0175%	4,609,668.5601	0.0714%	-	0.0000%	1,770,802.5926	0.0381%	7,627,295.2122	0.0371%
34203	531,032.7207	0.0074%	6,609,626.2719	0.1024%	-	0.0000%	2,497,890.5093	0.0538%	9,638,549.5019	0.0469%
34205	357,008.2610	0.0050%	7,227,851.5853	0.1120%	-	0.0000%	2,841,324.7018	0.0612%	10,426,184.5481	0.0508%
34207	362,944.8467	0.0051%	6,946,297.0584	0.1076%	-	0.0000%	2,828,987.5607	0.0609%	10,138,229.4658	0.0494%
34208	323,210.9679	0.0045%	4,890,513.6807	0.0758%	-	0.0000%	1,848,661.6525	0.0398%	7,062,386.3012	0.0344%
34209	967,139.3274	0.0136%	21,746,661.9145	0.3370%	-	0.0000%	9,001,909.8373	0.1938%	31,715,711.0792	0.1545%
34210	335,346.6208	0.0047%	7,130,459.4926	0.1105%	-	0.0000%	2,983,714.8478	0.0643%	10,449,520.9612	0.0509%
34211	196,883.3943	0.0028%	862,494.7982	0.0134%	-	0.0000%	344,880.0445	0.0074%	1,404,258.2371	0.0068%
34212	514,732.6902	0.0072%	3,538,599.6255	0.0548%	-	0.0000%	1,423,362.7850	0.0307%	5,476,695.1007	0.0267%
34215	34,196.8965	0.0005%	827,789.8613	0.0128%	-	0.0000%	349,955.6409	0.0075%	1,211,942.3987	0.0059%
34217	444,298.3042	0.0062%	11,940,396.2241	0.1850%	-	0.0000%	4,986,809.5572	0.1074%	17,371,504.0854	0.0846%
34219	494,671.9854	0.0069%	5,451,318.0339	0.0845%	-	0.0000%	2,257,620.1359	0.0486%	8,203,610.1552	0.0400%
34221	872,284.8053	0.0122%	23,262,835.3598	0.3605%	-	0.0000%	10,450,099.1336	0.2250%	34,585,219.2987	0.1684%
34222	328,096.9806	0.0046%	6,235,274.1199	0.0966%	-	0.0000%	2,702,689.7118	0.0582%	9,266,060.8122	0.0451%
34223	10,135,747.1827	0.1420%	6,648,583.5666	0.1030%	-	0.0000%	3,038,375.8036	0.0654%	19,822,706.5529	0.0965%
34224	18,502,766.2720	0.2592%	3,850,702.8934	0.0597%	-	0.0000%	1,674,277.5752	0.0361%	24,027,746.7406	0.1170%
34228	506,661.5087	0.0071%	12,873,024.3625	0.1995%	-	0.0000%	5,761,887.6217	0.1241%	19,141,573.4929	0.0932%
34229	983,860.3734	0.0138%	4,813,230.4553	0.0746%	-	0.0000%	2,263,525.0135	0.0487%	8,060,615.8421	0.0393%
34231	1,450,264.8548	0.0203%	13,234,174.3540	0.2051%	-	0.0000%	5,973,538.9377	0.1286%	20,657,978.1465	0.1006%

	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
ZIP Code	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
34232	1,091,074.4604	0.0153%	5,373,829.7886	0.0833%	-	0.0000%	2,228,482.7657	0.0480%	8,693,387.0146	0.0423%
34233	867,023.9652	0.0121%	3,717,019.1335	0.0576%	-	0.0000%	1,529,110.5865	0.0329%	6,113,153.6852	0.0298%
34234	288,055.2814	0.0040%	4,283,870.3814	0.0664%	-	0.0000%	1,944,622.7200	0.0419%	6,516,548.3827	0.0317%
34235	509,613.0124	0.0071%	3,071,422.2641	0.0476%	-	0.0000%	1,320,354.4611	0.0284%	4,901,389.7376	0.0239%
34236	439,539.3024	0.0062%	6,172,691.2883	0.0957%	-	0.0000%	2,825,262.1102	0.0608%	9,437,492.7010	0.0460%
34237	282,757.4669	0.0040%	2,809,363.2721	0.0435%	-	0.0000%	1,247,661.0980	0.0269%	4,339,781.8370	0.0211%
34238	1,427,452.3673	0.0200%	6,789,971.5224	0.1052%	-	0.0000%	2,907,985.3265	0.0626%	11,125,409.2162	0.0542%
34239	540,647.7750	0.0076%	5,724,713.8453	0.0887%	-	0.0000%	2,590,544.1502	0.0558%	8,855,905.7706	0.0431%
34240	1,261,581.6705	0.0177%	2,324,666.5772	0.0360%	-	0.0000%	861,204.1219	0.0185%	4,447,452.3696	0.0217%
34241	1,497,076.6117	0.0210%	2,492,646.8615	0.0386%	-	0.0000%	869,361.7753	0.0187%	4,859,085.2485	0.0237%
34242	1,077,040.1878	0.0151%	11,607,386.3198	0.1799%	-	0.0000%	5,253,980.4396	0.1131%	17,938,406.9472	0.0874%
34243	630,185.8300	0.0088%	6,264,840.2650	0.0971%	-	0.0000%	2,668,027.4842	0.0575%	9,563,053.5792	0.0466%
34251	1,408,638.6939	0.0197%	1,662,750.2561	0.0258%	-	0.0000%	837,649.5277	0.0180%	3,909,038.4777	0.0190%
34266	176,674,111.7241	2.4753%	6,459,475.7998	0.1001%	-	0.0000%	4,691,363.3455	0.1010%	187,824,950.8695	0.9148%
34269	48,990,942.9247	0.6864%	692,416.3168	0.0107%	-	0.0000%	351,367.2012	0.0076%	50,034,726.4426	0.2437%
34275	3,000,309.9538	0.0420%	8,627,615.1559	0.1337%	-	0.0000%	3,929,538.6148	0.0846%	15,557,463.7246	0.0758%
34285	3,921,135.4365	0.0549%	9,114,275.0152	0.1412%	-	0.0000%	4,057,486.7217	0.0874%	17,092,897.1734	0.0832%
34286	43,537,098.7079	0.6100%	1,019,481.6445	0.0158%	-	0.0000%	261,666.0997	0.0056%	44,818,246.4521	0.2183%
34287	39,838,558.0570	0.5582%	2,731,004.2290	0.0423%	-	0.0000%	643,370.6482	0.0139%	43,212,932.9342	0.2105%
34288	30,575,513.3686	0.4284%	623,139.2953	0.0097%	-	0.0000%	218,430.7966	0.0047%	31,417,083.4605	0.1530%
34289	4,248,713.2919	0.0595%	112,606.5359	0.0017%	-	0.0000%	40,576.9219	0.0009%	4,401,896.7497	0.0214%
34291	3,075,562.5603	0.0431%	265,952.7926	0.0041%	-	0.0000%	64,856.5656	0.0014%	3,406,371.9185	0.0166%
34292	2,969,217.8251	0.0416%	2,844,394.2645	0.0441%	-	0.0000%	1,097,916.7434	0.0236%	6,911,528.8331	0.0337%
34293	7,044,360.2398	0.0987%	8,628,299.7627	0.1337%	-	0.0000%	3,879,553.1918	0.0835%	19,552,213.1943	0.0952%
34420	-	0.0000%	3,177,668.9286	0.0492%	-	0.0000%	7,093,600.4407	0.1528%	10,271,269.3693	0.0500%
34428	-	0.0000%	3,285,540.4654	0.0509%	-	0.0000%	2,128,454.6360	0.0458%	5,413,995.1014	0.0264%
34429	-	0.0000%	4,283,805.9173	0.0664%	-	0.0000%	2,446,260.7441	0.0527%	6,730,066.6615	0.0328%
34431	-	0.0000%	1,957,566.1667	0.0303%	-	0.0000%	1,966,955.9793	0.0424%	3,924,522.1460	0.0191%
34432	-	0.0000%	3,225,674.9373	0.0500%	-	0.0000%	4,153,500.0535	0.0894%	7,379,174.9909	0.0359%

ZIP Code	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
34433	-	0.0000%	2,078,906.1927	0.0322%	-	0.0000%	1,506,013.9921	0.0324%	3,584,920.1847	0.0175%
34434	-	0.0000%	1,886,646.5762	0.0292%	-	0.0000%	1,554,204.7187	0.0335%	3,440,851.2950	0.0168%
34436	-	0.0000%	4,351,960.3423	0.0674%	-	0.0000%	2,805,331.0618	0.0604%	7,157,291.4041	0.0349%
34442	-	0.0000%	6,296,307.2883	0.0976%	-	0.0000%	4,689,622.4378	0.1010%	10,985,929.7261	0.0535%
34446	-	0.0000%	9,922,874.1775	0.1538%	-	0.0000%	4,195,469.2455	0.0903%	14,118,343.4231	0.0688%
34448	-	0.0000%	6,126,502.9236	0.0949%	-	0.0000%	3,104,124.8036	0.0668%	9,230,627.7272	0.0450%
34449	-	0.0000%	919,746.4190	0.0143%	-	0.0000%	570,464.6084	0.0123%	1,490,211.0274	0.0073%
34450	-	0.0000%	4,843,013.9616	0.0750%	-	0.0000%	3,719,174.3449	0.0801%	8,562,188.3064	0.0417%
34452	-	0.0000%	4,784,552.3574	0.0741%	-	0.0000%	2,827,195.2442	0.0609%	7,611,747.6016	0.0371%
34453	-	0.0000%	3,485,405.6113	0.0540%	-	0.0000%	2,511,287.4730	0.0541%	5,996,693.0843	0.0292%
34461	-	0.0000%	4,311,490.0612	0.0668%	-	0.0000%	2,736,437.1103	0.0589%	7,047,927.1715	0.0343%
34465	-	0.0000%	5,349,017.2327	0.0829%	-	0.0000%	3,622,411.4378	0.0780%	8,971,428.6704	0.0437%
34470	-	0.0000%	1,517,034.0762	0.0235%	-	0.0000%	5,324,484.0470	0.1147%	6,841,518.1233	0.0333%
34471	-	0.0000%	3,384,820.8829	0.0525%	-	0.0000%	9,802,156.9241	0.2111%	13,186,977.8070	0.0642%
34472	-	0.0000%	2,948,451.7573	0.0457%	-	0.0000%	8,733,757.1962	0.1881%	11,682,208.9535	0.0569%
34473	-	0.0000%	2,922,740.3670	0.0453%	-	0.0000%	4,747,664.6162	0.1022%	7,670,404.9832	0.0374%
34474	-	0.0000%	1,894,152.5870	0.0294%	-	0.0000%	4,649,217.2573	0.1001%	6,543,369.8443	0.0319%
34475	-	0.0000%	589,019.2109	0.0091%	-	0.0000%	1,756,076.4053	0.0378%	2,345,095.6162	0.0114%
34476	-	0.0000%	4,592,339.9278	0.0712%	-	0.0000%	8,190,335.2513	0.1764%	12,782,675.1791	0.0623%
34479	-	0.0000%	932,214.2933	0.0144%	-	0.0000%	3,499,935.2666	0.0754%	4,432,149.5599	0.0216%
34480	-	0.0000%	2,722,047.1064	0.0422%	-	0.0000%	7,424,942.1901	0.1599%	10,146,989.2965	0.0494%
34481	-	0.0000%	3,396,481.0240	0.0526%	-	0.0000%	5,491,218.8475	0.1182%	8,887,699.8715	0.0433%
34482	-	0.0000%	2,297,422.6130	0.0356%	-	0.0000%	6,697,498.5954	0.1442%	8,994,921.2084	0.0438%
34484	-	0.0000%	1,015,421.2531	0.0157%	-	0.0000%	1,811,418.3124	0.0390%	2,826,839.5654	0.0138%
34488	-	0.0000%	1,077,666.7949	0.0167%	-	0.0000%	3,071,093.7053	0.0661%	4,148,760.5001	0.0202%
34491	-	0.0000%	8,248,154.4053	0.1278%	-	0.0000%	16,229,108.7095	0.3495%	24,477,263.1147	0.1192%
34498	-	0.0000%	351,922.2926	0.0055%	-	0.0000%	333,831.2894	0.0072%	685,753.5821	0.0033%
34601	-	0.0000%	11,593,859.6726	0.1797%	-	0.0000%	5,737,001.1496	0.1235%	17,330,860.8222	0.0844%
34602	-	0.0000%	4,634,756.7969	0.0718%	-	0.0000%	2,226,218.4869	0.0479%	6,860,975.2838	0.0334%

	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
ZIP Code	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
34604	-	0.0000%	3,873,628.6505	0.0600%	-	0.0000%	1,976,464.0169	0.0426%	5,850,092.6674	0.0285%
34606	-	0.0000%	11,362,928.1853	0.1761%	-	0.0000%	10,083,947.9025	0.2171%	21,446,876.0878	0.1045%
34607	-	0.0000%	5,623,927.9596	0.0872%	-	0.0000%	7,080,563.2910	0.1525%	12,704,491.2506	0.0619%
34608	-	0.0000%	12,403,313.0502	0.1922%	-	0.0000%	6,583,304.5865	0.1418%	18,986,617.6367	0.0925%
34609	-	0.0000%	15,574,934.5378	0.2414%	-	0.0000%	7,817,292.5883	0.1683%	23,392,227.1261	0.1139%
34610	-	0.0000%	5,276,398.1053	0.0818%	-	0.0000%	2,934,167.0449	0.0632%	8,210,565.1501	0.0400%
34613	-	0.0000%	19,453,443.5564	0.3015%	-	0.0000%	8,936,635.1064	0.1924%	28,390,078.6628	0.1383%
34614	-	0.0000%	2,966,753.3700	0.0460%	-	0.0000%	1,278,195.9421	0.0275%	4,244,949.3121	0.0207%
34637	-	0.0000%	2,065,061.8738	0.0320%	-	0.0000%	1,189,302.0866	0.0256%	3,254,363.9604	0.0158%
34638	-	0.0000%	6,277,401.3876	0.0973%	-	0.0000%	3,780,014.9357	0.0814%	10,057,416.3233	0.0490%
34639	-	0.0000%	8,786,616.0194	0.1362%	-	0.0000%	6,578,296.0235	0.1417%	15,364,912.0429	0.0748%
34652	-	0.0000%	10,936,641.0803	0.1695%	-	0.0000%	15,870,535.7391	0.3418%	26,807,176.8194	0.1306%
34653	-	0.0000%	8,998,314.2841	0.1394%	-	0.0000%	13,748,382.0344	0.2961%	22,746,696.3184	0.1108%
34654	-	0.0000%	7,328,993.3539	0.1136%	-	0.0000%	5,480,172.8278	0.1180%	12,809,166.1817	0.0624%
34655	-	0.0000%	12,775,595.1505	0.1980%	-	0.0000%	10,313,908.7696	0.2221%	23,089,503.9201	0.1125%
34667	-	0.0000%	16,161,391.4668	0.2504%	-	0.0000%	23,360,005.9778	0.5030%	39,521,397.4446	0.1925%
34668	-	0.0000%	14,389,063.8795	0.2230%	-	0.0000%	22,415,504.9437	0.4827%	36,804,568.8232	0.1792%
34669	-	0.0000%	4,515,123.7974	0.0700%	-	0.0000%	3,654,324.3409	0.0787%	8,169,448.1383	0.0398%
34677	-	0.0000%	7,746,114.7370	0.1200%	-	0.0000%	4,681,782.5908	0.1008%	12,427,897.3277	0.0605%
34683	-	0.0000%	23,519,669.6352	0.3645%	-	0.0000%	20,552,174.5511	0.4426%	44,071,844.1863	0.2146%
34684	-	0.0000%	11,593,363.3998	0.1797%	-	0.0000%	10,109,498.1559	0.2177%	21,702,861.5556	0.1057%
34685	-	0.0000%	6,916,263.3040	0.1072%	-	0.0000%	5,359,849.8311	0.1154%	12,276,113.1350	0.0598%
34688	-	0.0000%	4,053,525.5301	0.0628%	-	0.0000%	3,072,363.6616	0.0662%	7,125,889.1917	0.0347%
34689	-	0.0000%	18,565,887.2794	0.2877%	-	0.0000%	15,332,114.2217	0.3302%	33,898,001.5011	0.1651%
34690	-	0.0000%	5,025,237.4981	0.0779%	-	0.0000%	5,848,877.0300	0.1259%	10,874,114.5281	0.0530%
34691	-	0.0000%	11,680,305.2654	0.1810%	-	0.0000%	10,906,156.7919	0.2349%	22,586,462.0572	0.1100%
34695	-	0.0000%	6,857,660.0696	0.1063%	-	0.0000%	4,348,490.9111	0.0936%	11,206,150.9807	0.0546%
34698	-	0.0000%	26,738,727.2631	0.4144%	-	0.0000%	19,086,130.8103	0.4110%	45,824,858.0734	0.2232%
34705	333,656.0000	0.0047%	2,382,418.6637	0.0369%	-	0.0000%	2,489,483.8502	0.0536%	5,205,558.5139	0.0254%

ZIP Code	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
34711	6,832,754.3603	0.0957%	41,769,363.4633	0.6473%	-	0.0000%	38,240,216.0317	0.8235%	86,842,333.8554	0.4229%
34714	6,299,461.0226	0.0883%	10,583,748.6332	0.1640%	-	0.0000%	9,193,711.5375	0.1980%	26,076,921.1933	0.1270%
34715	1,218,425.7867	0.0171%	10,944,840.2481	0.1696%	-	0.0000%	9,530,853.9371	0.2052%	21,694,119.9719	0.1057%
34731	190,798.7637	0.0027%	6,866,036.5265	0.1064%	-	0.0000%	9,484,184.2019	0.2042%	16,541,019.4920	0.0806%
34734	3,569,233.2062	0.0500%	1,945,437.4631	0.0301%	-	0.0000%	1,702,786.6753	0.0367%	7,217,457.3446	0.0352%
34736	534,461.7638	0.0075%	8,805,321.7853	0.1365%	-	0.0000%	9,317,878.7366	0.2007%	18,657,662.2857	0.0909%
34737	271,482.1381	0.0038%	2,057,527.2978	0.0319%	-	0.0000%	2,334,811.9718	0.0503%	4,663,821.4077	0.0227%
34739	362,967.6472	0.0051%	1,931,357.8354	0.0299%	-	0.0000%	2,312,267.2400	0.0498%	4,606,592.7226	0.0224%
34741	28,466,897.5151	0.3988%	19,313,618.3347	0.2993%	-	0.0000%	14,068,477.1870	0.3030%	61,848,993.0369	0.3012%
34743	43,517,481.2662	0.6097%	22,686,225.9980	0.3516%	-	0.0000%	15,623,486.8881	0.3364%	81,827,194.1523	0.3985%
34744	69,495,851.4930	0.9737%	34,577,110.0401	0.5358%	-	0.0000%	24,924,037.1925	0.5367%	128,996,998.7256	0.6283%
34746	72,347,997.0935	1.0136%	48,972,101.2883	0.7589%	-	0.0000%	35,687,421.2760	0.7685%	157,007,519.6577	0.7647%
34747	26,668,205.9500	0.3736%	25,177,207.0770	0.3902%	-	0.0000%	20,959,185.4032	0.4513%	72,804,598.4302	0.3546%
34748	1,168,037.2028	0.0164%	29,923,310.2029	0.4637%	-	0.0000%	34,729,219.9408	0.7479%	65,820,567.3464	0.3206%
34753	85,156.9328	0.0012%	1,733,829.5031	0.0269%	-	0.0000%	1,882,541.6479	0.0405%	3,701,528.0838	0.0180%
34756	1,116,733.3252	0.0156%	3,815,749.4627	0.0591%	-	0.0000%	3,235,023.9937	0.0697%	8,167,506.7817	0.0398%
34758	45,128,841.6385	0.6323%	28,128,800.4759	0.4359%	-	0.0000%	25,811,431.0104	0.5558%	99,069,073.1248	0.4825%
34759	44,055,386.7003	0.6172%	18,810,863.0802	0.2915%	-	0.0000%	24,299,933.3063	0.5233%	87,166,183.0869	0.4245%
34760	597,305.6299	0.0084%	461,883.0065	0.0072%	-	0.0000%	439,863.2246	0.0095%	1,499,051.8611	0.0073%
34761	28,271,852.2589	0.3961%	12,756,810.3694	0.1977%	-	0.0000%	11,462,254.0211	0.2468%	52,490,916.6494	0.2556%
34762	17,192.3398	0.0002%	443,885.2383	0.0069%	-	0.0000%	506,440.2354	0.0109%	967,517.8136	0.0047%
34769	23,431,155.7382	0.3283%	17,147,984.1607	0.2657%	-	0.0000%	12,222,348.3229	0.2632%	52,801,488.2219	0.2572%
34771	10,140,933.9874	0.1421%	12,356,977.6579	0.1915%	-	0.0000%	8,281,112.0581	0.1783%	30,779,023.7034	0.1499%
34772	17,865,583.4264	0.2503%	20,508,037.7508	0.3178%	-	0.0000%	14,702,008.7012	0.3166%	53,075,629.8785	0.2585%
34773	693,691.6280	0.0097%	2,502,173.4548	0.0388%	-	0.0000%	1,704,843.3221	0.0367%	4,900,708.4049	0.0239%
34785	-	0.0000%	7,447,408.4580	0.1154%	-	0.0000%	11,179,494.2069	0.2407%	18,626,902.6649	0.0907%
34786	37,404,866.4886	0.5241%	32,644,755.7297	0.5059%	-	0.0000%	27,600,141.4087	0.5943%	97,649,763.6270	0.4756%
34787	29,649,235.3464	0.4154%	23,767,539.7324	0.3683%	-	0.0000%	21,759,079.5506	0.4686%	75,175,854.6295	0.3661%
34788	1,063,488.3289	0.0149%	12,940,466.0992	0.2005%	-	0.0000%	19,259,359.3269	0.4147%	33,263,313.7550	0.1620%

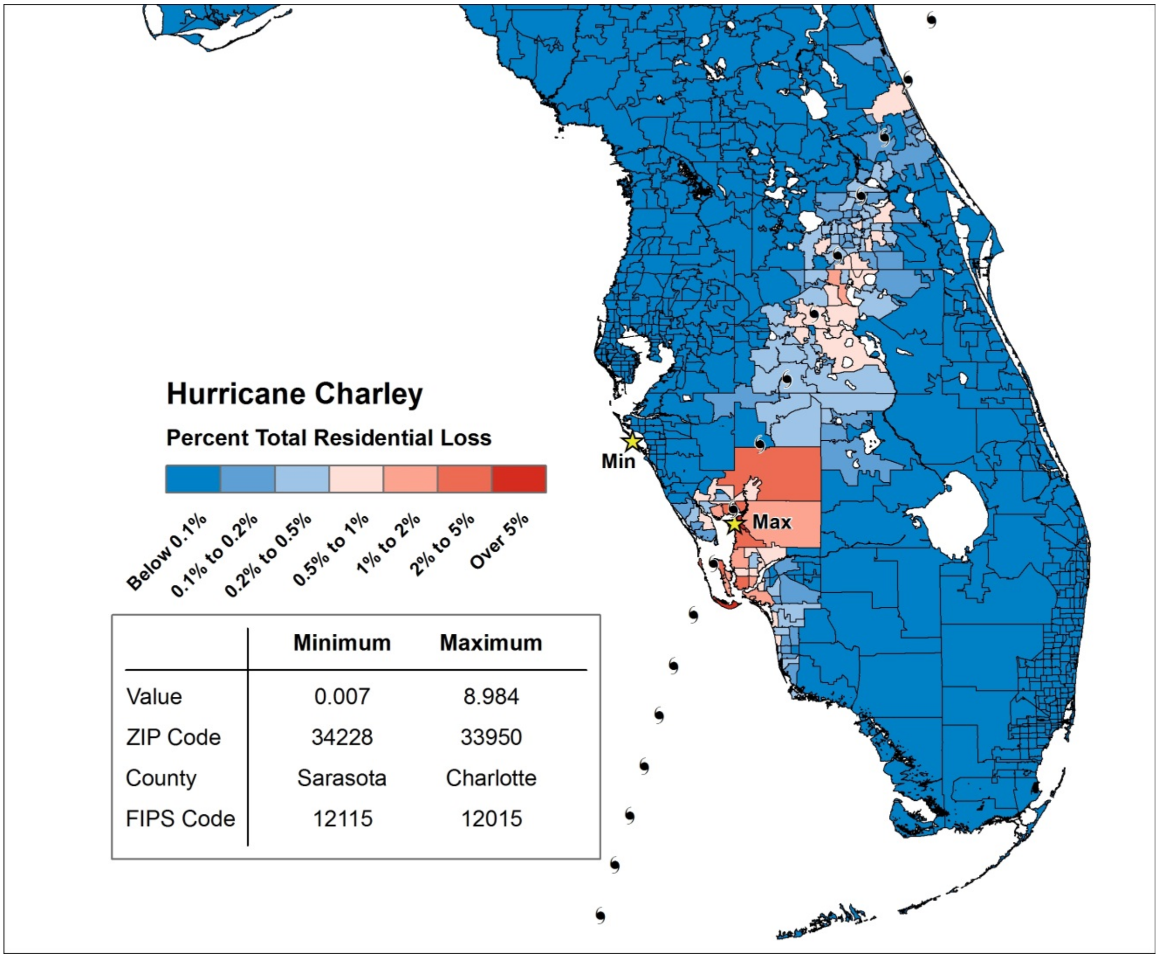
	Hurricane Charley		Hurricane Frances		Hurricane Ivan		Hurricane Jeanne		Total	
ZIP Code	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal and Commercial Residential Monetary Contribution ($)	Percent of Losses (%)
34797	80,474.7752	0.0011%	980,735.7895	0.0152%	-	0.0000%	1,149,517.3103	0.0248%	2,210,727.8750	0.0108%
34945	179,500.6369	0.0025%	6,639,030.9347	0.1029%	-	0.0000%	6,525,507.2291	0.1405%	13,344,038.8008	0.0650%
34946	74,384.3854	0.0010%	11,998,553.3999	0.1859%	-	0.0000%	11,745,380.3926	0.2529%	23,818,318.1778	0.1160%
34947	62,902.7274	0.0009%	8,069,564.3727	0.1250%	-	0.0000%	7,664,938.1436	0.1651%	15,797,405.2437	0.0769%
34949	237,697.2478	0.0033%	52,691,957.2105	0.8165%	-	0.0000%	53,599,743.3692	1.1542%	106,529,397.8275	0.5188%
34950	86,718.8240	0.0012%	16,928,732.2621	0.2623%	-	0.0000%	15,902,161.8893	0.3424%	32,917,612.9754	0.1603%
34951	677,668.4700	0.0095%	46,699,270.8148	0.7237%	-	0.0000%	46,243,529.2867	0.9958%	93,620,468.5715	0.4560%
34952	525,250.9925	0.0074%	91,224,725.1626	1.4137%	-	0.0000%	82,740,565.3728	1.7817%	174,490,541.5279	0.8498%
34953	911,816.5793	0.0128%	43,955,306.7225	0.6811%	-	0.0000%	43,894,898.6046	0.9452%	88,762,021.9064	0.4323%
34956	117,768.0112	0.0016%	5,832,748.4462	0.0904%	-	0.0000%	4,317,871.7101	0.0930%	10,268,388.1675	0.0500%
34957	-	0.0000%	64,355,796.7112	0.9973%	-	0.0000%	49,089,830.1042	1.0571%	113,445,626.8153	0.5525%
34972	943,544.9828	0.0132%	11,787,600.6873	0.1827%	-	0.0000%	11,389,567.0734	0.2453%	24,120,712.7434	0.1175%
34974	5,708,820.7493	0.0800%	36,487,104.0410	0.5654%	-	0.0000%	34,582,902.1708	0.7447%	76,778,826.9612	0.3739%
34981	43,248.2085	0.0006%	4,801,027.0467	0.0744%	-	0.0000%	4,446,475.8868	0.0958%	9,290,751.1421	0.0452%
34982	243,667.6629	0.0034%	44,937,884.5913	0.6964%	-	0.0000%	41,531,065.2647	0.8943%	86,712,617.5190	0.4223%
34983	557,788.7995	0.0078%	39,190,994.6652	0.6073%	-	0.0000%	39,595,519.7890	0.8527%	79,344,303.2537	0.3864%
34984	206,455.0749	0.0029%	15,211,102.7509	0.2357%	-	0.0000%	15,906,571.2762	0.3425%	31,324,129.1020	0.1526%
34986	568,148.4144	0.0080%	26,484,421.9026	0.4104%	-	0.0000%	25,140,303.4619	0.5414%	52,192,873.7790	0.2542%
34987	164,872.9434	0.0023%	5,753,981.2196	0.0892%	-	0.0000%	5,239,300.2282	0.1128%	11,158,154.3912	0.0543%
34990	425,595.1032	0.0060%	47,941,520.2366	0.7429%	-	0.0000%	43,875,698.9103	0.9448%	92,242,814.2501	0.4493%
34994	-	0.0000%	22,562,162.9224	0.3496%	-	0.0000%	17,855,394.8436	0.3845%	40,417,557.7661	0.1968%
34996	-	0.0000%	49,097,624.7583	0.7608%	-	0.0000%	35,416,818.8245	0.7627%	84,514,443.5828	0.4116%
34997	-	0.0000%	77,072,213.1726	1.1943%	-	0.0000%	59,722,419.7241	1.2861%	136,794,632.8967	0.6662%

B. *Provide maps color-coded by ZIP Code depicting the percentage of total residential losses from each hurricane, Hurricane Charley (2004), Hurricane Frances (2004), Hurricane Ivan (2004), and Hurricane Jeanne (2004) and for the cumulative losses using the following interval coding:*

Red Over	*5%*
Light Red	*2% to 5%*
Pink	*1% to 2%*
Light Pink	*0.5% to 1%*
Light Blue	*0.2% to 0.5%*
Medium Blue	*0.1% to 0.2%*
Blue Below	*0.1%*

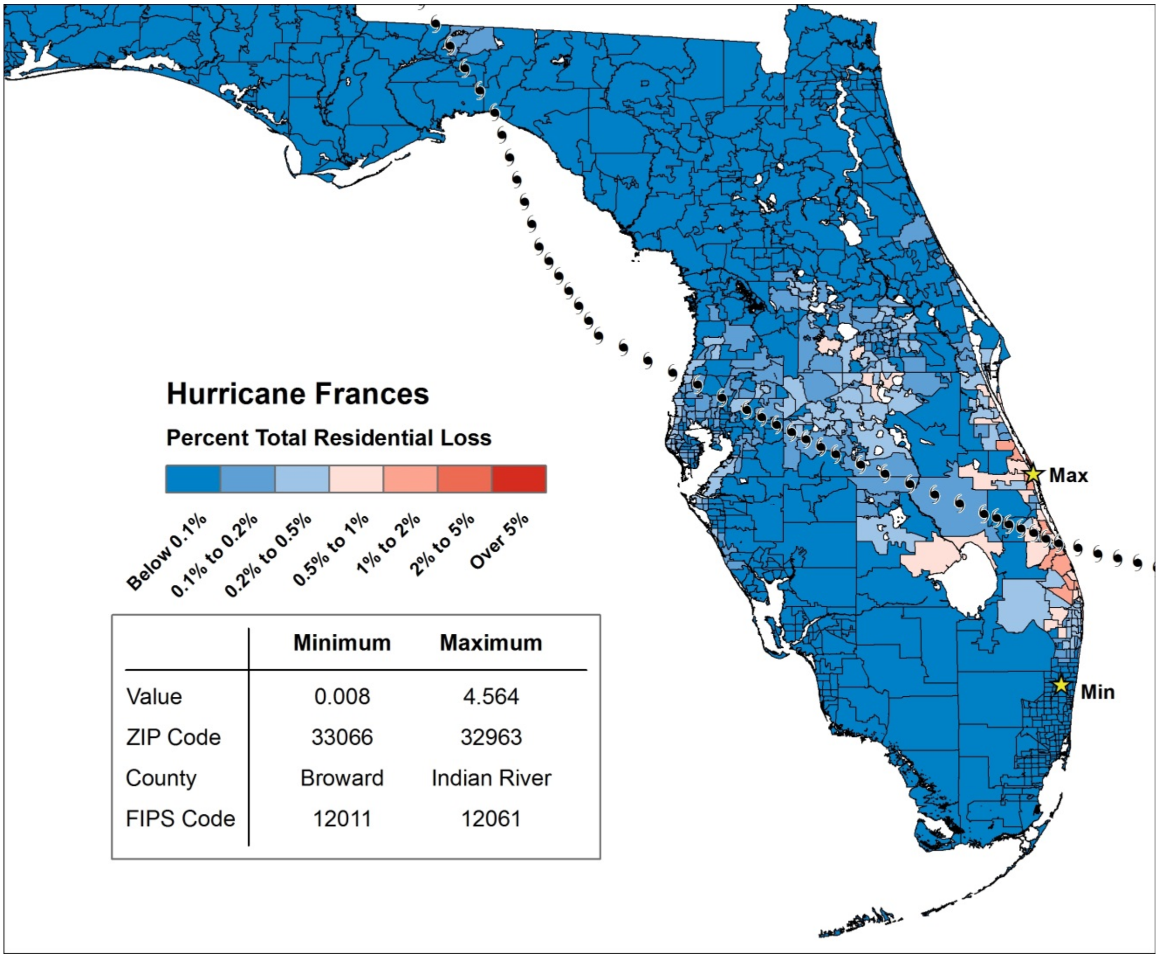
The relevant storm track should be plotted on each map.

The maps in Figure 91 to Figure 95 depict the percentage of gross, zero deductible losses from each specified event and in total for all events.



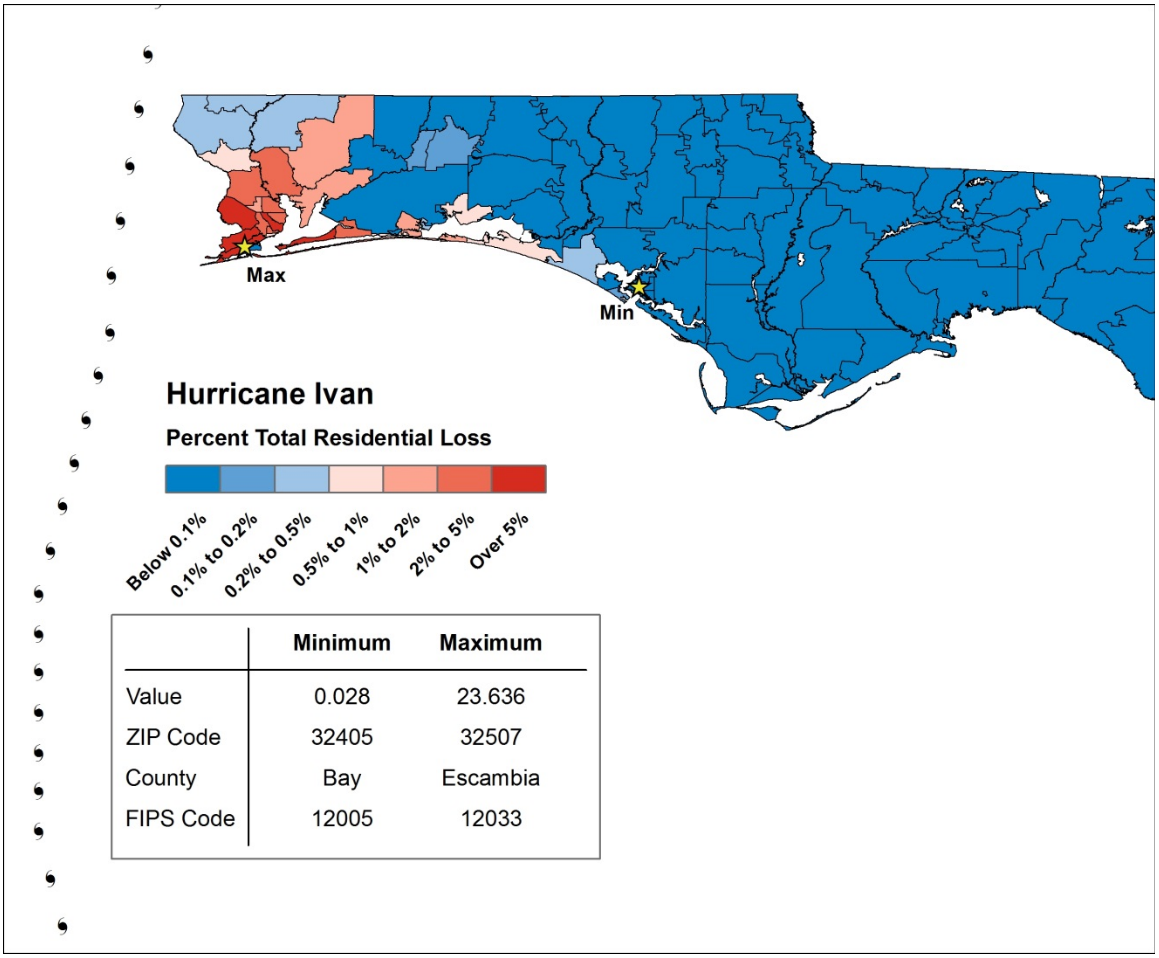
	Minimum	Maximum
Value	0.007	8.984
ZIP Code	34228	33950
County	Sarasota	Charlotte
FIPS Code	12115	12015

Figure 91. Percentage of Total Residential Loss from Hurricane Charley (2004)



	Minimum	Maximum
Value	0.008	4.564
ZIP Code	33066	32963
County	Broward	Indian River
FIPS Code	12011	12061

Figure 92. Percentage of Total Residential Loss from Hurricane Frances (2004)



	Minimum	Maximum
Value	0.028	23.636
ZIP Code	32405	32507
County	Bay	Escambia
FIPS Code	12005	12033

Figure 93. Percentage of Total Residential Loss from Hurricane Ivan (2004)

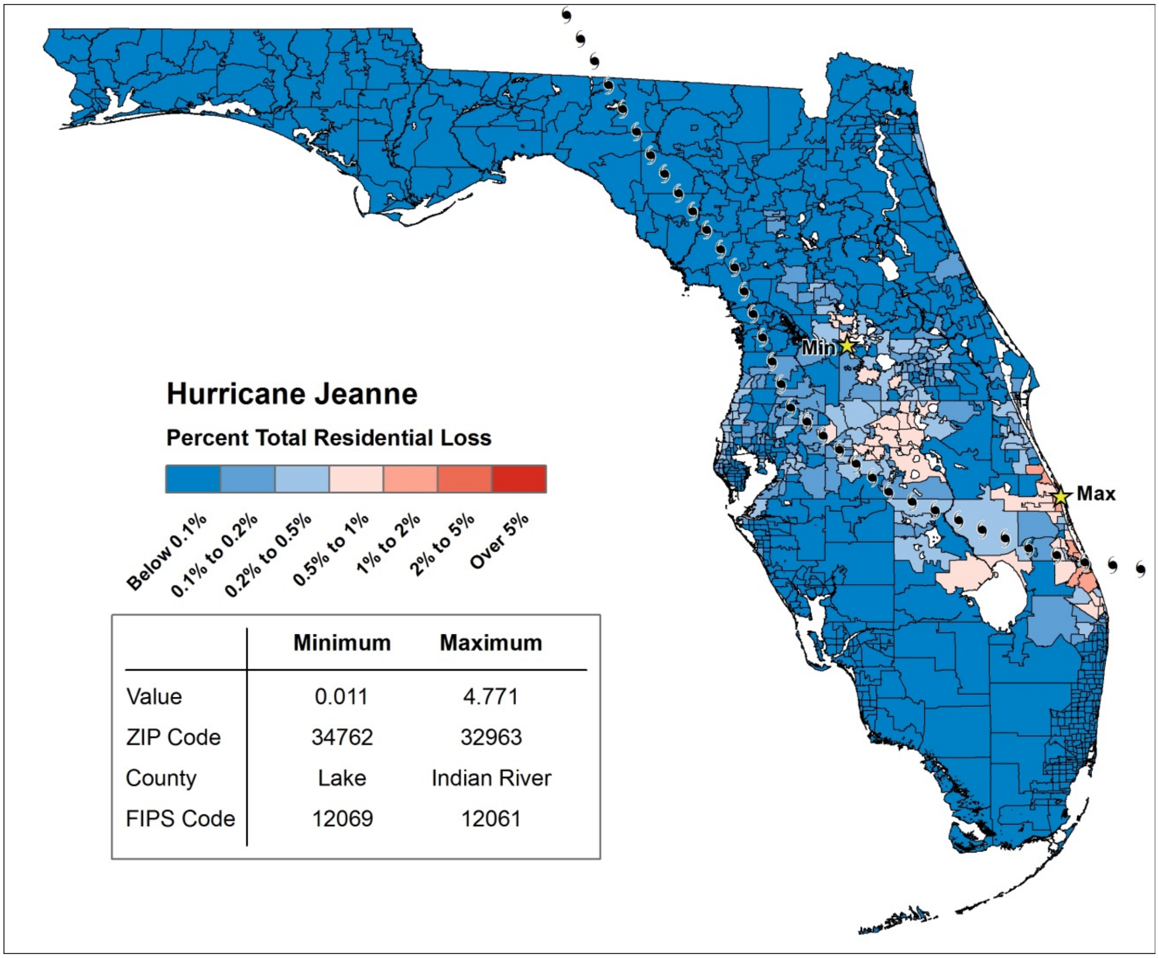
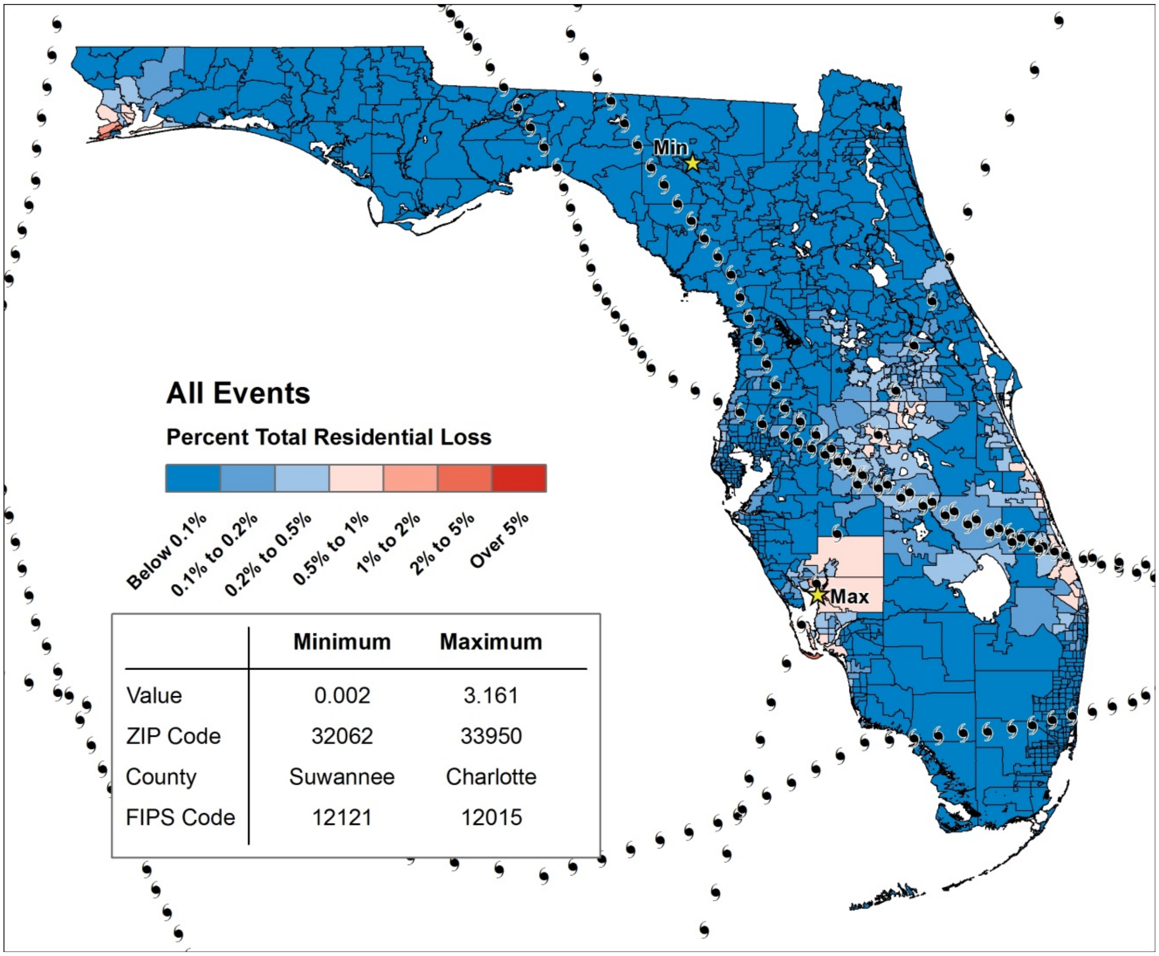


Figure 94. Percentage of Total Residential Loss from Hurricane Jeanne (2004)



	Minimum	Maximum
Value	0.002	3.161
ZIP Code	32062	33950
County	Suwannee	Charlotte
FIPS Code	12121	12015

Figure 95. Percentage of Total Residential Loss from All Storms (2004)

C. *Provide this form in Excel format. The file name shall include the abbreviated name of the modeling organization, the standards year, and the form name. Form A-3B (2004 Hurricane Season Losses, 2012 FHCF Exposure Data) shall also be included in a submission appendix.*

A hard copy of Form A-3B is included in this submission appendix and is also provided in Excel format.

Standard A-6, Disclosure 4

Form A-4A: Output Ranges (2007 FHCF Exposure Data)

A. Provide personal and commercial residential output ranges in the format shown in the file named "2013FormA4A.xlsx" by using an automated program or script. Provide this form in Excel format. The file name shall include the abbreviated name of the modeling organization, the standards year, and the form name. Form A-4A (Output Ranges, 2007 FHCF Exposure Data) shall also be included in a submission appendix.

A hard copy of Form A-4A is included in this submission appendix and is also provided in Excel format.

B. Provide loss costs rounded to three (3) decimal places by county. Within each county, loss costs shall be shown separately per $1,000 of exposure for frame owners, masonry owners, frame renters, masonry renters, frame condo unit owners, masonry condo unit owners, mobile home, and commercial residential. For each of these categories using ZIP Code centroids, the output range shall show the highest loss cost, the lowest loss cost, and the weighted average loss cost. The aggregate residential exposure data for this form shall be developed from the information in the file named "hlpm2007c.exe," except for insured value and deductibles information. Insured values shall be based on the output range specifications below. Deductible amounts of 0% and as specified in the output range specifications will be assumed to be uniformly applied to all risks. When calculating the weighted average loss costs, weight the loss costs by the total insured value calculated above. Include the statewide range of loss costs (i.e., low, high, and weighted average).

All requested loss costs are provided in Form A-4A, calculated using gross modeled losses based on the 2007 FHCF aggregate exposure data prepared as specified.

There are several county and type of business combinations for which there are no exposures in the "hlpm2007c.exe" file. In these cases, a loss cost is not generated by the software costs. Blank cells have been used to signify no exposure.

C. *If a modeling organization has loss costs for a ZIP Code for which there is no exposure, give the loss costs zero weight (i.e., assume the exposure in that ZIP Code is zero). Provide a list in the submission document of those ZIP Codes where this occurs.*

A loss cost is not produced in any case where there is no exposure. FHCF Zip Codes are remapped to current ZIP Codes by AIR. See Appendix 10 on page 506 of this submission for the list.

D. *If a modeling organization does not have loss costs for a ZIP Code for which there is some exposure, do not assume such loss costs are zero, but use only the exposures for which there are loss costs in calculating the weighted average loss costs. Provide a list in the submission document of the ZIP Codes where this occurs.*

There are no ZIP Codes in the FHCF data for which AIR does not produce loss costs. FHCF ZIP Codes are remapped to current ZIP Codes by AIR.

E. *All anomalies in loss costs that are not consistent with the requirements of Standard A-6 (Loss Output) and have been explained in Disclosure A-6.15 shall be shaded.*

All such anomalies are shaded in orange below in

Table 54 and Table 55.

Indicate if per diem is used in producing loss costs for Coverage D (ALE) in the personal residential output ranges.

A $150 per diem per policy is used in producing loss costs for Coverage D.

Standard A-6, Disclosure 5

Table 54. Output Ranges—Loss Costs per $1000 for 0% Deductible

COUNTY	LOSS COSTS	FRAME OWNERS	MASONRY OWNERS	MOBILE HOMES	FRAME RENTERS	MASONRY RENTERS	FRAME CONDO UNIT	MASONRY CONDO UNIT	COMMERCIAL RESIDENTIAL
ALACHUA	LOW	0.341	0.278	4.510	0.319	0.232	0.313	0.256	0.164
	AVERAGE	0.835	0.726	4.908	0.706	0.464	0.714	0.484	0.643
	HIGH	1.152	0.926	5.799	0.959	0.615	0.921	0.632	0.925
BAKER	LOW	0.260	0.209	3.081	0.239	0.182	0.280	0.376	0.333
	AVERAGE	0.557	0.466	3.320	0.501	0.339	0.280	0.376	0.344
	HIGH	0.675	0.542	3.596	0.551	0.363	0.280	0.376	0.378
BAY	LOW	0.728	0.837	9.964	1.030	0.964	1.485	0.621	0.991
	AVERAGE	6.118	4.203	19.661	5.134	3.323	8.725	5.163	5.299
	HIGH	11.030	9.122	36.464	10.320	6.906	9.946	6.740	8.218
BRADFORD	LOW	0.381	0.291	3.993	0.345	0.214	0.640	0.498	0.430
	AVERAGE	0.807	0.674	4.337	0.683	0.446	0.640	0.498	0.509
	HIGH	0.906	0.727	4.716	0.742	0.478	0.640	0.498	0.716
BREVARD	LOW	0.912	0.736	13.132	1.166	0.522	1.197	0.576	0.404
	AVERAGE	4.424	3.698	23.095	4.128	2.968	4.534	4.125	3.772
	HIGH	12.048	10.020	39.194	10.906	7.346	10.526	7.196	9.040
BROWARD	LOW	1.144	0.910	24.616	1.680	0.675	1.139	0.641	0.647
	AVERAGE	8.565	5.850	32.009	7.965	4.798	7.018	5.399	5.667
	HIGH	20.380	17.095	53.448	18.616	12.620	18.113	12.429	15.053

COUNTY	LOSS COSTS	FRAME OWNERS	MASONRY OWNERS	MOBILE HOMES	FRAME RENTERS	MASONRY RENTERS	FRAME CONDO UNIT	MASONRY CONDO UNIT	COMMERCIAL RESIDENTIAL
CALHOUN	LOW	0.744	0.598	7.485	1.110	0.445			1.054
	AVERAGE	1.551	1.287	7.762	1.358	0.853			1.054
	HIGH	2.107	1.697	9.786	1.413	0.899			1.054
CHARLOTTE	LOW	0.941	0.724	12.678	1.189	0.552	0.862	0.569	0.470
	AVERAGE	3.947	2.725	16.198	3.251	1.894	4.725	1.984	2.198
	HIGH	8.690	7.227	28.369	7.699	5.171	7.435	5.102	6.593
CITRUS	LOW	0.505	0.395	7.076	0.611	0.359	0.667	0.426	0.475
	AVERAGE	1.613	1.145	7.866	1.313	0.791	1.396	0.926	1.124
	HIGH	1.937	1.559	9.003	1.643	1.044	1.592	1.049	1.498
CLAY	LOW	0.332	0.246	4.298	0.282	0.224	0.351	0.219	0.312
	AVERAGE	0.793	0.729	4.607	0.728	0.504	0.673	0.432	0.703
	HIGH	1.137	0.915	5.658	0.943	0.608	0.937	0.627	0.909
COLLIER	LOW	1.268	0.984	17.485	1.201	0.761	1.189	0.728	0.502
	AVERAGE	6.293	4.809	23.255	6.204	3.873	6.554	4.542	3.911
	HIGH	14.679	12.295	42.891	13.306	9.090	12.853	8.899	10.965
COLUMBIA	LOW	0.296	0.216	3.544	0.270	0.153	0.354	0.358	0.391
	AVERAGE	0.685	0.563	4.070	0.548	0.364	0.576	0.395	0.494
	HIGH	0.901	0.726	4.606	0.745	0.484	0.729	0.406	0.585
DESOTO	LOW	1.058	0.747	12.770	1.118	0.713	1.190	0.572	0.819
	AVERAGE	2.727	2.104	13.001	2.384	1.476	2.071	1.348	1.266
	HIGH	2.971	2.386	13.741	2.497	1.572	2.411	1.584	2.357

COUNTY	LOSS COSTS	FRAME OWNERS	MASONRY OWNERS	MOBILE HOMES	FRAME RENTERS	MASONRY RENTERS	FRAME CONDO UNIT	MASONRY CONDO UNIT	COMMERCIAL RESIDENTIAL
DIXIE	LOW	0.517	0.434	4.953	0.779	0.464	0.476	0.320	0.324
	AVERAGE	1.183	0.843	5.489	0.908	0.549	0.955	0.801	0.711
	HIGH	2.826	2.315	11.184	0.981	0.584	2.196	1.485	0.775
DUVAL	LOW	0.283	0.235	3.689	0.282	0.215	0.323	0.190	0.140
	AVERAGE	1.048	0.860	5.076	0.887	0.606	0.847	0.659	0.821
	HIGH	3.114	2.552	12.902	2.720	1.801	2.474	1.802	2.260
ESCAMBIA	LOW	0.848	0.681	9.141	0.721	0.473	1.685	0.842	0.961
	AVERAGE	6.073	4.796	19.518	5.243	3.632	7.194	5.633	4.514
	HIGH	13.626	9.590	39.539	12.675	8.466	10.443	7.531	8.756
FLAGLER	LOW	0.473	0.417	6.398	0.508	0.312	0.856	0.308	0.311
	AVERAGE	2.356	1.376	10.701	1.824	1.022	2.557	1.186	1.508
	HIGH	4.348	3.530	17.657	3.862	2.496	3.739	2.459	3.364
FRANKLIN	LOW	2.288	3.010	22.747	5.851	4.059	3.435	2.276	2.073
	AVERAGE	7.530	6.567	25.663	7.739	4.860	5.268	5.335	4.219
	HIGH	9.480	7.874	29.686	8.839	5.999	8.559	5.853	7.004
GADSDEN	LOW	0.350	0.328	4.452	0.378	0.251			0.606
	AVERAGE	0.922	0.780	4.932	0.863	0.555			0.622
	HIGH	1.092	0.878	5.620	0.914	0.588			0.875
GILCHRIST	LOW	0.507	0.387	4.995	0.528	0.480		0.602	0.747
	AVERAGE	1.054	0.870	5.472	0.986	0.640		0.602	0.747
	HIGH	1.250	1.011	5.957	1.052	0.680		0.602	0.747

COUNTY	LOSS COSTS	FRAME OWNERS	MASONRY OWNERS	MOBILE HOMES	FRAME RENTERS	MASONRY RENTERS	FRAME CONDO UNIT	MASONRY CONDO UNIT	COMMERCIAL RESIDENTIAL
GLADES	LOW	1.487	1.191	17.099	2.746	1.012			
	AVERAGE	3.595	2.759	17.118	3.250	1.939			
	HIGH	3.925	3.153	18.046	3.306	2.074			
GULF	LOW	0.909	0.861	10.814	1.868	1.217	1.840	1.619	1.539
	AVERAGE	5.010	4.617	15.607	5.807	3.884	4.350	3.612	4.154
	HIGH	7.327	5.997	25.401	6.836	4.468	6.548	4.352	5.532
HAMILTON	LOW	0.227	0.225	3.020	0.235	0.311		0.287	0.288
	AVERAGE	0.538	0.448	3.157	0.467	0.316		0.287	0.462
	HIGH	0.661	0.530	3.590	0.538	0.352		0.287	0.533
HARDEE	LOW	0.926	0.754	11.663	1.042	0.632			1.179
	AVERAGE	2.418	1.900	11.858	2.118	1.308			1.572
	HIGH	2.639	2.118	12.586	2.206	1.390			2.096
HENDRY	LOW	1.516	1.145	16.364	1.559	0.997	2.635	1.292	1.236
	AVERAGE	4.047	3.205	18.557	3.431	2.263	3.872	2.449	2.820
	HIGH	5.099	4.096	22.088	4.350	2.704	4.161	2.710	4.097
HERNANDO	LOW	0.730	0.480	8.099	0.770	0.464	1.487	0.751	0.509
	AVERAGE	2.382	1.707	9.316	1.779	1.137	2.201	1.465	1.268
	HIGH	4.487	3.678	16.758	3.963	2.600	3.262	2.559	2.453
HIGHLANDS	LOW	0.895	0.652	11.594	0.939	0.608	1.714	0.526	0.681
	AVERAGE	2.563	2.001	12.694	2.124	1.288	2.055	1.429	1.473
	HIGH	4.031	3.238	18.687	3.396	2.131	2.853	2.154	2.829

COUNTY	LOSS COSTS	FRAME OWNERS	MASONRY OWNERS	MOBILE HOMES	FRAME RENTERS	MASONRY RENTERS	FRAME CONDO UNIT	MASONRY CONDO UNIT	COMMERCIAL RESIDENTIAL
HILLSBOROUGH	LOW	0.752	0.587	9.956	0.732	0.458	0.749	0.524	0.515
	AVERAGE	2.871	2.111	11.828	2.474	1.521	2.391	1.647	1.661
	HIGH	6.308	5.221	20.965	5.566	3.709	5.368	3.651	4.841
HOLMES	LOW	0.538	0.523	6.881	0.556	0.608	1.201		0.691
	AVERAGE	1.328	1.105	6.958	1.147	0.746	1.201		0.750
	HIGH	1.465	1.177	7.381	1.224	0.778	1.201		0.809
INDIAN RIVER	LOW	1.570	1.033	18.948	2.067	1.002	2.096	0.973	1.001
	AVERAGE	7.967	5.234	25.044	7.580	4.272	7.893	5.954	5.960
	HIGH	14.896	12.391	47.350	13.554	9.118	13.101	8.916	11.105
JACKSON	LOW	0.423	0.423	5.193	0.490	0.447	0.998	0.588	0.491
	AVERAGE	1.166	0.969	6.154	1.011	0.668	0.998	0.667	0.733
	HIGH	1.669	1.343	8.182	1.416	0.905	0.998	0.767	1.054
JEFFERSON	LOW	0.309	0.293	3.840	0.312	0.351			0.427
	AVERAGE	0.680	0.561	3.911	0.614	0.404			0.459
	HIGH	0.835	0.671	4.367	0.699	0.452			0.615
LAFAYETTE	LOW	0.442	0.360	4.248	0.674	0.357			
	AVERAGE	0.837	0.702	4.473	0.758	0.458			
	HIGH	0.933	0.751	4.650	0.782	0.509			
LAKE	LOW	0.560	0.456	6.832	0.605	0.358	0.840	0.444	0.499
	AVERAGE	1.748	1.321	9.482	1.485	0.923	1.761	1.101	1.284
	HIGH	2.615	2.098	12.684	2.167	1.376	1.982	1.314	1.974

COUNTY	LOSS COSTS	FRAME OWNERS	MASONRY OWNERS	MOBILE HOMES	FRAME RENTERS	MASONRY RENTERS	FRAME CONDO UNIT	MASONRY CONDO UNIT	COMMERCIAL RESIDENTIAL
LEE	LOW	0.959	0.743	13.749	0.924	0.528	0.902	0.540	0.378
	AVERAGE	5.591	2.623	17.633	4.397	2.131	4.958	2.678	2.700
	HIGH	12.835	10.750	38.017	11.528	7.879	11.139	7.723	9.622
LEON	LOW	0.325	0.278	4.348	0.351	0.236	0.354	0.232	0.137
	AVERAGE	0.899	0.744	4.945	0.752	0.500	0.623	0.460	0.647
	HIGH	1.097	0.883	5.417	0.930	0.598	0.918	0.583	0.882
LEVY	LOW	0.474	0.403	5.914	0.520	0.323	0.525	1.246	0.309
	AVERAGE	1.691	1.083	6.653	1.436	0.714	3.055	1.916	1.985
	HIGH	4.330	3.572	15.897	3.878	1.837	3.744	2.556	3.311
LIBERTY	LOW	0.703	0.559	6.815	1.101	0.816			
	AVERAGE	1.403	1.156	7.036	1.281	0.837			
	HIGH	1.552	1.249	7.487	1.327	0.848			
MADISON	LOW	0.295	0.248	3.154	0.278	0.329			0.384
	AVERAGE	0.638	0.520	3.489	0.568	0.371			0.395
	HIGH	0.738	0.593	3.864	0.612	0.399			0.524
MANATEE	LOW	0.906	0.640	11.620	1.074	0.493	0.911	0.441	0.453
	AVERAGE	4.670	2.985	15.412	4.224	2.366	5.419	3.182	3.184
	HIGH	10.820	9.049	33.222	9.650	6.585	9.358	6.463	8.109
MARION	LOW	0.428	0.300	5.033	0.433	0.261	0.517	0.285	0.310
	AVERAGE	1.292	0.924	6.542	1.014	0.641	1.049	0.710	0.746
	HIGH	1.590	1.277	7.971	1.301	0.832	1.280	0.857	1.236

COUNTY	LOSS COSTS	FRAME OWNERS	MASONRY OWNERS	MOBILE HOMES	FRAME RENTERS	MASONRY RENTERS	FRAME CONDO UNIT	MASONRY CONDO UNIT	COMMERCIAL RESIDENTIAL
MARTIN	LOW	1.868	1.339	23.653	4.094	0.987	2.587	1.189	1.445
	AVERAGE	9.795	6.766	37.419	9.029	5.189	11.000	6.487	5.907
	HIGH	14.927	12.329	47.770	13.661	9.060	13.153	8.853	11.227
MIAMI-DADE	LOW	1.452	0.936	25.077	1.256	0.795	1.249	0.654	0.516
	AVERAGE	8.354	6.478	28.485	10.022	6.382	9.017	7.770	5.740
	HIGH	27.128	22.901	70.608	24.783	17.161	24.096	16.783	19.805
MONROE	LOW	6.909	5.366	62.999	9.644	6.436	8.020	4.854	4.843
	AVERAGE	23.655	19.123	67.920	23.510	16.385	24.812	15.707	15.145
	HIGH	30.912	26.286	78.254	28.775	20.270	27.996	19.788	22.193
NASSAU	LOW	0.271	0.218	3.091	0.263	0.145	0.248	0.262	0.231
	AVERAGE	1.382	0.950	4.409	1.342	0.921	1.679	1.122	1.204
	HIGH	2.171	1.777	9.434	1.875	1.241	1.836	1.254	1.699
OKALOOSA	LOW	0.651	0.459	7.347	0.617	0.404	0.727	0.603	0.823
	AVERAGE	6.647	5.564	15.736	6.001	3.922	9.251	6.488	6.553
	HIGH	12.682	10.496	41.111	11.883	7.964	11.464	7.765	9.419
OKEECHOBEE	LOW	1.630	1.158	19.487	1.788	1.141	2.650	1.227	2.040
	AVERAGE	5.370	3.989	25.003	4.427	2.759	5.010	3.467	3.515
	HIGH	6.671	5.386	27.707	5.810	3.653	5.549	3.624	3.660
ORANGE	LOW	0.646	0.478	8.378	0.646	0.374	0.548	0.336	0.221
	AVERAGE	1.658	1.322	9.668	1.317	0.837	1.286	0.851	1.062
	HIGH	2.480	1.990	11.931	2.054	1.307	1.973	1.332	1.964

COUNTY	LOSS COSTS	FRAME OWNERS	MASONRY OWNERS	MOBILE HOMES	FRAME RENTERS	MASONRY RENTERS	FRAME CONDO UNIT	MASONRY CONDO UNIT	COMMERCIAL RESIDENTIAL
OSCEOLA	LOW	0.677	0.498	8.968	0.688	0.452	0.711	0.351	0.237
	AVERAGE	1.871	1.547	11.827	1.506	0.991	1.355	0.831	1.228
	HIGH	3.210	2.574	15.311	2.692	1.564	2.306	1.523	2.283
PALM BEACH	LOW	1.683	1.333	23.726	1.694	1.006	1.693	0.925	0.941
	AVERAGE	9.893	6.599	36.410	9.288	5.755	9.309	5.882	5.956
	HIGH	19.290	16.115	56.803	17.615	11.928	17.145	11.730	14.309
PASCO	LOW	0.764	0.577	8.849	0.804	0.509	0.902	0.450	0.567
	AVERAGE	2.651	2.544	11.688	2.201	1.622	2.568	2.256	2.194
	HIGH	6.049	5.034	20.287	5.355	3.597	5.174	3.557	4.610
PINELLAS	LOW	1.113	0.768	12.181	1.329	0.595	1.299	0.737	0.504
	AVERAGE	5.907	4.529	17.186	4.867	3.166	4.900	3.594	3.312
	HIGH	10.079	8.448	27.361	9.014	6.186	8.736	6.072	7.563
POLK	LOW	0.727	0.537	9.006	0.639	0.462	0.596	0.445	0.393
	AVERAGE	1.960	1.440	10.189	1.580	0.991	1.517	1.058	1.208
	HIGH	2.515	2.017	12.294	2.076	1.316	1.980	1.314	2.025
PUTNAM	LOW	0.464	0.310	4.832	0.418	0.276	0.759	0.304	0.471
	AVERAGE	1.047	0.854	5.734	0.877	0.572	0.922	0.565	0.756
	HIGH	1.602	1.284	8.089	1.239	0.837	1.222	0.861	1.158
ST. JOHNS	LOW	0.402	0.344	5.476	0.447	0.251	0.383	0.244	0.325
	AVERAGE	1.695	1.640	8.520	1.679	1.138	2.191	1.596	1.833
	HIGH	3.929	3.196	16.113	3.456	2.268	3.361	2.242	3.046

COUNTY	LOSS COSTS	FRAME OWNERS	MASONRY OWNERS	MOBILE HOMES	FRAME RENTERS	MASONRY RENTERS	FRAME CONDO UNIT	MASONRY CONDO UNIT	COMMERCIAL RESIDENTIAL
ST. LUCIE	LOW	1.602	1.247	22.547	1.780	0.978	1.570	0.950	0.904
	AVERAGE	7.008	4.094	31.791	6.551	3.556	8.272	6.088	4.858
	HIGH	15.853	13.167	50.555	14.487	9.701	13.961	9.481	11.854
SANTA ROSA	LOW	0.837	0.718	9.475	1.017	0.683	2.177	1.508	1.171
	AVERAGE	7.365	5.309	20.145	7.068	4.564	12.029	6.612	6.721
	HIGH	15.549	12.882	49.867	14.549	9.765	14.023	9.535	11.541
SARASOTA	LOW	0.897	0.627	11.595	1.012	0.536	1.071	0.487	0.630
	AVERAGE	5.059	3.500	18.022	4.543	2.842	5.276	3.514	3.348
	HIGH	9.263	7.778	28.001	8.269	5.673	8.018	5.582	6.965
SEMINOLE	LOW	0.642	0.481	8.210	0.616	0.365	0.658	0.416	0.217
	AVERAGE	1.662	1.297	8.924	1.273	0.830	1.290	0.852	1.089
	HIGH	2.018	1.618	10.068	1.668	1.061	1.633	1.036	1.552
SUMTER	LOW	0.553	0.442	7.649	0.565	0.337	0.658	0.425	0.451
	AVERAGE	1.008	0.899	8.267	1.082	0.773	1.367	0.675	0.721
	HIGH	1.919	1.539	9.417	1.583	1.008	1.418	0.939	1.412
SUWANNEE	LOW	0.315	0.239	3.789	0.316	0.344	0.644		0.540
	AVERAGE	0.740	0.607	4.115	0.625	0.418	0.644		0.634
	HIGH	0.971	0.782	4.881	0.809	0.525	0.644		0.749
TAYLOR	LOW	0.403	0.368	4.563	0.636	0.294	0.455	0.548	0.590
	AVERAGE	1.079	0.837	5.636	0.853	0.545	1.173	0.861	0.938
	HIGH	1.970	1.601	8.471	1.733	0.595	1.695	1.138	1.290

COUNTY	LOSS COSTS	FRAME OWNERS	MASONRY OWNERS	MOBILE HOMES	FRAME RENTERS	MASONRY RENTERS	FRAME CONDO UNIT	MASONRY CONDO UNIT	COMMERCIAL RESIDENTIAL
UNION	LOW	0.369	0.251	3.837	0.550	0.210		0.384	0.459
	AVERAGE	0.727	0.590	4.108	0.639	0.415		0.384	0.540
	HIGH	0.822	0.660	4.332	0.674	0.439		0.384	0.661
VOLUSIA	LOW	0.534	0.380	7.004	0.546	0.358	0.560	0.380	0.401
	AVERAGE	2.597	1.862	11.749	2.266	1.353	2.918	2.354	2.185
	HIGH	5.686	4.652	21.872	5.041	3.297	4.881	3.262	4.366
WAKULLA	LOW	0.466	0.417	6.199	0.568	0.370	0.968	0.646	0.568
	AVERAGE	1.531	1.334	6.858	1.266	1.086	2.139	2.484	1.130
	HIGH	4.546	3.734	16.276	4.193	2.764	4.000	2.696	3.467
WALTON	LOW	0.714	0.493	8.577	0.721	0.488	1.530	0.512	0.513
	AVERAGE	6.155	3.980	14.192	6.312	4.102	8.760	5.175	5.712
	HIGH	11.690	9.659	38.697	10.938	7.289	10.530	7.110	8.716
WASHINGTON	LOW	0.676	0.676	8.106	0.764	0.861	1.827		0.751
	AVERAGE	1.672	1.440	8.728	1.550	1.033	1.888		0.966
	HIGH	2.648	2.136	11.857	2.306	1.466	1.950		1.026
STATEWIDE	LOW	0.227	0.209	3.020	0.235	0.145	0.248	0.190	0.137
	AVERAGE	3.620	3.593	13.714	2.703	2.903	4.557	4.507	4.045
	HIGH	30.912	26.286	78.254	28.775	20.270	27.996	19.788	22.193

Table 55. Loss Costs per $1000 with Specified Deductibles

COUNTY	LOSS COSTS	FRAME OWNERS	MASONRY OWNERS	MOBILE HOMES	FRAME RENTERS	MASONRY RENTERS	FRAME CONDO UNIT	MASONRY CONDO UNIT	COMMERCIAL RESIDENTIAL
ALACHUA	LOW	0.251	0.206	3.649	0.249	0.176	0.236	0.187	0.108
	AVERAGE	0.623	0.538	4.000	0.546	0.357	0.531	0.358	0.427
	HIGH	0.871	0.693	4.798	0.748	0.479	0.693	0.472	0.616
BAKER	LOW	0.195	0.156	2.409	0.186	0.139	0.211	0.278	0.227
	AVERAGE	0.414	0.346	2.616	0.388	0.260	0.211	0.278	0.235
	HIGH	0.504	0.403	2.857	0.427	0.280	0.211	0.278	0.257
BAY	LOW	0.525	0.618	8.582	0.786	0.752	1.116	0.456	0.648
	AVERAGE	5.205	3.469	17.701	4.387	2.839	7.589	4.427	4.115
	HIGH	9.689	7.919	33.651	9.141	6.118	8.707	5.850	6.519
BRADFORD	LOW	0.281	0.215	3.190	0.268	0.162	0.476	0.369	0.292
	AVERAGE	0.602	0.500	3.487	0.529	0.344	0.476	0.369	0.346
	HIGH	0.675	0.538	3.817	0.573	0.369	0.476	0.369	0.475
BREVARD	LOW	0.675	0.546	11.217	0.911	0.399	0.900	0.427	0.270
	AVERAGE	3.589	2.994	20.580	3.432	2.497	3.712	3.431	2.854
	HIGH	10.521	8.662	35.884	9.591	6.483	9.126	6.203	7.132
BROWARD	LOW	0.840	0.669	21.799	1.293	0.516	0.847	0.471	0.438
	AVERAGE	7.266	4.815	28.884	6.840	4.105	5.850	4.518	4.447
	HIGH	18.300	15.218	49.577	16.737	11.376	16.158	11.020	12.391
CALHOUN	LOW	0.535	0.430	6.338	0.848	0.334			0.687
	AVERAGE	1.170	0.957	6.576	1.046	0.659			0.687
	HIGH	1.625	1.284	8.467	1.088	0.696			0.687

COUNTY	LOSS COSTS	FRAME OWNERS	MASONRY OWNERS	MOBILE HOMES	FRAME RENTERS	MASONRY RENTERS	FRAME CONDO UNIT	MASONRY CONDO UNIT	COMMERCIAL RESIDENTIAL
CHARLOTTE	LOW	0.682	0.533	10.969	0.924	0.420	0.655	0.425	0.314
	AVERAGE	3.224	2.169	14.229	2.694	1.555	3.941	1.573	1.606
	HIGH	7.521	6.193	25.747	6.719	4.533	6.374	4.355	5.144
CITRUS	LOW	0.371	0.294	5.941	0.475	0.279	0.505	0.317	0.325
	AVERAGE	1.254	0.876	6.649	1.046	0.628	1.076	0.709	0.782
	HIGH	1.525	1.211	7.710	1.323	0.839	1.240	0.808	1.038
CLAY	LOW	0.246	0.183	3.460	0.221	0.170	0.266	0.161	0.214
	AVERAGE	0.594	0.544	3.725	0.566	0.391	0.505	0.321	0.472
	HIGH	0.862	0.688	4.652	0.737	0.474	0.707	0.470	0.609
COLLIER	LOW	0.940	0.722	15.367	0.934	0.587	0.886	0.533	0.334
	AVERAGE	5.304	4.012	20.838	5.345	3.338	5.563	3.840	3.026
	HIGH	13.008	10.791	39.547	11.835	8.120	11.301	7.782	8.835
COLUMBIA	LOW	0.220	0.160	2.809	0.208	0.115	0.265	0.265	0.264
	AVERAGE	0.510	0.417	3.267	0.422	0.280	0.429	0.291	0.330
	HIGH	0.678	0.542	3.747	0.579	0.376	0.545	0.300	0.388
DESOTO	LOW	0.768	0.546	10.992	0.856	0.544	0.883	0.420	0.555
	AVERAGE	2.098	1.593	11.138	1.877	1.163	1.577	1.021	0.879
	HIGH	2.323	1.835	11.819	1.989	1.253	1.853	1.208	1.586
DIXIE	LOW	0.387	0.323	4.105	0.616	0.367	0.357	0.237	0.220
	AVERAGE	0.924	0.644	4.574	0.719	0.435	0.761	0.640	0.503
	HIGH	2.346	1.901	9.811	0.776	0.463	1.821	1.225	0.566

COUNTY	LOSS COSTS	FRAME OWNERS	MASONRY OWNERS	MOBILE HOMES	FRAME RENTERS	MASONRY RENTERS	FRAME CONDO UNIT	MASONRY CONDO UNIT	COMMERCIAL RESIDENTIAL
DUVAL	LOW	0.211	0.175	2.941	0.220	0.165	0.245	0.140	0.092
	AVERAGE	0.811	0.658	4.168	0.706	0.482	0.656	0.512	0.574
	HIGH	2.545	2.066	11.227	2.265	1.507	2.001	1.460	1.631
ESCAMBIA	LOW	0.615	0.494	7.613	0.540	0.354	1.240	0.616	0.645
	AVERAGE	5.074	3.927	17.338	4.407	3.070	6.091	4.790	3.371
	HIGH	12.000	8.261	36.401	11.221	7.503	9.064	6.535	6.887
FLAGLER	LOW	0.344	0.303	5.239	0.385	0.236	0.660	0.223	0.206
	AVERAGE	1.890	1.075	9.171	1.494	0.828	2.064	0.937	1.088
	HIGH	3.590	2.880	15.552	3.250	2.101	3.074	2.001	2.472
FRANKLIN	LOW	1.848	2.483	20.767	5.129	3.578	2.891	1.899	1.565
	AVERAGE	6.574	5.683	23.510	6.838	4.303	4.551	4.644	3.303
	HIGH	8.350	6.861	27.324	7.850	5.341	7.519	5.109	5.572
GADSDEN	LOW	0.257	0.241	3.628	0.285	0.188			0.406
	AVERAGE	0.682	0.572	4.048	0.656	0.424			0.415
	HIGH	0.809	0.644	4.639	0.701	0.452			0.567
GILCHRIST	LOW	0.382	0.292	4.110	0.414	0.374		0.456	0.501
	AVERAGE	0.811	0.664	4.539	0.780	0.507		0.456	0.501
	HIGH	0.967	0.775	4.978	0.834	0.541		0.456	0.501
GLADES	LOW	1.085	0.867	14.822	2.137	0.772			
	AVERAGE	2.776	2.090	14.840	2.556	1.527			
	HIGH	3.043	2.401	15.718	2.602	1.637			

COUNTY	LOSS COSTS	FRAME OWNERS	MASONRY OWNERS	MOBILE HOMES	FRAME RENTERS	MASONRY RENTERS	FRAME CONDO UNIT	MASONRY CONDO UNIT	COMMERCIAL RESIDENTIAL
GULF	LOW	0.663	0.623	9.428	1.473	0.966	1.454	1.288	1.118
	AVERAGE	4.243	3.874	13.944	5.033	3.369	3.662	3.045	3.174
	HIGH	6.321	5.102	23.192	5.963	3.897	5.625	3.697	4.276
HAMILTON	LOW	0.168	0.165	2.359	0.181	0.236		0.209	0.194
	AVERAGE	0.395	0.329	2.477	0.357	0.240		0.209	0.305
	HIGH	0.487	0.388	2.850	0.410	0.268		0.209	0.350
HARDEE	LOW	0.683	0.556	9.860	0.802	0.485			0.805
	AVERAGE	1.842	1.428	10.029	1.658	1.023			1.074
	HIGH	2.039	1.614	10.701	1.745	1.099			1.399
HENDRY	LOW	1.115	0.840	14.234	1.195	0.767	1.996	0.942	0.821
	AVERAGE	3.173	2.457	16.221	2.730	1.797	2.977	1.862	1.983
	HIGH	4.014	3.158	19.472	3.463	2.153	3.199	2.065	2.804
HERNANDO	LOW	0.549	0.358	6.853	0.604	0.363	1.163	0.576	0.353
	AVERAGE	1.930	1.357	7.990	1.455	0.933	1.782	1.175	0.907
	HIGH	3.798	3.079	14.955	3.404	2.234	2.728	2.133	1.794
HIGHLANDS	LOW	0.650	0.477	9.723	0.716	0.461	1.264	0.383	0.454
	AVERAGE	1.938	1.490	10.730	1.642	0.995	1.521	1.059	1.001
	HIGH	3.124	2.466	16.254	2.673	1.680	2.158	1.627	1.899
HILLSBOROUGH	LOW	0.572	0.437	8.468	0.584	0.354	0.572	0.390	0.358
	AVERAGE	2.335	1.684	10.212	2.056	1.261	1.934	1.321	1.209
	HIGH	5.390	4.417	18.786	4.806	3.213	4.544	3.074	3.722

COUNTY	LOSS COSTS	FRAME OWNERS	MASONRY OWNERS	MOBILE HOMES	FRAME RENTERS	MASONRY RENTERS	FRAME CONDO UNIT	MASONRY CONDO UNIT	COMMERCIAL RESIDENTIAL
HOLMES	LOW	0.390	0.377	5.715	0.414	0.461	0.880		0.462
	AVERAGE	0.985	0.810	5.780	0.869	0.569	0.880		0.502
	HIGH	1.085	0.861	6.154	0.926	0.594	0.880		0.543
INDIAN RIVER	LOW	1.167	0.758	16.562	1.648	0.777	1.586	0.723	0.681
	AVERAGE	6.729	4.338	22.342	6.512	3.652	6.683	5.045	4.656
	HIGH	13.127	10.808	43.696	12.010	8.100	11.464	7.749	8.870
JACKSON	LOW	0.307	0.305	4.203	0.365	0.333	0.725	0.427	0.317
	AVERAGE	0.860	0.706	5.076	0.762	0.507	0.725	0.485	0.484
	HIGH	1.255	0.993	6.922	1.085	0.696	0.725	0.558	0.680
JEFFERSON	LOW	0.227	0.214	3.099	0.238	0.268			0.288
	AVERAGE	0.504	0.413	3.162	0.471	0.309			0.307
	HIGH	0.623	0.496	3.580	0.538	0.347			0.404
LAFAYETTE	LOW	0.326	0.266	3.462	0.525	0.276			
	AVERAGE	0.635	0.528	3.658	0.593	0.358			
	HIGH	0.709	0.565	3.817	0.612	0.398			
LAKE	LOW	0.407	0.334	5.571	0.462	0.269	0.616	0.323	0.334
	AVERAGE	1.314	0.980	7.940	1.147	0.714	1.313	0.817	0.858
	HIGH	1.991	1.575	10.803	1.687	1.074	1.481	0.979	1.306
LEE	LOW	0.701	0.543	11.933	0.714	0.403	0.670	0.395	0.249
	AVERAGE	4.699	2.075	15.588	3.712	1.766	4.126	2.185	2.025
	HIGH	11.347	9.415	34.936	10.240	7.027	9.762	6.735	7.736

COUNTY	LOSS COSTS	FRAME OWNERS	MASONRY OWNERS	MOBILE HOMES	FRAME RENTERS	MASONRY RENTERS	FRAME CONDO UNIT	MASONRY CONDO UNIT	COMMERCIAL RESIDENTIAL
LEON	LOW	0.238	0.203	3.551	0.265	0.176	0.258	0.167	0.089
	AVERAGE	0.671	0.550	4.096	0.576	0.384	0.459	0.338	0.426
	HIGH	0.827	0.656	4.520	0.722	0.465	0.683	0.431	0.579
LEVY	LOW	0.348	0.295	4.939	0.398	0.244	0.386	1.012	0.205
	AVERAGE	1.346	0.830	5.579	1.165	0.564	2.555	1.587	1.478
	HIGH	3.656	2.988	14.098	3.323	1.545	3.145	2.136	2.504
LIBERTY	LOW	0.508	0.403	5.757	0.841	0.633			
	AVERAGE	1.057	0.859	5.947	0.988	0.649			
	HIGH	1.173	0.929	6.355	1.023	0.657			
MADISON	LOW	0.216	0.182	2.475	0.213	0.250			0.260
	AVERAGE	0.473	0.384	2.776	0.436	0.284			0.266
	HIGH	0.549	0.439	3.115	0.471	0.306			0.347
MANATEE	LOW	0.674	0.473	10.031	0.846	0.384	0.687	0.324	0.307
	AVERAGE	3.929	2.453	13.592	3.611	2.013	4.623	2.671	2.469
	HIGH	9.529	7.901	30.418	8.557	5.860	8.173	5.618	6.497
MARION	LOW	0.313	0.220	4.058	0.331	0.196	0.387	0.209	0.206
	AVERAGE	0.977	0.691	5.397	0.790	0.499	0.785	0.533	0.506
	HIGH	1.200	0.953	6.648	1.021	0.648	0.966	0.637	0.817
MARTIN	LOW	1.388	0.979	20.867	3.290	0.759	1.968	0.888	1.000
	AVERAGE	8.351	5.655	34.076	7.784	4.458	9.489	5.499	4.574
	HIGH	13.118	10.711	44.032	12.068	8.013	11.476	7.660	8.945

COUNTY	LOSS COSTS	FRAME OWNERS	MASONRY OWNERS	MOBILE HOMES	FRAME RENTERS	MASONRY RENTERS	FRAME CONDO UNIT	MASONRY CONDO UNIT	COMMERCIAL RESIDENTIAL
MIAMI-DADE	LOW	1.077	0.688	22.240	0.966	0.607	0.923	0.480	0.337
	AVERAGE	7.038	5.361	25.570	8.722	5.561	7.708	6.708	4.525
	HIGH	24.668	20.659	66.187	22.536	15.639	21.756	15.060	16.612
MONROE	LOW	5.884	4.494	59.261	8.544	5.664	6.948	4.130	3.855
	AVERAGE	21.536	17.220	63.945	21.487	15.013	22.618	14.167	12.783
	HIGH	28.449	24.009	74.132	26.481	18.674	25.640	18.013	18.916
NASSAU	LOW	0.201	0.161	2.445	0.206	0.109	0.185	0.197	0.158
	AVERAGE	1.099	0.745	3.606	1.096	0.756	1.343	0.896	0.866
	HIGH	1.746	1.417	8.077	1.541	1.025	1.468	1.002	1.214
OKALOOSA	LOW	0.473	0.336	6.104	0.462	0.302	0.523	0.437	0.536
	AVERAGE	5.686	4.707	13.921	5.172	3.383	8.068	5.624	5.180
	HIGH	11.205	9.171	37.996	10.573	7.092	10.097	6.779	7.550
OKEECHOBEE	LOW	1.195	0.844	16.980	1.366	0.874	2.007	0.902	1.426
	AVERAGE	4.292	3.118	22.182	3.571	2.227	3.970	2.730	2.550
	HIGH	5.414	4.293	24.753	4.766	2.998	4.426	2.861	2.670
ORANGE	LOW	0.471	0.352	6.896	0.492	0.284	0.408	0.247	0.143
	AVERAGE	1.231	0.971	8.060	1.007	0.640	0.944	0.623	0.701
	HIGH	1.887	1.494	10.112	1.599	1.021	1.477	0.995	1.303
OSCEOLA	LOW	0.496	0.368	7.404	0.525	0.342	0.523	0.259	0.154
	AVERAGE	1.402	1.146	9.979	1.159	0.764	0.998	0.611	0.816
	HIGH	2.463	1.942	13.164	2.104	1.224	1.735	1.140	1.522

COUNTY	LOSS COSTS	FRAME OWNERS	MASONRY OWNERS	MOBILE HOMES	FRAME RENTERS	MASONRY RENTERS	FRAME CONDO UNIT	MASONRY CONDO UNIT	COMMERCIAL RESIDENTIAL
PALM BEACH	LOW	1.231	0.974	20.937	1.298	0.766	1.249	0.675	0.632
	AVERAGE	8.445	5.495	33.044	8.021	4.970	7.921	4.936	4.644
	HIGH	17.236	14.266	52.734	15.779	10.712	15.220	10.348	11.693
PASCO	LOW	0.572	0.432	7.477	0.632	0.402	0.686	0.338	0.389
	AVERAGE	2.164	2.091	10.122	1.827	1.364	2.095	1.871	1.669
	HIGH	5.197	4.286	18.199	4.652	3.136	4.409	3.019	3.570
PINELLAS	LOW	0.867	0.587	10.638	1.079	0.476	1.022	0.568	0.351
	AVERAGE	5.070	3.833	15.321	4.203	2.744	4.176	3.056	2.584
	HIGH	8.887	7.386	24.979	7.997	5.515	7.639	5.288	6.068
POLK	LOW	0.532	0.396	7.443	0.493	0.350	0.445	0.326	0.261
	AVERAGE	1.471	1.065	8.515	1.219	0.765	1.124	0.782	0.811
	HIGH	1.911	1.512	10.416	1.616	1.026	1.470	0.973	1.343
PUTNAM	LOW	0.338	0.229	3.907	0.318	0.207	0.553	0.219	0.317
	AVERAGE	0.776	0.627	4.678	0.671	0.436	0.677	0.414	0.502
	HIGH	1.202	0.949	6.758	0.951	0.643	0.901	0.634	0.754
ST. JOHNS	LOW	0.300	0.258	4.489	0.348	0.193	0.293	0.181	0.223
	AVERAGE	1.350	1.301	7.208	1.377	0.934	1.771	1.282	1.327
	HIGH	3.230	2.598	14.149	2.895	1.906	2.749	1.820	2.226
ST. LUCIE	LOW	1.177	0.915	19.853	1.382	0.752	1.163	0.697	0.612
	AVERAGE	5.793	3.296	28.703	5.514	2.989	6.979	5.160	3.732
	HIGH	13.986	11.492	46.760	12.837	8.620	12.226	8.242	9.485

COUNTY	LOSS COSTS	FRAME OWNERS	MASONRY OWNERS	MOBILE HOMES	FRAME RENTERS	MASONRY RENTERS	FRAME CONDO UNIT	MASONRY CONDO UNIT	COMMERCIAL RESIDENTIAL
SANTA ROSA	LOW	0.605	0.521	7.935	0.760	0.512	1.631	1.127	0.794
	AVERAGE	6.300	4.454	17.957	6.104	3.949	10.537	5.695	5.275
	HIGH	13.776	11.284	46.289	12.954	8.703	12.368	8.342	9.283
SARASOTA	LOW	0.666	0.461	9.953	0.807	0.418	0.801	0.358	0.443
	AVERAGE	4.280	2.906	16.045	3.904	2.446	4.493	2.972	2.605
	HIGH	8.134	6.777	25.475	7.318	5.042	6.986	4.846	5.560
SEMINOLE	LOW	0.470	0.354	6.748	0.470	0.277	0.482	0.304	0.141
	AVERAGE	1.237	0.955	7.393	0.974	0.636	0.946	0.623	0.717
	HIGH	1.522	1.205	8.442	1.290	0.821	1.214	0.765	1.018
SUMTER	LOW	0.404	0.324	6.354	0.433	0.256	0.486	0.311	0.303
	AVERAGE	0.748	0.667	6.907	0.837	0.600	1.023	0.499	0.485
	HIGH	1.458	1.155	7.921	1.235	0.792	1.061	0.699	0.938
SUWANNEE	LOW	0.232	0.176	3.027	0.242	0.262	0.477		0.358
	AVERAGE	0.552	0.450	3.316	0.480	0.321	0.477		0.422
	HIGH	0.735	0.587	3.999	0.631	0.409	0.477		0.499
TAYLOR	LOW	0.300	0.272	3.757	0.499	0.226	0.341	0.424	0.408
	AVERAGE	0.837	0.638	4.731	0.673	0.428	0.937	0.685	0.649
	HIGH	1.591	1.279	7.306	1.432	0.470	1.365	0.910	0.914
UNION	LOW	0.274	0.186	3.055	0.423	0.159		0.284	0.311
	AVERAGE	0.541	0.436	3.289	0.493	0.319		0.284	0.362
	HIGH	0.612	0.488	3.485	0.520	0.338		0.284	0.437

COUNTY	LOSS COSTS	FRAME OWNERS	MASONRY OWNERS	MOBILE HOMES	FRAME RENTERS	MASONRY RENTERS	FRAME CONDO UNIT	MASONRY CONDO UNIT	COMMERCIAL RESIDENTIAL
VOLUSIA	LOW	0.389	0.279	5.732	0.412	0.269	0.409	0.274	0.266
	AVERAGE	2.057	1.452	10.041	1.842	1.097	2.352	1.905	1.585
	HIGH	4.749	3.844	19.415	4.277	2.803	4.051	2.690	3.250
WAKULLA	LOW	0.342	0.309	5.262	0.436	0.284	0.735	0.488	0.375
	AVERAGE	1.224	1.054	5.874	1.023	0.897	1.756	2.078	0.817
	HIGH	3.873	3.140	14.681	3.620	2.389	3.390	2.265	2.637
WALTON	LOW	0.518	0.359	7.246	0.541	0.367	1.138	0.370	0.342
	AVERAGE	5.248	3.302	12.514	5.474	3.563	7.610	4.435	4.473
	HIGH	10.280	8.396	35.691	9.696	6.460	9.228	6.174	6.936
WASHINGTON	LOW	0.491	0.489	6.832	0.573	0.666	1.388		0.484
	AVERAGE	1.269	1.079	7.417	1.202	0.806	1.441		0.656
	HIGH	2.069	1.640	10.312	1.829	1.167	1.493		0.701
STATEWIDE	LOW	0.168	0.156	2.359	0.181	0.109	0.185	0.140	0.089
	AVERAGE	3.009	2.937	11.982	2.261	2.471	3.846	3.794	3.136
	HIGH	28.449	24.009	74.132	26.481	18.674	25.640	18.013	18.916

Form A-4B: Output Ranges (2012 FHCF Exposure Data)

A. *Provide personal and commercial residential output ranges in the format shown in the file named "2013FormA4B.xlsx" by using an automated program or script. Provide this form in Excel format. The file name shall include the abbreviated name of the modeling organization, the standards year, and the form name. Form A-4B (Output Ranges, 2012 FHCF Exposure Data) shall also be included in a submission appendix.*

A hard copy of Form A-4B is included in this submission appendix and is also provided in Excel format.

B. *Provide loss costs rounded to three (3) decimal places by county. Within each county, loss costs shall be shown separately per $1,000 of exposure for frame owners, masonry owners, frame renters, masonry renters, frame condo unit owners, masonry condo unit owners, mobile home, and commercial residential. For each of these categories using ZIP Code centroids, the output range shall show the highest loss cost, the lowest loss cost, and the weighted average loss cost. The aggregate residential exposure data for this form shall be developed from the information in the file named "hlpm2012c.exe," except for insured value and deductibles information. Insured values shall be based on the output range specifications below. Deductible amounts of 0% and as specified in the output range specifications will be assumed to be uniformly applied to all risks. When calculating the weighted average loss costs, weight the loss costs by the total insured value calculated above. Include the statewide range of loss costs (i.e., low, high, and weighted average).*

All requested loss costs are provided in Form A-4B, calculated using gross modeled losses based on the 2012 FHCF aggregate exposure data prepared as specified.

There are several county and type of business combinations for which there are no exposures in the "hlpm2012c.exe" file. In these cases, a loss cost is not generated by the software blank cells have been used to signify no exposure.

C. *If a modeling organization has loss costs for a ZIP Code for which there is no exposure, give the loss costs zero weight (i.e., assume the exposure in that ZIP Code is zero). Provide a list in the submission document of those ZIP Codes where this occurs.*

A loss cost is not produced in any case where there is no exposure. FHCF Zip Codes are remapped to current ZIP Codes by AIR. See Appendix 10 on page 506 of this submission for the list

D. *If a modeling organization does not have loss costs for a ZIP Code for which there is some exposure, do not assume such loss costs are zero, but use only the exposures for which there are loss costs in calculating the weighted average loss costs. Provide a list in the submission document of the ZIP Codes where this occurs.*

There are no ZIP Codes in the FHCF data for which AIR does not produce loss costs. FHCF ZIP Codes are remapped to current ZIP Codes by AIR.

E. *All anomalies in loss costs that are not consistent with the requirements of Standard A-6 (Loss Output) and have been explained in Disclosure A-6.15 shall be shaded.*

All such anomalies are shaded in orange below in Table 56 and Table 57 below

Indicate if per diem is used in producing loss costs for Coverage D (ALE) in the personal residential output ranges. If a per diem rate is used in the submission, a rate of $150.00 per day per policy shall be used.

A $150 per diem per policy is used in producing loss costs for Coverage D.

Table 56. Loss Costs per $1000 for 0% Deductible

County	Loss Costs	Frame Owners	Masonry Owners	Mobile Homes	Frame Renters	Masonry Renters	Frame Condo Unit	Masonry Condo Unit	Commercial Residential
ALACHUA	LOW	0.316	0.257	2.473	0.295	0.183	0.287	0.202	0.237
	AVERAGE	0.781	0.711	4.828	0.643	0.442	0.675	0.448	0.577
	HIGH	1.152	0.926	8.371	0.959	0.615	0.921	0.632	0.806
BAKER	LOW	0.223	0.189	1.680	0.201	0.159			
	AVERAGE	0.508	0.444	2.991	0.457	0.332			
	HIGH	0.675	0.542	5.224	0.551	0.363			
BAY	LOW	0.703	0.709	5.557	0.838	0.722	1.331	0.745	0.871
	AVERAGE	5.103	3.978	18.108	4.087	2.858	8.010	4.510	5.809
	HIGH	11.030	9.122	48.422	10.320	6.906	9.946	6.740	8.218
BRADFORD	LOW	0.312	0.270	2.189	0.305	0.203			
	AVERAGE	0.759	0.665	4.148	0.681	0.436			
	HIGH	0.906	0.727	6.845	0.742	0.478			
BREVARD	LOW	0.812	0.686	7.387	0.861	0.475	1.046	0.476	0.327
	AVERAGE	4.116	3.349	28.118	3.825	2.666	4.121	3.736	3.736
	HIGH	12.048	10.020	52.257	10.906	7.346	10.526	7.196	9.040
BROWARD	LOW	1.048	0.881	11.459	0.887	0.503	0.863	0.529	0.489
	AVERAGE	7.516	5.434	40.154	4.941	4.333	5.739	4.600	5.116
	HIGH	20.380	17.095	74.224	18.616	12.620	17.557	12.429	15.053
CALHOUN	0.700	0.449	4.126	0.582	0.667				0.700
	1.457	1.225	6.866	1.316	0.852				1.457
	2.107	1.697	14.000	1.830	0.899				2.107

COUNTY	LOSS COSTS	FRAME OWNERS	MASONRY OWNERS	MOBILE HOMES	FRAME RENTERS	MASONRY RENTERS	FRAME CONDO UNIT	MASONRY CONDO UNIT	COMMERCIAL RESIDENTIAL
CHARLOTTE	LOW	0.828	0.699	5.867	0.949	0.455	0.716	0.476	0.475
	AVERAGE	3.578	2.434	16.398	2.747	1.645	4.000	1.716	1.973
	HIGH	8.690	7.227	39.112	7.699	5.171	7.435	5.102	6.593
CITRUS	LOW	0.505	0.404	3.943	0.538	0.293	0.562	0.410	0.500
	AVERAGE	1.523	1.071	8.630	1.234	0.737	1.368	0.917	1.134
	HIGH	1.937	1.559	12.762	1.643	1.044	1.592	1.049	1.498
CLAY	LOW	0.307	0.246	2.360	0.262	0.211	0.271	0.198	0.250
	AVERAGE	0.750	0.704	4.454	0.663	0.478	0.576	0.390	0.593
	HIGH	1.137	0.915	8.165	0.943	0.608	0.937	0.627	0.909
COLLIER	LOW	1.135	0.958	8.116	0.994	0.628	0.914	0.578	0.502
	AVERAGE	5.419	3.924	28.283	4.623	3.136	5.568	3.595	3.738
	HIGH	14.679	12.295	57.881	13.306	9.090	12.853	8.899	10.965
COLUMBIA	LOW	0.251	0.202	1.936	0.237	0.171	0.511	0.318	0.283
	AVERAGE	0.634	0.540	3.722	0.518	0.352	0.574	0.393	0.305
	HIGH	0.901	0.726	6.670	0.745	0.473	0.729	0.406	0.407
DESOTO	LOW	0.930	0.743	7.122	0.975	0.660	1.100	0.685	1.014
	AVERAGE	2.561	1.931	12.903	2.260	1.309	1.732	1.146	1.255
	HIGH	2.971	2.386	19.645	2.497	1.572	2.174	1.584	1.646
DIXIE	LOW	0.480	0.343	2.762	0.398	0.434	0.433	0.242	0.324
	AVERAGE	1.085	0.778	5.207	0.876	0.576	0.830	0.517	0.703
	HIGH	2.826	2.315	15.487	0.981	0.637	1.090	0.722	0.932

COUNTY	LOSS COSTS	FRAME OWNERS	MASONRY OWNERS	MOBILE HOMES	FRAME RENTERS	MASONRY RENTERS	FRAME CONDO UNIT	MASONRY CONDO UNIT	COMMERCIAL RESIDENTIAL
DUVAL	LOW	0.258	0.227	2.035	0.257	0.178	0.296	0.184	0.132
	AVERAGE	0.968	0.836	4.986	0.798	0.547	0.713	0.549	0.705
	HIGH	2.911	2.552	16.811	2.530	1.801	2.474	1.603	2.417
ESCAMBIA	LOW	0.548	0.464	5.042	0.610	0.697	1.152	0.828	0.869
	AVERAGE	4.895	4.531	18.656	4.494	3.296	6.381	4.596	5.015
	HIGH	11.652	9.590	52.862	12.675	8.466	10.443	6.999	8.756
FLAGLER	LOW	0.438	0.351	3.509	0.440	0.234	0.679	0.265	0.338
	AVERAGE	2.033	1.228	10.676	1.496	0.789	2.371	1.037	1.312
	HIGH	4.348	3.530	24.412	3.862	2.496	3.739	2.459	3.364
FRANKLIN	LOW	2.162	1.748	11.728	3.058	2.488	2.639	1.867	4.208
	AVERAGE	6.743	6.298	23.299	7.259	4.851	4.636	4.556	5.380
	HIGH	9.480	7.874	40.148	8.839	5.999	8.559	5.853	7.004
GADSDEN	LOW	0.324	0.296	2.441	0.261	0.278		0.553	0.606
	AVERAGE	0.853	0.760	4.847	0.827	0.556		0.553	0.866
	HIGH	1.092	0.878	8.165	0.914	0.588		0.553	0.884
GILCHRIST	LOW	0.464	0.299	2.763	0.420	0.326		0.602	
	AVERAGE	0.960	0.813	5.030	0.960	0.627		0.602	
	HIGH	1.250	1.011	8.558	1.052	0.680		0.602	
GLADES	LOW	1.247	0.998	9.483	2.945	1.537			
	AVERAGE	3.462	2.388	17.581	3.234	1.940			
	HIGH	3.925	3.153	25.753	3.306	2.074			

COUNTY	LOSS COSTS	FRAME OWNERS	MASONRY OWNERS	MOBILE HOMES	FRAME RENTERS	MASONRY RENTERS	FRAME CONDO UNIT	MASONRY CONDO UNIT	COMMERCIAL RESIDENTIAL
GULF	LOW	0.733	0.589	4.936	0.924	0.594	1.373	0.975	0.878
	AVERAGE	4.508	4.434	14.752	5.287	3.313	3.075	1.533	3.378
	HIGH	7.327	5.997	34.990	6.836	4.468	6.548	4.352	5.532
HAMILTON	LOW	0.254	0.182	1.644	0.225	0.254			
	AVERAGE	0.510	0.441	2.896	0.455	0.311			
	HIGH	0.661	0.530	5.236	0.538	0.352			
HARDEE	LOW	0.836	0.669	6.443	0.862	0.598		1.387	0.673
	AVERAGE	2.314	1.791	11.988	1.967	1.235		1.387	0.995
	HIGH	2.639	2.118	18.078	2.206	1.390		1.387	1.317
HENDRY	LOW	1.263	1.012	7.430	1.100	0.959	2.983	0.869	1.236
	AVERAGE	3.889	2.896	18.616	3.293	2.095	3.737	2.078	2.038
	HIGH	5.099	4.096	32.181	4.350	2.704	4.161	2.710	2.824
HERNANDO	LOW	0.661	0.480	4.559	0.631	0.327	1.229	0.576	0.474
	AVERAGE	2.270	1.584	11.347	1.598	1.039	2.342	1.448	1.129
	HIGH	4.487	3.678	22.863	3.963	2.600	3.832	2.559	2.453
HIGHLANDS	LOW	0.824	0.651	6.360	0.870	0.430	0.835	0.590	0.640
	AVERAGE	2.435	1.888	15.767	2.001	1.205	2.055	1.390	1.499
	HIGH	4.031	3.238	26.674	3.396	2.131	2.853	1.870	2.829
HILLSBOROUGH	LOW	0.708	0.566	5.589	0.638	0.382	0.614	0.413	0.504
	AVERAGE	2.580	1.989	13.066	2.036	1.390	2.120	1.489	1.615
	HIGH	6.308	5.221	28.367	5.566	3.709	5.368	3.651	4.841
HOLMES	LOW	0.470	0.398	3.773	0.556	0.778	1.201		0.809
	AVERAGE	1.241	1.094	6.396	1.091	0.778	1.201		0.930
	HIGH	1.465	1.177	10.691	1.224	0.778	1.201		1.171

COUNTY	LOSS COSTS	FRAME OWNERS	MASONRY OWNERS	MOBILE HOMES	FRAME RENTERS	MASONRY RENTERS	FRAME CONDO UNIT	MASONRY CONDO UNIT	COMMERCIAL RESIDENTIAL
INDIAN RIVER	LOW	1.247	0.999	10.697	1.482	0.781	1.316	0.814	0.891
	AVERAGE	7.339	4.343	29.369	6.382	3.512	6.783	5.427	5.662
	HIGH	14.896	12.391	62.660	13.554	9.118	13.101	8.916	11.105
JACKSON	LOW	0.392	0.359	2.833	0.424	0.452		0.643	0.322
	AVERAGE	1.092	0.948	5.752	0.958	0.656		0.680	0.697
	HIGH	1.669	1.343	11.803	1.272	0.740		0.726	1.054
JEFFERSON	LOW	0.258	0.218	2.116	0.272	0.188	0.520		
	AVERAGE	0.640	0.532	3.659	0.608	0.386	0.520		
	HIGH	0.835	0.671	6.314	0.699	0.452	0.520		
LAFAYETTE	LOW	0.400	0.339	2.350	0.525	0.416	0.720		
	AVERAGE	0.785	0.672	4.138	0.741	0.485	0.720		
	HIGH	0.933	0.751	6.706	0.782	0.509	0.720		
LAKE	LOW	0.516	0.380	3.714	0.431	0.367	0.606	0.400	0.511
	AVERAGE	1.620	1.221	12.172	1.232	0.804	1.626	1.034	1.339
	HIGH	2.615	2.098	18.214	2.167	1.376	1.982	1.314	1.974
LEE	LOW	0.861	0.726	6.302	0.769	0.445	0.733	0.453	0.378
	AVERAGE	4.941	2.277	22.621	2.931	1.692	4.264	2.134	2.458
	HIGH	12.835	10.750	51.358	11.528	7.879	11.139	7.723	9.622
LEON	LOW	0.304	0.257	2.385	0.238	0.181	0.300	0.202	0.137
	AVERAGE	0.848	0.731	5.101	0.687	0.466	0.545	0.425	0.493
	HIGH	1.097	0.883	7.821	0.930	0.598	0.870	0.614	0.882
LEVY	LOW	0.423	0.348	3.298	0.487	0.303	1.613	1.132	0.720
	AVERAGE	1.491	1.006	6.263	1.255	0.681	2.915	1.980	2.159
	HIGH	4.330	3.572	21.794	3.878	2.591	3.744	2.556	3.311

COUNTY	LOSS COSTS	FRAME OWNERS	MASONRY OWNERS	MOBILE HOMES	FRAME RENTERS	MASONRY RENTERS	FRAME CONDO UNIT	MASONRY CONDO UNIT	COMMERCIAL RESIDENTIAL
LIBERTY	LOW	0.637	0.540	3.759	0.550	0.848			
	AVERAGE	1.272	1.108	6.356	1.245	0.848			
	HIGH	1.552	1.249	10.781	1.327	0.848			
MADISON	LOW	0.257	0.226	1.720	0.247	0.177			
	AVERAGE	0.608	0.512	3.352	0.545	0.363			
	HIGH	0.738	0.593	5.610	0.612	0.399			
MANATEE	LOW	0.741	0.625	5.367	0.575	0.407	0.639	0.406	0.438
	AVERAGE	4.135	2.643	19.907	3.551	1.877	4.552	2.902	3.101
	HIGH	10.820	9.049	45.008	9.650	6.585	9.358	6.463	8.109
MARION	LOW	0.348	0.279	2.737	0.356	0.249	0.450	0.285	0.295
	AVERAGE	1.228	0.851	7.433	0.910	0.582	1.006	0.680	0.763
	HIGH	1.590	1.277	11.524	1.301	0.832	1.280	0.857	1.284
MARTIN	LOW	1.615	1.293	10.933	2.092	1.022	2.115	0.934	1.004
	AVERAGE	8.937	6.016	48.603	8.404	4.747	10.463	5.952	5.839
	HIGH	14.927	12.329	64.879	13.661	9.060	13.153	8.853	11.227
MIAMI-DADE	LOW	1.072	0.896	11.717	1.005	0.605	0.950	0.537	0.516
	AVERAGE	8.202	5.962	30.611	8.125	5.699	7.878	5.892	5.237
	HIGH	27.128	22.901	66.333	24.783	17.161	24.096	16.783	19.805
MONROE	LOW	6.168	5.030	35.543	8.575	3.927	7.120	3.427	3.192
	AVERAGE	21.794	18.581	84.163	24.739	16.605	23.465	15.212	13.709
	HIGH	30.912	26.286	100.586	28.775	20.270	27.996	19.788	22.193
NASSAU	LOW	0.215	0.184	1.701	0.211	0.152	0.585	0.247	0.253
	AVERAGE	1.180	0.871	4.234	1.230	0.767	1.400	1.051	1.080
	HIGH	2.171	1.777	13.296	1.875	1.241	1.836	1.254	1.699

COUNTY	LOSS COSTS	FRAME OWNERS	MASONRY OWNERS	MOBILE HOMES	FRAME RENTERS	MASONRY RENTERS	FRAME CONDO UNIT	MASONRY CONDO UNIT	COMMERCIAL RESIDENTIAL
OKALOOSA	LOW	0.531	0.504	4.051	0.599	0.432	0.767	0.404	0.719
	AVERAGE	5.529	5.051	13.711	5.119	3.924	7.689	5.841	5.637
	HIGH	12.682	10.496	54.332	11.883	7.964	11.464	7.765	9.419
OKEECHOBEE	LOW	1.372	1.158	10.870	2.562	1.049	2.404	0.854	1.902
	AVERAGE	4.962	3.591	28.807	4.378	2.695	3.598	3.314	2.900
	HIGH	6.671	5.386	38.787	5.810	3.653	5.549	3.624	3.660
ORANGE	LOW	0.564	0.464	4.569	0.457	0.296	0.489	0.315	0.222
	AVERAGE	1.512	1.265	11.743	1.182	0.762	1.157	0.785	1.002
	HIGH	2.480	1.990	17.153	2.054	1.307	1.973	1.309	1.964
OSCEOLA	LOW	0.591	0.498	4.897	0.555	0.353	0.539	0.351	0.237
	AVERAGE	1.728	1.460	13.570	1.364	0.865	1.245	0.759	0.971
	HIGH	3.210	2.574	21.950	2.692	1.564	2.306	1.590	2.283
PALM BEACH	LOW	1.539	1.299	10.987	1.319	0.854	1.244	0.793	0.909
	AVERAGE	8.908	6.067	40.448	7.994	5.246	8.312	5.381	5.624
	HIGH	19.290	16.115	73.019	17.615	11.928	17.145	11.730	14.309
PASCO	LOW	0.691	0.517	4.952	0.709	0.432	0.612	0.434	0.424
	AVERAGE	2.218	2.365	13.505	1.746	1.416	2.105	2.203	2.136
	HIGH	6.049	5.034	27.490	5.355	3.597	5.174	3.557	4.610
PINELLAS	LOW	0.871	0.702	5.612	1.009	0.486	1.059	0.502	0.648
	AVERAGE	5.611	4.323	23.191	4.009	2.966	4.561	3.321	3.201
	HIGH	10.079	8.448	37.377	9.014	6.186	8.736	6.072	7.563

COUNTY	LOSS COSTS	FRAME OWNERS	MASONRY OWNERS	MOBILE HOMES	FRAME RENTERS	MASONRY RENTERS	FRAME CONDO UNIT	MASONRY CONDO UNIT	COMMERCIAL RESIDENTIAL
POLK	LOW	0.596	0.503	4.927	0.521	0.346	0.521	0.327	0.480
	AVERAGE	1.770	1.358	12.185	1.342	0.934	1.214	0.945	1.021
	HIGH	2.515	2.017	17.750	2.076	1.316	1.980	1.314	1.992
PUTNAM	LOW	0.364	0.282	2.645	0.381	0.263	0.400	0.277	0.579
	AVERAGE	0.997	0.832	6.279	0.874	0.562	0.815	0.457	0.750
	HIGH	1.602	1.284	11.708	1.239	0.790	1.222	0.815	0.898
ST. JOHNS	LOW	0.381	0.323	3.038	0.337	0.256	0.335	0.244	0.281
	AVERAGE	1.475	1.466	8.580	1.509	1.018	1.966	1.494	1.629
	HIGH	3.929	3.196	22.329	3.456	2.268	3.361	2.242	3.046
ST. LUCIE	LOW	1.466	1.239	13.201	1.708	0.815	1.335	0.852	0.872
	AVERAGE	6.507	3.497	37.383	5.848	2.919	7.017	4.784	4.608
	HIGH	15.853	13.167	66.978	14.487	9.701	13.961	9.481	11.854
SANTA ROSA	LOW	0.572	0.640	5.239	0.614	0.597	2.283	1.664	0.707
	AVERAGE	5.047	4.490	18.234	5.520	3.612	11.270	6.259	5.739
	HIGH	15.549	12.882	65.808	14.549	9.765	14.023	9.535	11.541
SARASOTA	LOW	0.721	0.608	5.430	0.858	0.568	0.666	0.439	0.448
	AVERAGE	4.502	3.120	24.136	3.582	2.461	4.971	3.189	3.171
	HIGH	9.263	7.778	38.143	8.269	5.673	8.018	5.582	6.965
SEMINOLE	LOW	0.555	0.445	4.473	0.439	0.295	0.487	0.337	0.217
	AVERAGE	1.530	1.243	11.498	1.204	0.779	1.210	0.817	1.010
	HIGH	2.018	1.618	14.544	1.668	1.061	1.633	1.036	1.552
SUMTER	LOW	0.518	0.437	4.199	0.552	0.292	0.576	0.396	0.425
	AVERAGE	0.902	0.756	9.755	0.835	0.597	1.184	0.557	0.700
	HIGH	1.919	1.539	13.550	1.547	1.008	1.441	0.939	1.412

COUNTY	LOSS COSTS	FRAME OWNERS	MASONRY OWNERS	MOBILE HOMES	FRAME RENTERS	MASONRY RENTERS	FRAME CONDO UNIT	MASONRY CONDO UNIT	COMMERCIAL RESIDENTIAL
SUWANNEE	LOW	0.277	0.223	2.070	0.267	0.193	0.509	0.261	0.488
	AVERAGE	0.694	0.578	3.846	0.597	0.407	0.509	0.261	0.654
	HIGH	0.971	0.782	7.052	0.809	0.525	0.509	0.261	0.749
TAYLOR	LOW	0.349	0.315	2.532	0.595	0.385	0.427	0.453	0.692
	AVERAGE	0.996	0.815	5.101	0.838	0.552	0.844	0.635	0.692
	HIGH	1.970	1.601	11.887	1.733	1.137	1.695	0.856	0.692
UNION	LOW	0.309	0.233	2.105	0.294	0.156	0.302	0.220	0.661
	AVERAGE	0.662	0.566	3.730	0.595	0.406	0.302	0.220	0.661
	HIGH	0.822	0.660	6.288	0.674	0.439	0.302	0.220	0.661
VOLUSIA	LOW	0.468	0.380	3.828	0.439	0.263	0.455	0.311	0.338
	AVERAGE	2.382	1.715	14.159	1.807	1.219	2.769	2.176	2.008
	HIGH	5.686	4.652	30.072	5.041	3.297	4.881	3.262	4.366
WAKULLA	LOW	0.442	0.375	3.482	0.385	0.359	0.968	1.823	0.367
	AVERAGE	1.293	1.238	6.856	0.992	0.668	1.873	2.574	1.968
	HIGH	4.546	3.734	22.111	3.355	2.764	4.000	2.696	2.893
WALTON	LOW	0.613	0.493	4.755	0.588	0.459	1.373	1.016	0.483
	AVERAGE	4.740	3.366	12.323	4.639	3.320	8.163	4.316	6.084
	HIGH	11.690	9.659	51.361	10.938	7.289	10.530	7.110	8.716
WASHINGTON	LOW	0.615	0.494	4.468	0.648	0.463	0.957		0.706
	AVERAGE	1.542	1.392	7.443	1.479	0.987	0.957		0.836
	HIGH	2.648	2.136	16.875	2.306	1.466	0.957		1.026
STATEWIDE	LOW	0.215	0.182	1.644	0.201	0.152	0.271	0.184	0.132
	AVERAGE	3.143	3.271	15.873	2.358	2.453	3.479	3.771	3.908
	HIGH	30.912	26.286	100.586	28.775	20.270	27.996	19.788	22.193

Table 57. Loss Costs per $1000 with Specified Deductibles

County	Loss Costs	Frame Owners	Masonry Owners	Mobile Homes	Frame Renters	Masonry Renters	Frame Condo Unit	Masonry Condo Unit	Commercial Residential
ALACHUA	LOW	0.234	0.190	1.881	0.230	0.139	0.217	0.148	0.159
	AVERAGE	0.581	0.527	3.970	0.495	0.340	0.501	0.330	0.384
	HIGH	0.871	0.693	7.162	0.748	0.479	0.693	0.472	0.532
BAKER	LOW	0.167	0.141	1.242	0.155	0.120			
	AVERAGE	0.377	0.330	2.365	0.354	0.255			
	HIGH	0.504	0.403	4.302	0.427	0.280			
BAY	LOW	0.510	0.518	4.522	0.621	0.551	0.983	0.546	0.599
	AVERAGE	4.282	3.266	16.298	3.436	2.416	6.931	3.831	4.531
	HIGH	9.689	7.919	45.260	9.141	6.118	8.707	5.850	6.519
BRADFORD	LOW	0.232	0.201	1.650	0.237	0.153			
	AVERAGE	0.566	0.493	3.360	0.526	0.336			
	HIGH	0.675	0.538	5.744	0.573	0.369			
BREVARD	LOW	0.601	0.509	5.976	0.661	0.363	0.785	0.351	0.216
	AVERAGE	3.324	2.693	25.444	3.167	2.232	3.354	3.091	2.827
	HIGH	10.521	8.662	48.544	9.591	6.483	9.126	6.203	7.132
BROWARD	LOW	0.770	0.648	9.476	0.677	0.387	0.643	0.393	0.319
	AVERAGE	6.299	4.457	36.849	4.099	3.691	4.682	3.799	3.973
	HIGH	18.300	15.218	69.786	16.737	11.376	15.628	11.020	12.391
CALHOUN	LOW	0.504	0.327	3.285	0.426	0.509			
	AVERAGE	1.094	0.908	5.797	1.010	0.658			
	HIGH	1.625	1.284	12.462	1.435	0.696			

County	Loss Costs	Frame Owners	Masonry Owners	Mobile Homes	Frame Renters	Masonry Renters	Frame Condo Unit	Masonry Condo Unit	Commercial Residential
CHARLOTTE	LOW	0.609	0.514	4.670	0.735	0.347	0.537	0.351	0.318
	AVERAGE	2.904	1.922	14.537	2.250	1.340	3.298	1.349	1.435
	HIGH	7.521	6.193	36.111	6.719	4.533	6.374	4.355	5.144
CITRUS	LOW	0.371	0.297	3.135	0.411	0.224	0.421	0.302	0.341
	AVERAGE	1.180	0.816	7.404	0.978	0.583	1.053	0.701	0.786
	HIGH	1.525	1.211	11.230	1.323	0.839	1.240	0.808	1.038
CLAY	LOW	0.228	0.183	1.792	0.205	0.160	0.206	0.145	0.169
	AVERAGE	0.560	0.525	3.631	0.513	0.370	0.431	0.289	0.398
	HIGH	0.862	0.688	6.943	0.737	0.474	0.707	0.470	0.609
COLLIER	LOW	0.830	0.700	6.648	0.766	0.478	0.669	0.424	0.334
	AVERAGE	4.523	3.224	25.748	3.893	2.668	4.681	2.994	2.886
	HIGH	13.008	10.791	54.116	11.835	8.120	11.301	7.782	8.835
COLUMBIA	LOW	0.186	0.150	1.448	0.181	0.129	0.380	0.233	0.192
	AVERAGE	0.471	0.400	2.998	0.398	0.270	0.424	0.290	0.207
	HIGH	0.678	0.542	5.620	0.579	0.366	0.545	0.300	0.277
DESOTO	LOW	0.674	0.541	5.795	0.729	0.500	0.809	0.500	0.693
	AVERAGE	1.963	1.456	11.133	1.776	1.027	1.297	0.859	0.870
	HIGH	2.323	1.835	17.405	1.989	1.253	1.625	1.208	1.161
DIXIE	LOW	0.356	0.254	2.172	0.304	0.339	0.321	0.178	0.220
	AVERAGE	0.842	0.591	4.360	0.693	0.456	0.649	0.398	0.492
	HIGH	2.346	1.901	13.872	0.776	0.505	0.865	0.566	0.633
DUVAL	LOW	0.193	0.170	1.535	0.198	0.136	0.223	0.136	0.086
	AVERAGE	0.745	0.639	4.127	0.633	0.433	0.548	0.422	0.489
	HIGH	2.367	2.066	14.899	2.099	1.507	2.001	1.293	1.756

County	Loss Costs	Frame Owners	Masonry Owners	Mobile Homes	Frame Renters	Masonry Renters	Frame Condo Unit	Masonry Condo Unit	Commercial Residential
ESCAMBIA	LOW	0.402	0.342	3.940	0.451	0.523	0.834	0.603	0.582
	AVERAGE	4.021	3.692	16.613	3.731	2.770	5.345	3.845	3.787
	HIGH	10.166	8.261	49.351	11.221	7.503	9.064	6.018	6.887
FLAGLER	LOW	0.319	0.257	2.704	0.338	0.176	0.511	0.192	0.223
	AVERAGE	1.617	0.950	9.208	1.213	0.631	1.905	0.811	0.941
	HIGH	3.590	2.880	21.974	3.250	2.101	3.074	2.001	2.472
FRANKLIN	LOW	1.733	1.390	10.291	2.566	2.105	2.159	1.525	3.324
	AVERAGE	5.846	5.436	21.310	6.401	4.291	3.961	3.937	4.281
	HIGH	8.350	6.861	37.460	7.850	5.341	7.519	5.109	5.572
GADSDEN	LOW	0.238	0.217	1.868	0.201	0.209		0.404	0.406
	AVERAGE	0.629	0.556	4.011	0.627	0.425		0.404	0.558
	HIGH	0.809	0.644	6.984	0.701	0.452		0.404	0.567
GILCHRIST	LOW	0.344	0.222	2.149	0.325	0.253		0.456	
	AVERAGE	0.735	0.618	4.182	0.759	0.497		0.456	
	HIGH	0.967	0.775	7.376	0.834	0.541		0.456	
GLADES	LOW	0.902	0.725	7.746	2.269	1.193			
	AVERAGE	2.664	1.792	15.376	2.535	1.526			
	HIGH	3.043	2.401	23.078	2.602	1.637			
GULF	LOW	0.527	0.425	3.990	0.690	0.446	1.049	0.745	0.613
	AVERAGE	3.788	3.708	13.222	4.564	2.855	2.524	1.213	2.544
	HIGH	6.321	5.102	32.464	5.963	3.897	5.625	3.697	4.276
HAMILTON	LOW	0.186	0.135	1.211	0.173	0.192			
	AVERAGE	0.375	0.323	2.284	0.347	0.236			
	HIGH	0.487	0.388	4.314	0.410	0.268			

County	Loss Costs	Frame Owners	Masonry Owners	Mobile Homes	Frame Renters	Masonry Renters	Frame Condo Unit	Masonry Condo Unit	Commercial Residential
HARDEE	LOW	0.611	0.493	5.121	0.652	0.456		1.037	0.452
	AVERAGE	1.758	1.342	10.236	1.535	0.964		1.037	0.680
	HIGH	2.039	1.614	15.873	1.745	1.099		1.037	0.908
HENDRY	LOW	0.919	0.738	5.979	0.838	0.733	2.266	0.628	0.821
	AVERAGE	3.035	2.203	16.409	2.597	1.655	2.858	1.566	1.406
	HIGH	4.014	3.158	29.173	3.463	2.153	3.199	2.065	1.991
HERNANDO	LOW	0.492	0.358	3.664	0.488	0.252	0.947	0.435	0.325
	AVERAGE	1.834	1.253	9.923	1.299	0.848	1.905	1.159	0.809
	HIGH	3.798	3.079	20.773	3.404	2.234	3.221	2.133	1.794
HIGHLANDS	LOW	0.597	0.477	4.995	0.646	0.327	0.602	0.428	0.426
	AVERAGE	1.834	1.401	13.679	1.540	0.929	1.518	1.029	1.020
	HIGH	3.124	2.466	23.881	2.673	1.680	2.158	1.405	1.899
HILLSBOROUGH	LOW	0.521	0.418	4.462	0.505	0.293	0.467	0.308	0.354
	AVERAGE	2.085	1.580	11.432	1.672	1.147	1.701	1.185	1.170
	HIGH	5.390	4.417	25.945	4.806	3.213	4.544	3.074	3.722
HOLMES	LOW	0.342	0.291	2.938	0.414	0.594	0.880		0.543
	AVERAGE	0.917	0.802	5.323	0.824	0.594	0.880		0.615
	HIGH	1.085	0.861	9.232	0.926	0.594	0.880		0.759
INDIAN RIVER	LOW	0.911	0.732	8.874	1.145	0.596	0.971	0.598	0.602
	AVERAGE	6.162	3.550	26.540	5.432	2.968	5.684	4.574	4.422
	HIGH	13.127	10.808	58.593	12.010	8.100	11.464	7.749	8.870
JACKSON	LOW	0.287	0.262	2.144	0.313	0.338		0.468	0.212
	AVERAGE	0.802	0.691	4.762	0.720	0.497		0.495	0.458
	HIGH	1.255	0.993	10.313	0.954	0.562		0.530	0.680

County	Loss Costs	Frame Owners	Masonry Owners	Mobile Homes	Frame Renters	Masonry Renters	Frame Condo Unit	Masonry Condo Unit	Commercial Residential
JEFFERSON	LOW	0.190	0.161	1.609	0.205	0.141	0.383		
	AVERAGE	0.473	0.392	2.971	0.465	0.295	0.383		
	HIGH	0.623	0.496	5.356	0.538	0.347	0.383		
LAFAYETTE	LOW	0.295	0.249	1.811	0.406	0.323	0.540		
	AVERAGE	0.593	0.505	3.391	0.578	0.379	0.540		
	HIGH	0.709	0.565	5.688	0.612	0.398	0.540		
LAKE	LOW	0.378	0.280	2.831	0.335	0.279	0.439	0.291	0.341
	AVERAGE	1.211	0.902	10.489	0.943	0.619	1.210	0.766	0.890
	HIGH	1.991	1.575	16.014	1.687	1.074	1.481	0.979	1.306
LEE	LOW	0.627	0.530	5.074	0.591	0.341	0.540	0.332	0.249
	AVERAGE	4.120	1.780	20.397	2.400	1.379	3.512	1.713	1.827
	HIGH	11.347	9.415	47.863	10.240	7.027	9.762	6.735	7.736
LEON	LOW	0.222	0.189	1.831	0.181	0.135	0.220	0.146	0.089
	AVERAGE	0.631	0.540	4.274	0.523	0.357	0.399	0.312	0.324
	HIGH	0.827	0.656	6.742	0.722	0.465	0.646	0.456	0.579
LEVY	LOW	0.316	0.255	2.608	0.371	0.228	1.297	0.904	0.492
	AVERAGE	1.176	0.768	5.270	1.007	0.535	2.424	1.638	1.606
	HIGH	3.656	2.988	19.702	3.323	2.228	3.145	2.136	2.504
LIBERTY	LOW	0.459	0.388	2.988	0.404	0.657			
	AVERAGE	0.953	0.822	5.366	0.957	0.657			
	HIGH	1.173	0.929	9.444	1.023	0.657			

County	Loss Costs	Frame Owners	Masonry Owners	Mobile Homes	Frame Renters	Masonry Renters	Frame Condo Unit	Masonry Condo Unit	Commercial Residential
MADISON	LOW	0.190	0.166	1.271	0.190	0.133			
	AVERAGE	0.450	0.378	2.691	0.419	0.278			
	HIGH	0.549	0.439	4.690	0.471	0.306			
MANATEE	LOW	0.546	0.460	4.321	0.442	0.311	0.477	0.298	0.296
	AVERAGE	3.457	2.157	17.917	3.013	1.579	3.852	2.427	2.398
	HIGH	9.529	7.901	41.820	8.557	5.860	8.173	5.618	6.497
MARION	LOW	0.255	0.206	2.069	0.269	0.190	0.338	0.209	0.195
	AVERAGE	0.925	0.634	6.256	0.707	0.451	0.752	0.509	0.513
	HIGH	1.200	0.953	9.943	1.021	0.648	0.958	0.637	0.849
MARTIN	LOW	1.175	0.943	8.973	1.592	0.783	1.560	0.688	0.681
	AVERAGE	7.572	4.982	44.976	7.214	4.055	8.995	5.017	4.531
	HIGH	13.118	10.711	60.671	12.068	8.013	11.476	7.660	8.945
MIAMI-DADE	LOW	0.785	0.659	9.716	0.771	0.462	0.699	0.398	0.337
	AVERAGE	6.902	4.910	27.727	6.996	4.936	6.664	4.997	4.095
	HIGH	24.668	20.659	62.166	22.536	15.639	21.756	15.060	16.612
MONROE	LOW	5.186	4.185	32.558	7.441	3.391	6.060	2.869	2.474
	AVERAGE	19.771	16.729	79.884	22.659	15.215	21.332	13.701	11.504
	HIGH	28.449	24.009	96.087	26.481	18.674	25.640	18.013	18.916
NASSAU	LOW	0.159	0.136	1.277	0.161	0.114	0.457	0.185	0.176
	AVERAGE	0.932	0.680	3.486	1.001	0.625	1.113	0.835	0.772
	HIGH	1.746	1.417	11.680	1.541	1.025	1.468	1.002	1.214
OKALOOSA	LOW	0.386	0.369	3.154	0.439	0.321	0.552	0.291	0.463
	AVERAGE	4.676	4.253	12.101	4.373	3.388	6.625	5.024	4.391
	HIGH	11.205	9.171	50.830	10.573	7.092	10.097	6.779	7.550

County	Loss Costs	Frame Owners	Masonry Owners	Mobile Homes	Frame Renters	Masonry Renters	Frame Condo Unit	Masonry Condo Unit	Commercial Residential
OKEECHOBEE	LOW	0.996	0.844	8.945	1.957	0.798	1.794	0.622	1.311
	AVERAGE	3.941	2.784	25.923	3.520	2.171	2.786	2.604	2.027
	HIGH	5.414	4.293	35.448	4.766	2.998	4.426	2.861	2.670
ORANGE	LOW	0.413	0.342	3.515	0.352	0.227	0.367	0.233	0.143
	AVERAGE	1.118	0.928	10.039	0.900	0.581	0.847	0.573	0.659
	HIGH	1.887	1.494	15.017	1.599	1.021	1.477	0.977	1.303
OSCEOLA	LOW	0.433	0.368	3.779	0.431	0.269	0.404	0.259	0.154
	AVERAGE	1.289	1.078	11.675	1.043	0.663	0.914	0.556	0.641
	HIGH	2.463	1.942	19.453	2.104	1.224	1.735	1.190	1.522
PALM BEACH	LOW	1.119	0.945	9.034	1.001	0.647	0.904	0.582	0.609
	AVERAGE	7.542	5.025	37.079	6.842	4.507	7.004	4.483	4.366
	HIGH	17.236	14.266	68.526	15.779	10.712	15.220	10.348	11.693
PASCO	LOW	0.514	0.386	3.962	0.554	0.338	0.464	0.325	0.293
	AVERAGE	1.790	1.936	11.879	1.437	1.184	1.698	1.825	1.628
	HIGH	5.197	4.286	25.093	4.652	3.136	4.409	3.019	3.570
PINELLAS	LOW	0.665	0.533	4.612	0.796	0.382	0.818	0.380	0.459
	AVERAGE	4.803	3.648	21.082	3.429	2.563	3.866	2.810	2.494
	HIGH	8.887	7.386	34.651	7.997	5.515	7.639	5.288	6.068
POLK	LOW	0.438	0.372	3.810	0.407	0.266	0.393	0.243	0.320
	AVERAGE	1.323	1.003	10.432	1.029	0.720	0.897	0.697	0.682
	HIGH	1.911	1.512	15.511	1.616	1.026	1.470	0.973	1.302

County	Loss Costs	Frame Owners	Masonry Owners	Mobile Homes	Frame Renters	Masonry Renters	Frame Condo Unit	Masonry Condo Unit	Commercial Residential
PUTNAM	LOW	0.269	0.209	2.011	0.292	0.199	0.291	0.200	0.391
	AVERAGE	0.737	0.610	5.219	0.668	0.429	0.597	0.333	0.494
	HIGH	1.202	0.949	10.121	0.951	0.606	0.901	0.599	0.579
ST. JOHNS	LOW	0.285	0.242	2.354	0.266	0.199	0.255	0.181	0.194
	AVERAGE	1.166	1.155	7.337	1.234	0.832	1.580	1.196	1.174
	HIGH	3.230	2.598	20.053	2.895	1.906	2.749	1.820	2.226
ST. LUCIE	LOW	1.074	0.909	11.083	1.289	0.620	0.978	0.623	0.590
	AVERAGE	5.346	2.779	34.159	4.888	2.424	5.852	3.993	3.527
	HIGH	13.986	11.492	62.765	12.837	8.620	12.226	8.242	9.485
SANTA ROSA	LOW	0.419	0.465	4.120	0.454	0.444	1.714	1.298	0.459
	AVERAGE	4.206	3.718	16.225	4.698	3.085	9.834	5.366	4.458
	HIGH	13.776	11.284	61.827	12.954	8.703	12.368	8.342	9.283
SARASOTA	LOW	0.528	0.446	4.352	0.658	0.434	0.493	0.325	0.305
	AVERAGE	3.783	2.570	21.917	3.036	2.102	4.217	2.683	2.457
	HIGH	8.134	6.777	35.254	7.318	5.042	6.986	4.846	5.560
SEMINOLE	LOW	0.406	0.328	3.436	0.342	0.225	0.366	0.247	0.141
	AVERAGE	1.135	0.914	9.813	0.918	0.595	0.887	0.597	0.664
	HIGH	1.522	1.205	12.614	1.290	0.821	1.214	0.765	1.018
SUMTER	LOW	0.380	0.322	3.282	0.417	0.222	0.422	0.290	0.284
	AVERAGE	0.663	0.556	8.331	0.642	0.460	0.883	0.410	0.467
	HIGH	1.458	1.155	11.776	1.218	0.792	1.092	0.699	0.938
SUWANNEE	LOW	0.205	0.165	1.559	0.202	0.145	0.375	0.191	0.332
	AVERAGE	0.516	0.428	3.114	0.458	0.312	0.375	0.191	0.436
	HIGH	0.735	0.587	5.978	0.631	0.409	0.375	0.191	0.499

County	Loss Costs	Frame Owners	Masonry Owners	Mobile Homes	Frame Renters	Masonry Renters	Frame Condo Unit	Masonry Condo Unit	Commercial Residential
TAYLOR	LOW	0.257	0.233	1.970	0.456	0.297	0.318	0.343	0.476
	AVERAGE	0.767	0.621	4.285	0.660	0.435	0.657	0.493	0.476
	HIGH	1.591	1.279	10.499	1.432	0.941	1.365	0.675	0.476
UNION	LOW	0.229	0.173	1.582	0.229	0.118	0.224	0.160	0.437
	AVERAGE	0.491	0.418	2.995	0.458	0.312	0.224	0.160	0.437
	HIGH	0.612	0.488	5.246	0.520	0.338	0.224	0.160	0.437
VOLUSIA	LOW	0.341	0.279	2.937	0.339	0.199	0.341	0.227	0.222
	AVERAGE	1.876	1.331	12.351	1.454	0.983	2.224	1.754	1.454
	HIGH	4.749	3.844	27.250	4.277	2.803	4.051	2.690	3.250
WAKULLA	LOW	0.325	0.276	2.804	0.294	0.273	0.735	1.486	0.246
	AVERAGE	1.019	0.974	5.911	0.783	0.535	1.514	2.156	1.478
	HIGH	3.873	3.140	20.280	2.858	2.389	3.390	2.265	2.163
WALTON	LOW	0.445	0.359	3.777	0.442	0.343	1.009	0.753	0.320
	AVERAGE	3.966	2.749	10.810	3.944	2.839	7.056	3.647	4.753
	HIGH	10.280	8.396	47.978	9.696	6.460	9.228	6.174	6.936
WASHINGTON	LOW	0.445	0.359	3.540	0.477	0.346	0.694		0.453
	AVERAGE	1.164	1.041	6.284	1.142	0.768	0.694		0.555
	HIGH	2.069	1.640	15.084	1.829	1.167	0.694		0.701
STATEWIDE	LOW	0.159	0.135	1.211	0.155	0.114	0.206	0.136	0.086
	AVERAGE	2.585	2.658	14.093	1.950	2.072	2.891	3.138	3.018
	HIGH	28.449	24.009	96.087	26.481	18.674	25.640	18.013	18.916

Standard A-6, Disclosure 6

Form A-5: Percentage Change in Output Ranges (2007 FHCF Exposure Data)

A. *Provide summaries of the percentage change in average loss cost output range data compiled in Form A-4A (Output Ranges, 2007 FHCF Exposure Data) relative to the equivalent data compiled from the previously accepted model in the format shown in the file named "2013FormA5.xlsx."*
For the change in output range exhibit, provide the summary by:
- *Statewide (overall percentage change),*
- *By region, as defined in Figure 14 – North, Central and South,*
- *By county, as defined in Figure 15 – Coastal and Inland.*

The percentage change in the average loss costs relative to the equivalent data compiled from the previously accepted model is provided in Form A-5.

B. *Provide this form in Excel format. The file name shall include the abbreviated name of the modeling organization, the standards year, and the form name. All tables in Form A-5 (Percentage Change in Output Ranges, 2007 FHCF Exposure Data) shall also be included in a submission appendix.*

A hard copy of the tables in Form A-5 is included in this appendix and provided in an Excel format.

Table 58. Percentage Change in $0 Deductible Output Ranges

Region	Frame Owners	Masonry Owners	Mobile Homes	Frame Renters	Masonry Renters	Frame Condo Unit	Masonry Condo Unit	Commercial Residential
Coastal	3.3%	1.6%	114.0%	1.8%	-0.3%	1.5%	-1.0%	1.2%
Inland	6.1%	6.7%	134.4%	4.2%	4.5%	3.7%	3.2%	5.2%
North	6.9%	4.4%	123.7%	4.3%	3.2%	3.0%	-0.7%	3.4%
Central	2.8%	2.3%	124.5%	1.4%	-0.1%	-0.3%	-3.4%	0.4%
South	2.0%	1.8%	109.2%	1.0%	-0.1%	2.2%	-0.3%	1.4%
Statewide	3.6%	2.0%	119.4%	2.2%	0.0%	1.6%	-0.9%	1.3%

Table 59. Percentage Change in Specified Deductible Output Ranges

Region	Frame Owners	Masonry Owners	Mobile Homes	Frame Renters	Masonry Renters	Frame Condo Unit	Masonry Condo Unit	Commercial Residential
Coastal	3.5%	1.6%	126.9%	1.9%	-0.3%	1.6%	-1.1%	1.3%
Inland	6.6%	7.0%	156.9%	4.8%	5.0%	4.0%	3.4%	5.4%
North	7.5%	4.6%	140.3%	4.6%	3.3%	3.1%	-0.9%	3.7%
Central	2.8%	2.0%	141.4%	1.3%	-0.3%	-0.5%	-3.8%	0.2%
South	2.1%	1.8%	120.9%	1.1%	0.0%	2.4%	-0.4%	1.5%
Statewide	3.8%	2.0%	134.4%	2.3%	0.0%	1.7%	-1.1%	1.4%

C. *Provide color-coded maps by county reflecting the percentage changes in the average loss costs with specified deductibles for frame owners, masonry owners, frame renters, masonry renters, frame condo unit owners, masonry condo unit owners, mobile home, and commercial residential from the output ranges from the previously accepted model.*
Counties with a negative percentage change (reduction in loss costs) shall be indicated with shades of blue; counties with a positive percentage change (increase in loss costs) shall be indicated with shades of red; and counties with no percentage change shall be white. The larger the percentage change in the county, the more intense the color-shade.

Figure 96 to Figure 103 show the percentage change in loss costs by county for the specified deductibles from the output ranges from the previously accepted model.

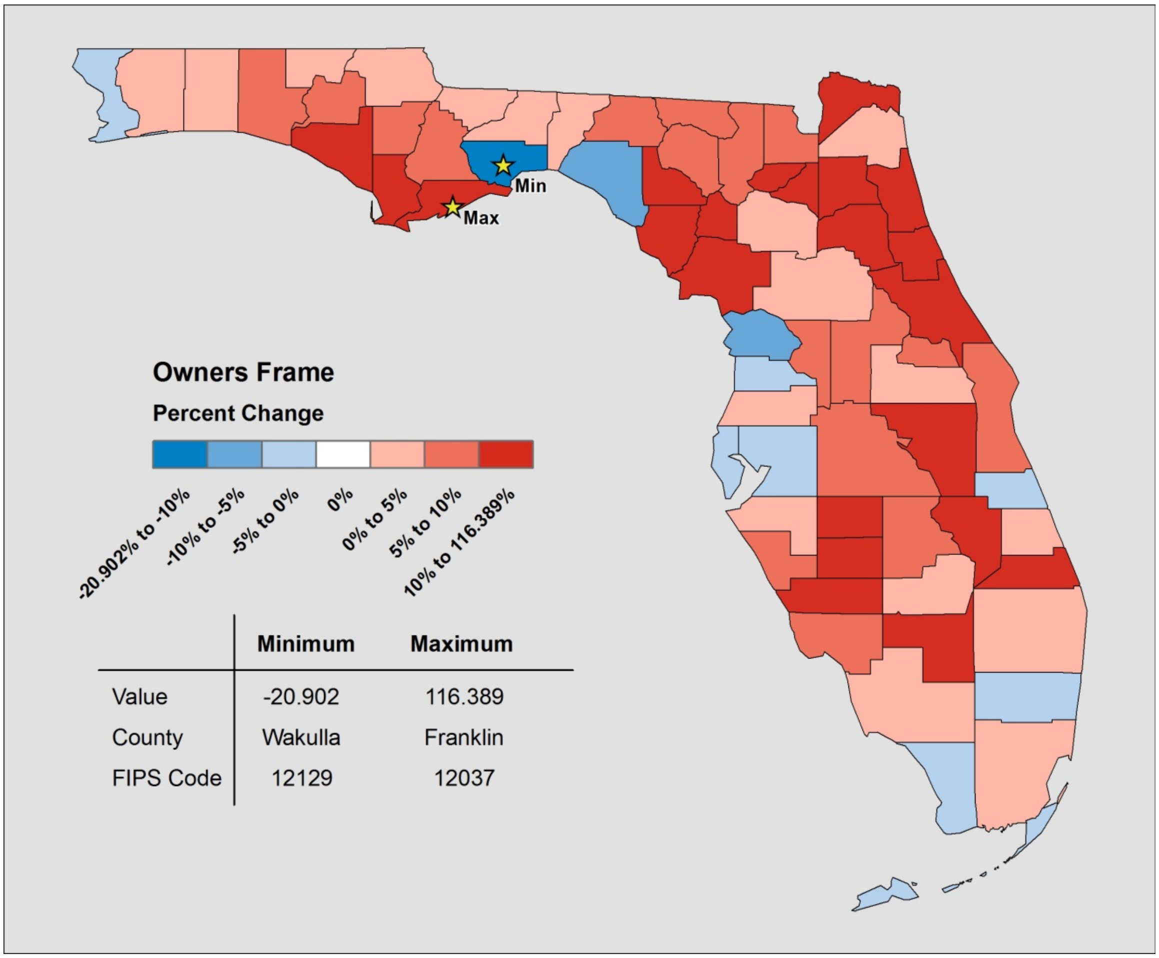


Figure 96. Percentage Change for Frame Owners

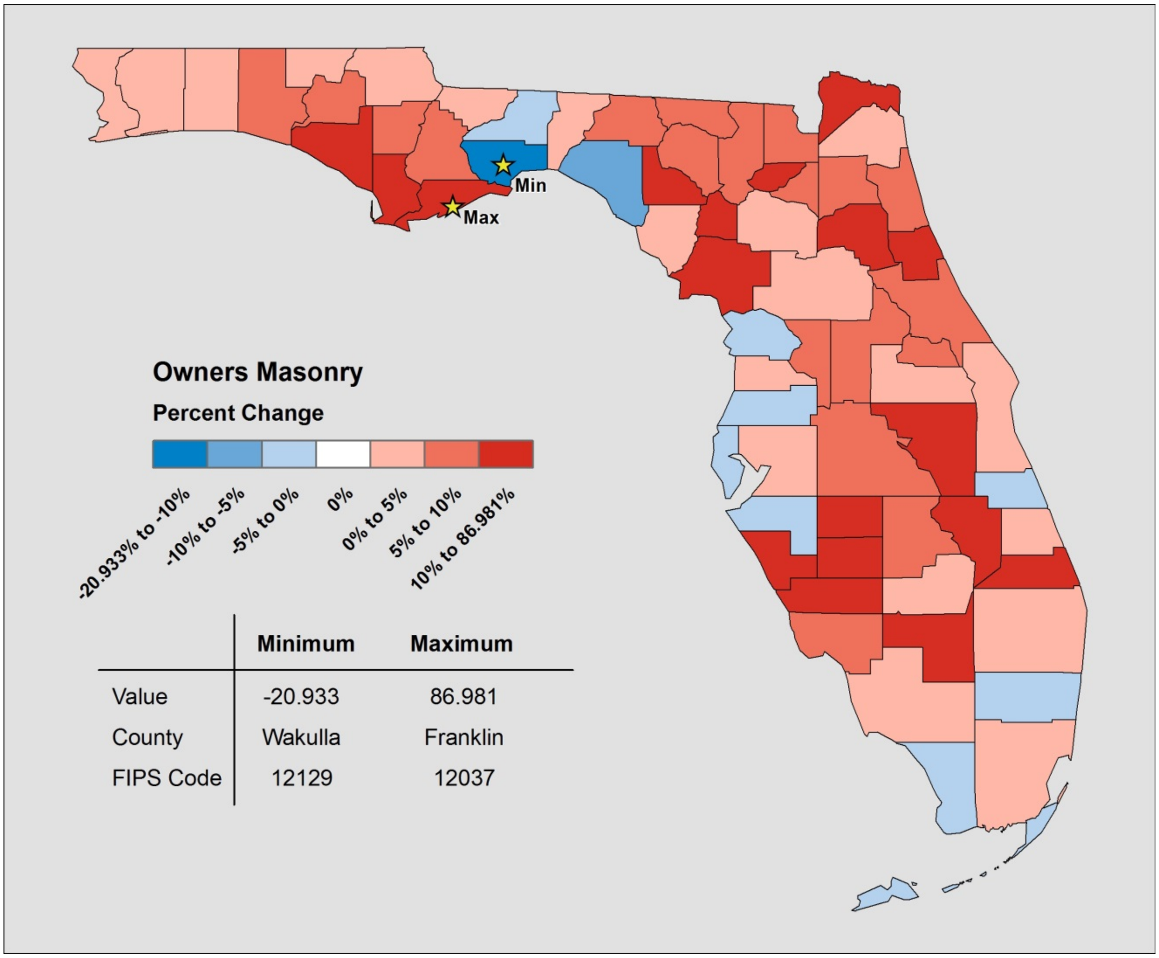


Figure 97. Percentage Change for Masonry Owners

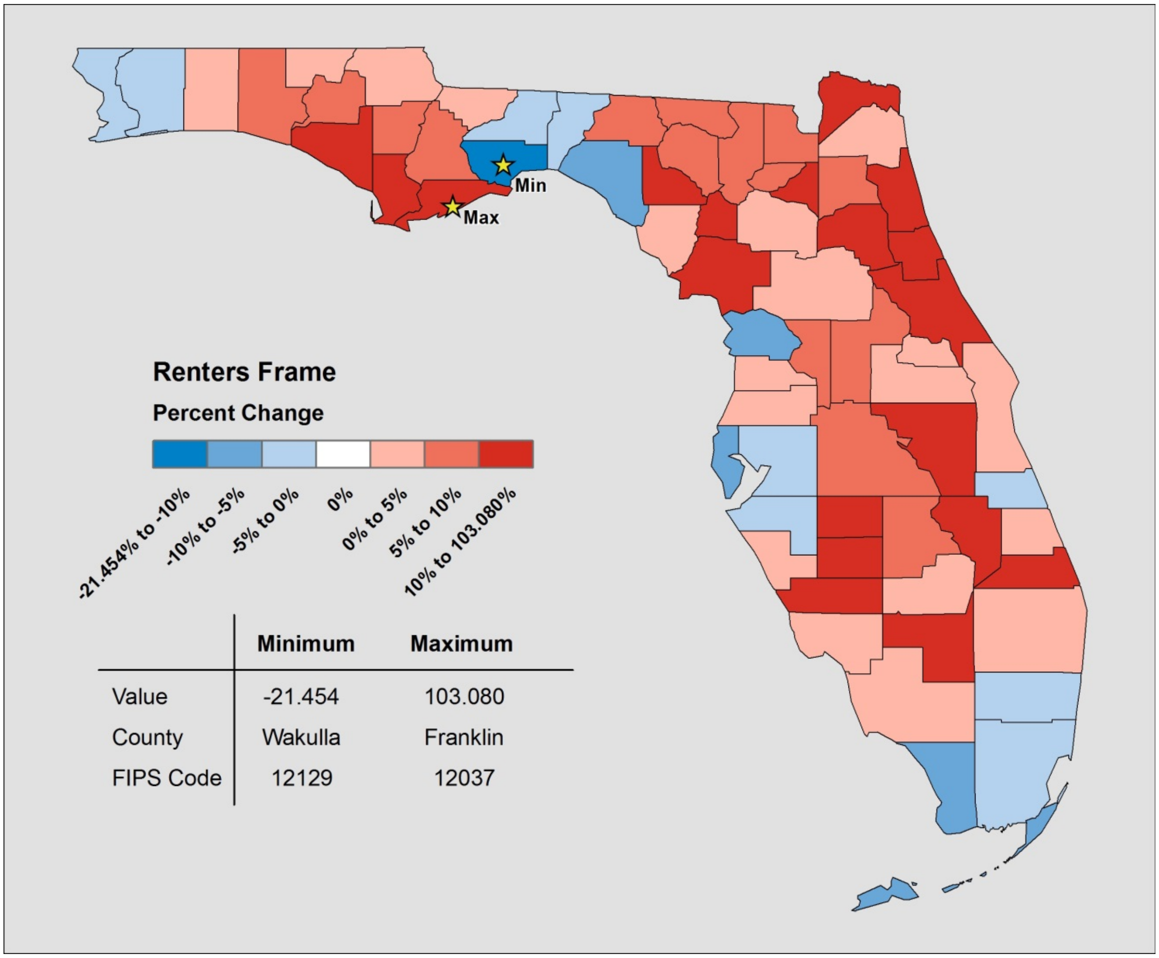


Figure 98. Percentage Change for Frame Renters

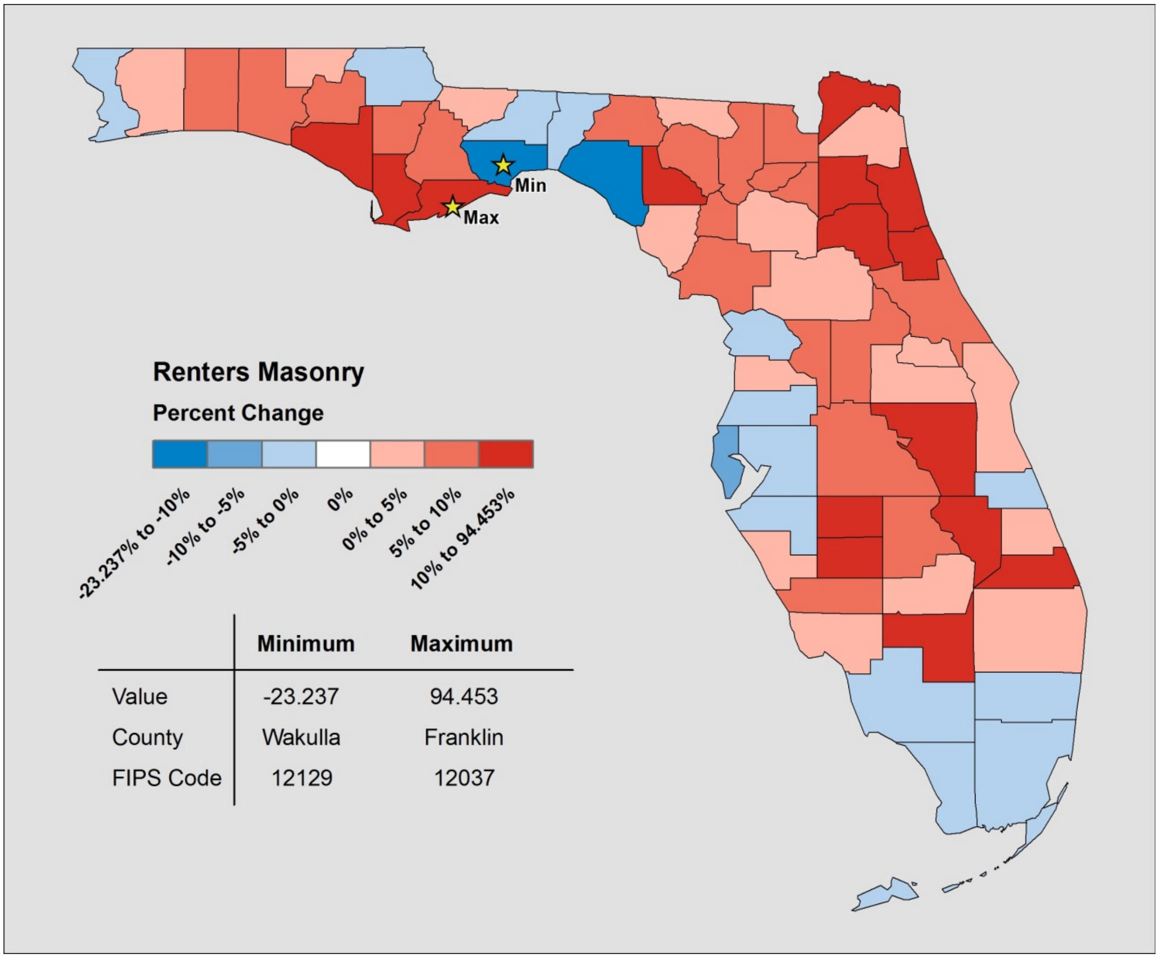
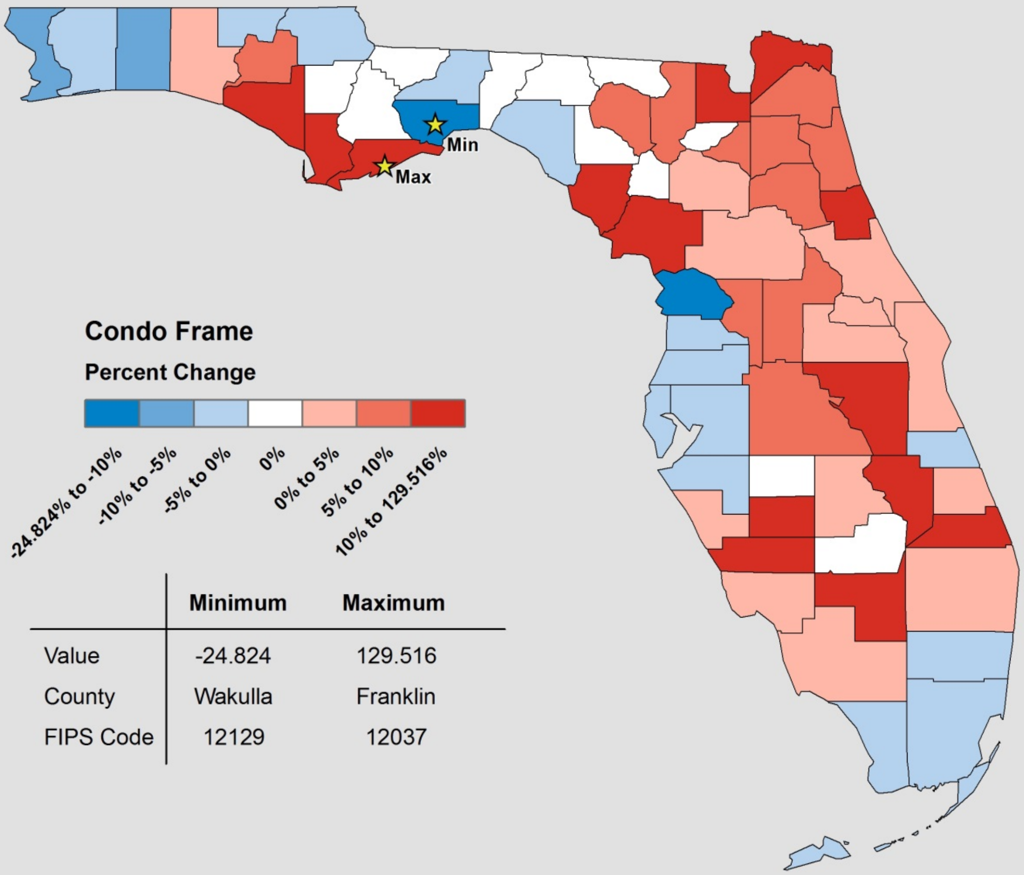
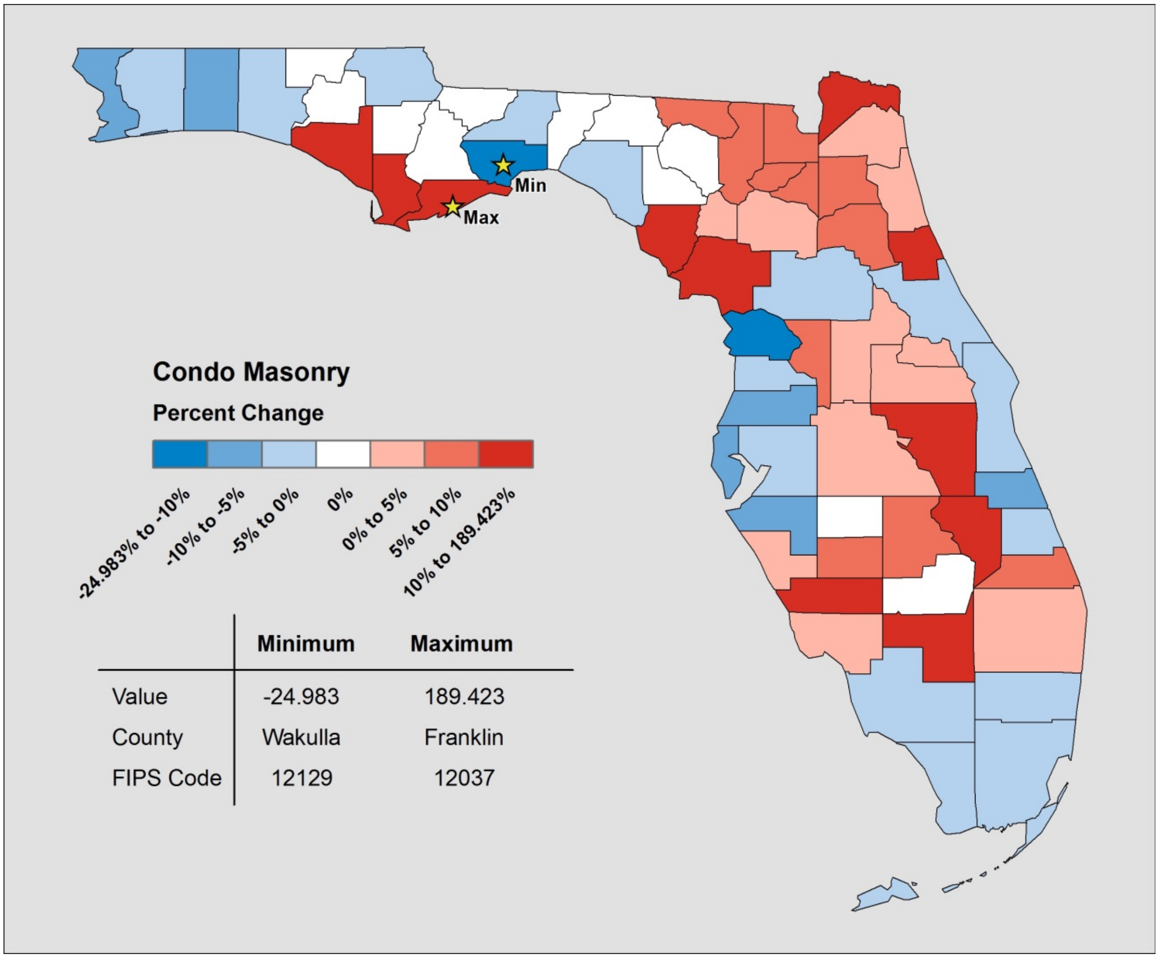


Figure 99. Percentage Change for Masonry Renters



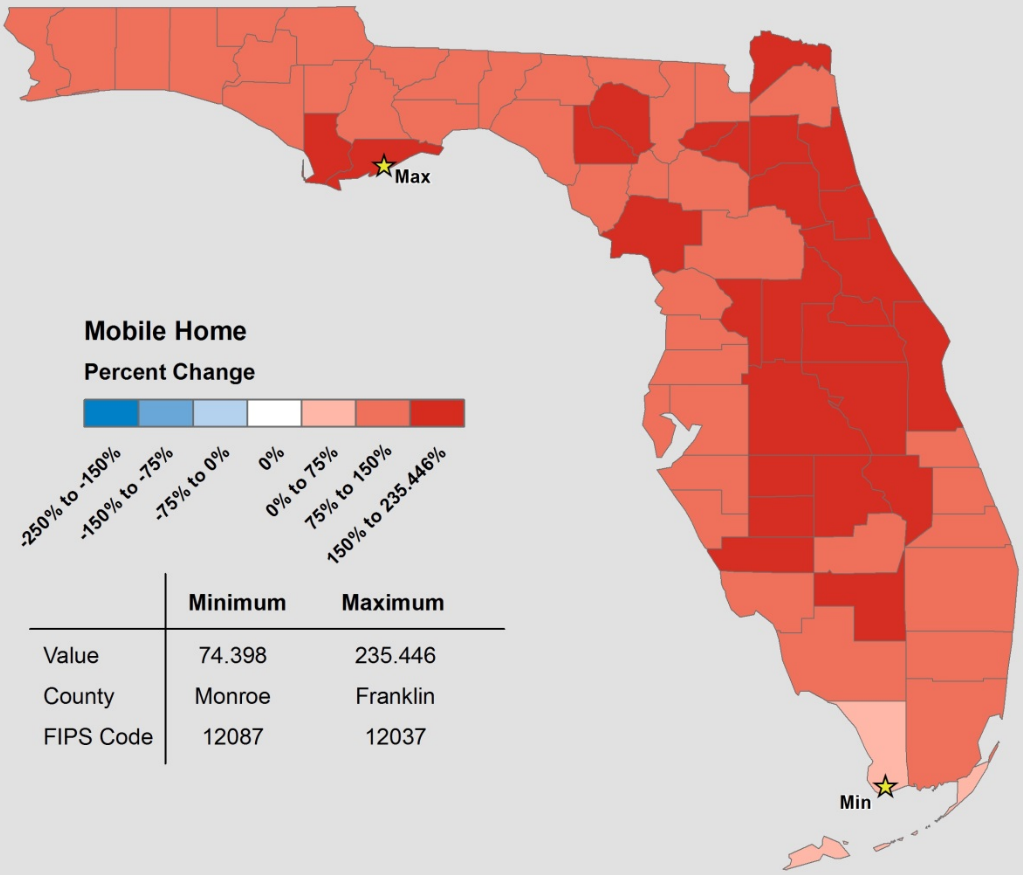
	Minimum	Maximum
Value	-24.824	129.516
County	Wakulla	Franklin
FIPS Code	12129	12037

Figure 100. Percentage Change for Frame Condo Unit Owners



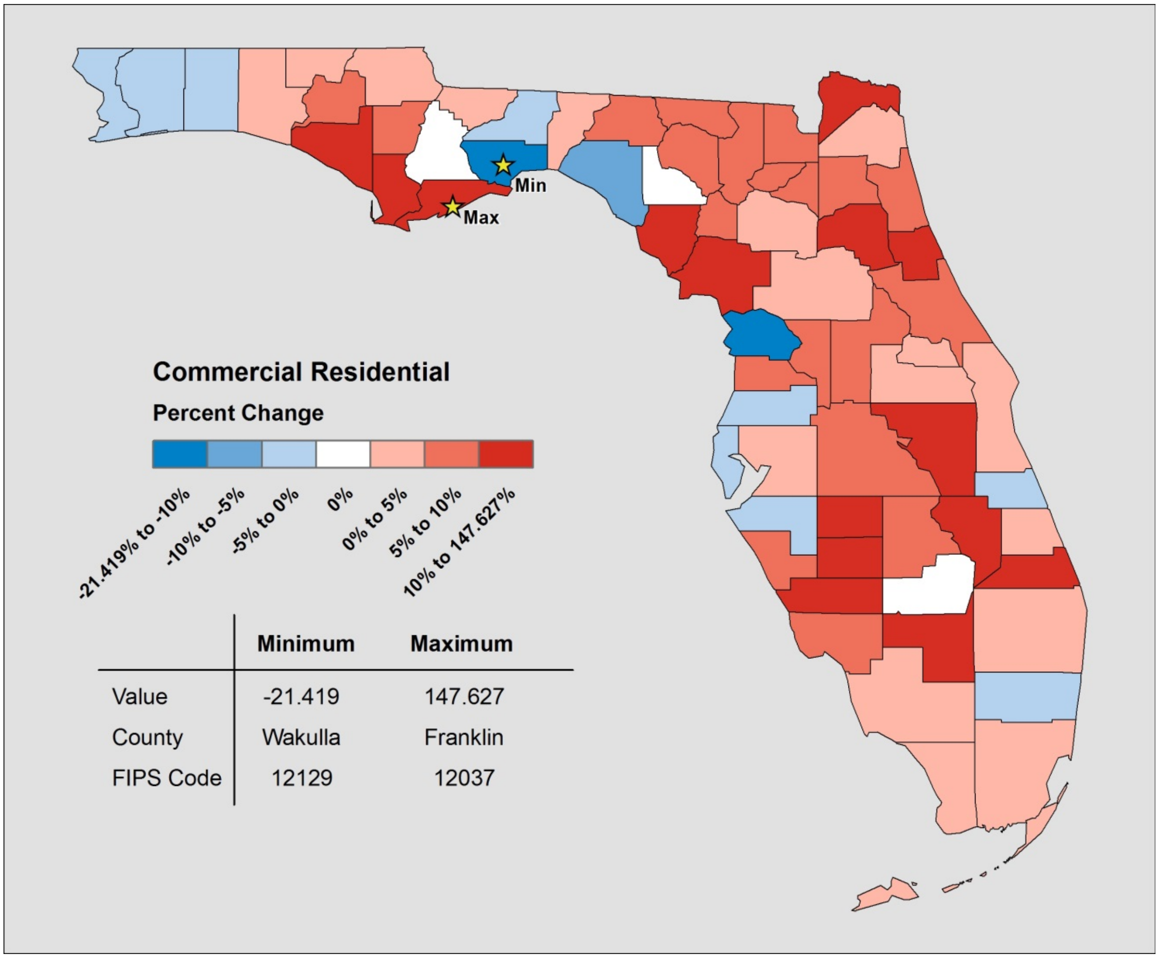
	Minimum	Maximum
Value	-24.983	189.423
County	Wakulla	Franklin
FIPS Code	12129	12037

Figure 101. Percentage Change for Masonry Condo Unit Owners



	Minimum	Maximum
Value	74.398	235.446
County	Monroe	Franklin
FIPS Code	12087	12037

Figure 102. Percentage Change for Mobile Home



	Minimum	Maximum
Value	-21.419	147.627
County	Wakulla	Franklin
FIPS Code	12129	12037

Figure 103. Percentage Change for Commercial Residential

Standard A-6, Disclosure 7

Form A-6: Logical Relationship to Risk (Trade Secret Item)

A. *Provide the logical relationship to risk exhibits in the format shown in the file named "**2013FormA6.xlsx**."*

Form A-6 will be provided as a Trade Secret item.

B. *Create exposure sets for each exhibit by modeling all of the coverages from the appropriate Notional Set listed below at each of the locations in "Location Grid A" as described in the file "**NotionalInput13.xlsx**." Refer to the Notional Policy Specifications below for additional modeling information. Explain any assumptions, deviations, and differences from the prescribed exposure information.*

Exhibit	Notional Set
Deductible Sensitivity	Set 1
Construction Sensitivity	Set 2
Policy Form Sensitivity	Set 3
Coverage Sensitivity	Set 4
Building Code/Enforcement (Year Built) Sensitivity	Set 5
Building Strength Sensitivity	Set 6
Condo Unit Floor Sensitivity	Set 7
Number of Stories Sensitivity	Set 8

Models shall treat points in Location Grid A as coordinates that would result from a geocoding process. Models shall treat points by simulating loss at exact location or by using the nearest modeled parcel/street/cell in the model.
Report results for each of the points in "Location Grid A" individually, unless specified. Loss cost per $1,000 of exposure shall be rounded to 3 decimal places.

Exposure sets have been created using the specifications and grid points provided in NotionalInput13.xlsx provided by the Commission. Gross modeled losses have been used in the preparation of this form.

C. *All anomalies in loss costs that are not consistent with the requirements of Standard A-6 (Loss Output) and have been explained in Disclosure A-6.15 shall be shaded.*

The loss costs are consistent with the requirements of Standard A-6.

D. *Create an exposure set and report loss costs results for strong owners frame buildings (Notional Set 6) for each of the points in "Location Grid B" as described in the file "NotionalInput13.xlsx." Provide a color-coded contour map of the loss costs. Provide a scatter plot of the loss costs (y-axis) against distance to closest coast (x-axis).*

An exposure set has been created for strong owners frame buildings (Notional Set 6) for each of the points in "Location Grid B", and loss costs have been produced. The color-coded contour map of loss costs and scatter plot of loss costs against distance to closest coast will be provided as trade secret items.

Form A-7: Percentage Change in Logical Relationship to Risk

A. *Provide summaries of the percentage change in logical relationship to risk exhibits from the previously accepted model in the format shown in the file named "**2013FormA7.xlsx**."*

The exhibits showing percentage change in logical relationship to risk from the previously accepted model have been prepared in the format specified and included in the submission appendix.

B. *Create exposure sets for each exhibit by modeling all of the coverages from the appropriate Notional Set listed below at each of the locations in "Location Grid B" as described in the file "**NotionalInput13.xlsx**." Refer to the Notional Policy Specifications provided in Form A-6 (Logical Relationship to Risk, Trade Secret item) for additional modeling information. Explain any assumptions, deviations, and differences from the prescribed exposure information.*

Exhibit	Notional Set
Deductible Sensitivity	Set 1
Construction Sensitivity	Set 2
Policy Form Sensitivity	Set 3
Coverage Sensitivity	Set 4
Building Code/Enforcement (Year Built) Sensitivity	Set 5
Building Strength Sensitivity	Set 6
Condo Unit Floor Sensitivity	Set 7
Number of Stories Sensitivity	Set 8

Models shall treat points in Location Grid B as coordinates that would result from a geocoding process. Models shall treat points by simulating loss at exact location or by using the nearest modeled parcel/street/cell in the model.
Provide the results statewide (overall percentage change) and by the regions defined in Form A-5 (Percentage Change in Output Ranges, 2007 FHCF Exposure Data).

Exposure sets have been created using the specifications and grid points in NotionalInput13.xlsx provided by the Commission. For ease of readability, we have provided the Commission's specifications for the building strength notional set in the table below. Gross modeled losses have been used in the preparation of form A-7.

Table 60. Specifications for the Building Strength Notional Set

Policy Type	Type	Building Features Modeled
Owners & Renters	Weak	YB 1980, 1-story, Gable roof geometry, Shingle roof covering, 6d Nails roof deck attachment, Toe Nail roof wall anchorage, No opening protection
	Medium	YB 1998, 1-story Unknown roof geometry, Unknown roof covering, Unknown roof deck attachment, Unknown roof wall anchorage, Unknown opening protection
	Strong	YB 2007, 1-story, Hip roof geometry, Rated Shingle (110 mph) roof covering, 8d Nails HWS roof deck attachment, Straps roof wall anchorage, With opening protection

Policy Type	Type	Building Features Modeled
Condo Unit	Weak	YB 1980, 3-story, Gable roof geometry, Shingle roof covering, 6d Nails roof deck attachment, Toe Nail roof wall anchorage, No opening protection
	Medium	YB 1998, 3-story, Unknown roof geometry, Unknown roof covering, Unknown roof deck attachment, Unknown roof wall anchorage, Unknown opening protection
	Strong	YB 2007, 3-story, Hip roof geometry, Rated Shingle (110 mph) roof covering, 8d Nails HWS roof deck attachment, Straps roof wall anchorage, With opening protection
Mobile Homes	Weak	YB 1974, 1-story, Untied foundation, Gable roof geometry, Shingle roof covering, Unknown roof deck attachment, Unknown roof wall anchorage, No opening protection
	Medium	YB 1992, 1-story, Unknown foundation tie-down, Unknown roof geometry, Unknown roof covering, Unknown roof deck attachment, Unknown roof wall anchorage, Unknown opening protection
	Strong	YB 2004, 1-story, Tied foundation, Gable roof geometry, Rated Shingle (110 mph) roof covering, Unknown roof deck attachment, Unknown roof wall anchorage, With opening protection
Commercial Residential	Weak	YB 1980, Concrete, 20-story, Flat roof geometry, BUR with Gravel roof covering, Unknown roof deck attachment, Unknown roof wall anchorage, No opening protection
	Medium	YB 1998, Concrete, 20-story, Unknown roof geometry, Unknown roof covering, Unknown roof deck attachment, Unknown roof wall anchorage, Unknown opening protection
	Strong	YB 2007, Concrete, 20-story, Flat roof geometry, BUR with Gravel roof covering, Unknown roof deck attachment, Unknown roof wall anchorage, With opening protection

C. Provide this form in Excel format. The file name shall include the abbreviated name of the modeling organization, the standards year, and the form name. All tables in Form A-7 (Percentage Change in Logical Relationship to Risk) shall also be included in a submission appendix.

Hard copy of Form A-7 is included in this appendix in Table 61 and Table 62 below and is provided in Excel format.

Table 61. Percentage Change in Logical Relationship to Risk—Deductible

Construction/ Policy	Region	Percent Change in Loss Cost					
		$0	$500	1%	2%	5%	10%
Frame Owners	Coastal	2.4%	2.5%	2.5%	2.4%	2.3%	2.0%
	Inland	9.8%	10.3%	10.4%	10.3%	9.5%	8.4%
	North	3.9%	4.0%	4.0%	4.0%	3.9%	3.6%
	Central	5.0%	5.1%	5.1%	5.0%	4.4%	3.7%
	South	1.9%	2.0%	2.0%	2.0%	1.9%	1.6%
	Statewide	3.1%	3.2%	3.2%	3.1%	2.9%	2.5%
Masonry Owners	Coastal	2.0%	2.0%	2.0%	1.9%	1.7%	1.3%
	Inland	9.6%	10.1%	10.1%	9.9%	8.9%	7.8%
	North	3.5%	3.6%	3.6%	3.5%	3.2%	2.9%
	Central	4.7%	4.8%	4.7%	4.5%	3.9%	3.2%
	South	1.5%	1.5%	1.5%	1.5%	1.2%	0.9%
	Statewide	2.7%	2.8%	2.7%	2.6%	2.3%	1.8%
Mobile Homes	Coastal	87.3%	92.2%	92.2%	95.5%	102.5%	108.9%
	Inland	115.7%	127.3%	127.3%	134.4%	147.1%	154.2%
	North	95.9%	102.1%	102.1%	106.0%	113.4%	119.5%
	Central	101.0%	108.3%	108.3%	112.8%	121.3%	127.0%
	South	83.4%	87.9%	87.9%	91.0%	97.9%	104.6%
	Statewide	90.7%	96.1%	96.1%	99.7%	106.9%	113.0%
Frame Renters	Coastal	1.2%	1.3%	1.3%	1.3%	1.3%	1.4%
	Inland	9.3%	9.9%	9.9%	9.9%	9.6%	9.5%
	North	3.0%	3.1%	3.1%	3.1%	3.1%	3.1%
	Central	3.8%	3.8%	3.9%	3.8%	3.7%	3.8%
	South	0.8%	0.8%	0.8%	0.8%	0.8%	0.9%
	Statewide	2.0%	2.0%	2.0%	2.0%	1.9%	2.0%
Masonry Renters	Coastal	0.7%	0.6%	0.7%	0.6%	0.6%	0.6%
	Inland	8.5%	9.1%	9.1%	9.1%	8.7%	8.3%
	North	2.4%	2.5%	2.5%	2.5%	2.4%	2.3%
	Central	3.2%	3.2%	3.3%	3.2%	3.0%	2.9%
	South	0.2%	0.2%	0.2%	0.2%	0.1%	0.1%
	Statewide	1.4%	1.3%	1.4%	1.3%	1.2%	1.2%
Frame Condo Unit	Coastal	1.0%	1.0%	1.0%	1.0%	0.9%	0.8%
	Inland	8.5%	9.0%	9.0%	9.0%	8.5%	8.2%
	North	2.8%	2.9%	2.9%	2.9%	2.8%	2.8%
	Central	3.4%	3.4%	3.4%	3.2%	3.0%	2.8%
	South	0.6%	0.6%	0.6%	0.6%	0.5%	0.5%

Construction/ Policy	Region	Percent Change in Loss Cost					
		$0	$500	1%	2%	5%	10%
	Statewide	1.7%	1.7%	1.7%	1.6%	1.5%	1.4%
Masonry Condo Unit	Coastal	0.6%	0.5%	0.5%	0.4%	0.3%	0.1%
	Inland	8.1%	8.5%	8.5%	8.4%	7.9%	7.3%
	North	2.3%	2.4%	2.4%	2.3%	2.2%	2.0%
	Central	3.0%	2.9%	2.9%	2.8%	2.5%	2.2%
	South	0.1%	0.0%	0.0%	0.0%	-0.2%	-0.3%
	Statewide	1.3%	1.2%	1.2%	1.1%	0.9%	0.7%

Construction/ Policy	Region	Percent Change in Loss Cost					
		$0	2%	3%	5%	10%	
Commercial Residential	Coastal	3.0%	3.2%	3.1%	3.1%	2.7%	
	Inland	9.9%	10.1%	9.6%	8.9%	7.5%	
	North	4.7%	5.0%	4.9%	4.8%	4.4%	
	Central	5.7%	5.7%	5.6%	5.3%	4.7%	
	South	2.3%	2.4%	2.4%	2.4%	2.0%	
	Statewide	3.6%	3.7%	3.7%	3.5%	3.1%	

Table 62. Percent Change in Logical Relationship to Risk—Construction

Policy	Region	Percent Change in Loss Cost	
		Masonry	Frame
Owners	Coastal	2.0%	2.4%
	Inland	9.6%	9.8%
	North	3.5%	3.9%
	Central	4.7%	5.0%
	South	1.5%	1.9%
	Statewide	2.7%	3.1%
Renters	Coastal	0.7%	1.2%
	Inland	8.5%	9.3%
	North	2.4%	3.0%
	Central	3.2%	3.8%
	South	0.2%	0.8%
	Statewide	1.4%	2.0%
Condo Unit	Coastal	0.6%	1.0%
	Inland	8.1%	8.5%
	North	2.3%	2.8%
	Central	3.0%	3.4%

Policy	Region	Percent Change in Loss Cost	
		Masonry	Frame
	South	0.1%	0.6%
	Statewide	1.3%	1.7%
Policy	**Region**	**Percent Change in Loss Cost**	
		Concrete	
Commercial Residential	Coastal	3.0%	
	Inland	9.9%	
	North	4.7%	
	Central	5.7%	
	South	2.3%	
	Statewide	3.6%	

Table 63. Percent Change in Logical Relationship to Risk - Policy Form

Region	Percent Change in Loss Cost		
	Frame Owners	Masonry Owners	Mobile Homes
Coastal	2.4%	2.0%	87.3%
Inland	9.8%	9.6%	115.7%
North	3.9%	3.5%	95.9%
Central	5.0%	4.7%	101.0%
South	1.9%	1.5%	83.4%
Statewide	3.1%	2.7%	90.7%

Table 64. Percent Change in Logical Relationship to Risk—Coverage

Construction/ Policy	Region	Percent Change in Loss Cost			
		Coverage A	Coverage B	Coverage C	Coverage D
Frame Owners	Coastal	2.8%	2.5%	-1.1%	4.5%
	Inland	9.6%	9.6%	8.4%	18.5%
	North	4.0%	3.9%	1.7%	6.9%
	Central	5.4%	5.2%	0.8%	7.0%
	South	2.3%	2.0%	-1.4%	4.1%
	Statewide	3.5%	3.3%	-0.4%	5.2%
Masonry Owners	Coastal	2.4%	2.3%	-1.7%	3.3%
	Inland	9.5%	9.5%	8.3%	18.5%
	North	3.7%	3.7%	1.1%	5.6%

Construction/ Policy	Region	Percent Change in Loss Cost			
		Coverage A	Coverage B	Coverage C	Coverage D
	Central	5.1%	5.1%	0.3%	6.0%
	South	1.9%	1.8%	-2.0%	2.9%
	Statewide	3.1%	3.1%	-1.0%	4.0%
Mobile Homes	Coastal	81.3%	81.3%	107.2%	125.7%
	Inland	107.9%	107.9%	153.6%	220.6%
	North	89.2%	89.2%	120.5%	143.3%
	Central	94.8%	94.8%	123.7%	156.1%
	South	77.4%	77.4%	102.9%	119.6%
	Statewide	84.7%	84.7%	111.1%	132.4%
Frame Renters	Coastal			-0.1%	3.8%
	Inland			6.9%	18.3%
	North			1.9%	5.4%
	Central			2.2%	7.7%
	South			-0.5%	3.1%
	Statewide			0.6%	4.6%
Masonry Renters	Coastal			-0.1%	2.6%
	Inland			6.9%	18.7%
	North			1.8%	4.3%
	Central			2.3%	6.1%
	South			-0.6%	1.9%
	Statewide			0.6%	3.3%
Frame Condo Unit	Coastal	2.6%		-0.1%	3.7%
	Inland	9.7%		6.9%	19.1%
	North	4.0%		1.9%	5.6%
	Central	5.3%		2.2%	7.1%
	South	2.1%		-0.5%	3.0%
	Statewide	3.4%		0.6%	4.4%
Masonry Condo Unit	Coastal	2.5%		-0.1%	2.2%
	Inland	9.7%		6.9%	19.4%
	North	3.7%		1.8%	4.2%
	Central	5.2%		2.3%	5.2%
	South	1.9%		-0.6%	1.7%
	Statewide	3.2%		0.6%	2.9%
Commercial Residential	Coastal	3.1%		1.1%	3.8%
	Inland	10.0%		7.7%	20.3%

Construction/ Policy	Region	Percent Change in Loss Cost			
		Coverage A	Coverage B	Coverage C	Coverage D
	North	4.8%		3.0%	7.9%
	Central	5.8%		3.6%	6.3%
	South	2.4%		0.4%	2.8%
	Statewide	3.7%		1.7%	4.2%

Table 65. Percent Change in Logical Relationship to Risk—Building Code/Enforcement (Year Built) Sensitivity

Construction/ Policy	Region	Percent Change in Loss Cost		
		Year Built 1980	Year Built 1998	Year Built 2004
Frame Owners	Coastal	1.6%	3.7%	8.5%
	Inland	7.0%	9.7%	14.3%
	North	2.2%	4.6%	9.4%
	Central	3.2%	5.8%	10.4%
	South	1.5%	3.5%	8.3%
	Statewide	2.1%	4.4%	9.2%
Masonry Owners	Coastal	1.3%	3.3%	8.1%
	Inland	6.9%	9.5%	14.1%
	North	1.8%	4.2%	9.0%
	Central	3.0%	5.5%	10.1%
	South	1.1%	3.0%	7.8%
	Statewide	1.8%	4.0%	8.8%
Construction / Policy	**Region**	**Percent Change in Loss Cost**		
		Year Built 1974	**Year Built 1992**	**Year Built 2004**
Mobile Homes	Coastal	216.6%	126.9%	-9.0%
	Inland	298.8%	164.6%	9.4%
	North	236.8%	135.7%	4.2%
	Central	253.2%	144.1%	2.6%
	South	208.1%	122.8%	-14.8%
	Statewide	226.3%	131.3%	-6.8%
Construction / Policy	**Region**	**Percent Change in Loss Cost**		
		Year Built 1980	**Year Built 1998**	**Year Built 2004**
Frame Renters	Coastal	0.5%	2.5%	7.5%
	Inland	6.4%	9.2%	13.9%
	North	1.3%	3.7%	8.7%

	Central	2.0%	4.6%	9.4%
	South	0.4%	2.3%	7.3%
	Statewide	1.0%	3.3%	8.2%
Masonry Renters	Coastal	0.0%	1.9%	7.0%
	Inland	5.7%	8.4%	13.0%
	North	0.8%	3.2%	8.2%
	Central	1.4%	4.1%	8.8%
	South	-0.1%	1.6%	6.7%
	Statewide	0.4%	2.7%	7.7%
Frame Condo Unit	Coastal	0.3%	2.3%	7.3%
	Inland	5.8%	8.4%	13.0%
	North	1.2%	3.6%	8.5%
	Central	1.7%	4.2%	8.9%
	South	0.3%	2.1%	7.1%
	Statewide	0.8%	3.0%	7.9%
Masonry Condo Unit	Coastal	-0.2%	1.8%	6.8%
	Inland	5.3%	8.0%	12.6%
	North	0.7%	3.1%	8.0%
	Central	1.2%	3.8%	8.6%
	South	-0.2%	1.5%	6.5%
	Statewide	0.3%	2.5%	7.5%
Commercial Residential	Coastal	1.4%	3.6%	8.5%
	Inland	7.0%	9.9%	15.2%
	North	2.0%	4.4%	9.3%
	Central	3.1%	5.4%	10.3%
	South	1.3%	3.3%	8.3%
	Statewide	1.9%	4.1%	9.1%

Table 66. Percent Change in Logical Relationship to Risk—Building Strength

Construction/ Policy	Region	Percent Change in Loss Cost		
		Weak	Medium	Strong
Frame Owners	Coastal	1.3%	3.4%	4.9%
	Inland	7.0%	9.7%	9.8%
	North	2.1%	4.4%	5.7%
	Central	3.0%	5.5%	6.3%

Construction/ Policy	Region	Percent Change in Loss Cost		
		Weak	Medium	Strong
	South	1.2%	3.1%	4.8%
	Statewide	1.8%	4.1%	5.4%
Masonry Owners	Coastal	1.1%	3.2%	4.7%
	Inland	6.9%	9.5%	9.6%
	North	1.9%	4.2%	5.5%
	Central	2.8%	5.4%	6.2%
	South	1.0%	2.9%	4.6%
	Statewide	1.7%	3.9%	5.2%
Mobile Homes	Coastal	160.3%	126.9%	-0.7%
	Inland	221.5%	164.6%	20.8%
	North	175.8%	135.7%	14.1%
	Central	188.3%	144.1%	12.6%
	South	153.6%	122.8%	-7.2%
	Statewide	167.8%	131.3%	1.8%
Frame Renters	Coastal	0.2%	2.2%	4.1%
	Inland	6.4%	9.2%	9.4%
	North	1.2%	3.6%	5.1%
	Central	1.8%	4.4%	5.5%
	South	0.1%	1.9%	4.0%
	Statewide	0.7%	3.0%	4.6%
Masonry Renters	Coastal	-0.1%	1.9%	3.7%
	Inland	5.7%	8.4%	8.8%
	North	0.8%	3.2%	4.7%
	Central	1.3%	4.0%	5.2%
	South	-0.2%	1.6%	3.6%
	Statewide	0.4%	2.6%	4.2%
Frame Condo Unit	Coastal	0.9%	2.9%	4.3%
	Inland	5.8%	8.5%	8.9%
	North	1.5%	3.8%	5.1%
	Central	2.2%	4.6%	5.6%
	South	0.9%	2.7%	4.2%
	Statewide	1.3%	3.5%	4.8%
Masonry Condo Unit	Coastal	0.4%	2.3%	3.8%
	Inland	5.3%	7.9%	8.5%
	North	1.0%	3.4%	4.7%
	Central	1.6%	4.2%	5.3%

Construction/ Policy	Region	Percent Change in Loss Cost		
		Weak	Medium	Strong
	South	0.4%	2.1%	3.7%
	Statewide	0.8%	3.0%	4.3%
Commercial Residential	Coastal	1.4%	3.6%	5.2%
	Inland	7.0%	9.9%	11.0%
	North	2.0%	4.4%	6.0%
	Central	3.1%	5.4%	6.8%
	South	1.3%	3.3%	5.1%
	Statewide	1.9%	4.1%	5.8%

Table 67. Percent Change in Logical Relationship to Risk—Condo Unit Floor

Construction/ Policy	Region	Percent Change in Loss Cost			
		3rd Floor	9th Floor	15th Floor	20th Floor
Condo Unit A	Coastal	-0.2%	-0.2%	-0.2%	-0.2%
	Inland	5.4%	5.4%	5.4%	5.4%
	North	0.7%	0.7%	0.7%	0.7%
	Central	1.4%	1.4%	1.4%	1.4%
	South	-0.3%	-0.3%	-0.3%	-0.3%
	Statewide	0.3%	0.3%	0.3%	0.3%
Condo Unit B	Coastal	-0.1%	-0.1%	-0.1%	-0.1%
	Inland	5.7%	5.7%	5.7%	5.7%
	North	0.8%	0.8%	0.8%	0.8%
	Central	1.5%	1.5%	1.5%	1.5%
	South	-0.2%	-0.2%	-0.2%	-0.2%
	Statewide	0.4%	0.4%	0.4%	0.4%

Table 68. Percent Change in Logical Relationship to Risk—Number of Stories

Construction/ Policy	Region	Percent Change in Loss Cost		
		1 Story	2 Story	
Frame Owners	Coastal	2.1%	2.6%	
	Inland	9.8%	9.8%	
	North	3.7%	4.0%	
	Central	4.7%	5.2%	

Construction/ Policy	Region	Percent Change in Loss Cost		
		1 Story	2 Story	
	South	1.6%	2.2%	
	Statewide	2.8%	3.3%	
Masonry Owners	Coastal	1.9%	2.4%	
	Inland	9.6%	9.6%	
	North	3.5%	3.7%	
	Central	4.6%	5.0%	
	South	1.4%	1.9%	
	Statewide	2.6%	3.1%	
Frame Renters	Coastal	0.9%	1.5%	
	Inland	9.2%	9.3%	
	North	2.8%	3.1%	
	Central	3.6%	4.0%	
	South	0.4%	1.1%	
	Statewide	1.7%	2.2%	
Masonry Renters	Coastal	0.6%	1.0%	
	Inland	8.5%	8.5%	
	North	2.5%	2.6%	
	Central	3.1%	3.4%	
	South	0.1%	0.6%	
	Statewide	1.3%	1.7%	
Construction/ Policy	**Region**	**Percent Change in Loss Cost**		
		5 Story	**10 Story**	**20 Story**
Commercial Residential	Coastal	3.1%	3.0%	3.0%
	Inland	10.0%	9.9%	9.9%
	North	4.8%	4.7%	4.7%
	Central	5.8%	5.7%	5.7%
	South	2.4%	2.3%	2.3%
	Statewide	3.7%	3.6%	3.6%

Standard A-6, Disclosure 9

Form A-8: Probable Maximum Loss for Florida

A. *Provide a detailed explanation of how the Expected Annual Hurricane Losses and Return Periods are calculated.*

In Form A-8, the Total Loss column contains the sum of all event losses for only events whose individual losses fall within the bounded range. The Number of Hurricanes column shows the corresponding number (count) of events in the catalog whose losses fall within the range. The Average Loss column contains the quotient of the Total Loss and Number of Hurricanes for each range. The Expected Annual Hurricane Losses column is the quotient of the Total Loss for the range and the (constant) number of years in the catalog of 50,000. Finally, the Return Period column shows the return period, or reciprocal of exceedance probability, for the loss amount from the Average Loss column, calculated in accordance with the event-ranking methodology described in Standard A-3, Disclosure 1.

B. *Complete Part A showing the personal and commercial residential probable maximum loss for Florida. For the Expected Annual Hurricane Losses column, provide personal and commercial residential, zero deductible statewide loss costs based on the 2012 Florida Hurricane Catastrophe Fund's aggregate personal and commercial residential exposure data found in the file named "hlpm2012c.exe."*
In the column, Return Period (Years), provide the return period associated with the average loss within the ranges indicated on a cumulative basis.
For example, if the average loss is $4,705 million for the range $4,501 million to $5,000 million, provide the return period associated with a loss that is $4,705 million or greater.
For each loss range in millions ($1,001-$1,500, $1,501-$2,000, $2,001-$2,500) the average loss within that range should be identified and then the return period associated with that loss calculated. The return period is then the reciprocal of the probability of the loss equaling or exceeding this average loss size.
The probability of equaling or exceeding the average of each range should be smaller as the ranges increase (and the average losses within the ranges increase). Therefore, the return period associated with each range and average loss within that range should be larger as the ranges increase. Return periods shall be based on cumulative probabilities.
A return period for an average loss of $4,705 million within the $4,501-$5,000 million range should be lower than the return period for an average loss of $5,455 million associated with a $5,001- $6,000 million range.

The 2012 FHCF aggregate exposure data has been modeled with a zero deductible assumption. Gross, zero deductible modeled losses have been used in the preparation of this form according to the specifications provided.

C. *Provide a graphical comparison of the current submission Residential Return Periods loss curve to the previously accepted submission Residential Return Periods loss curve. Residential Return Period (Years) shall be shown on the y-axis on a log 10 scale with Losses in Billions shown on the x-axis. The legend shall indicate the corresponding submission with a solid line representing the current year and a dotted line representing the previously accepted submission.*

A graphical comparison of the exceedance probability curves based on modeling the data as described in B. for both the current and previously accepted submission is provided.

D. *Provide the estimated loss and uncertainty interval for each of the Personal and Commercial Residential Return Periods given in Part B. Describe how the uncertainty intervals are derived.*

Estimated loss and uncertainty intervals are provided for each return period. The uncertainty intervals are 95% confidence intervals based on bootstrapping method, and were computed using the software MatLab.

E. *Provide this form in Excel format. The file name shall include the abbreviated name of the modeling organization, the standards year, and the form name. Form A-8 (Probable Maximum Loss for Florida) shall also be included in a submission appendix.*

A hard copy of Form A-8 is included in this appendix in Table 69 and Table 70 and is provided in Excel format.

Table 69. Part A: Personal and Commercial Residential Probable Maximum Loss for Florida

LOSS RANGE (MILLIONS)			TOTAL LOSS	AVERAGE LOSS (MILLIONS)	NUMBER OF HURRICANES	EXPECTED ANNUAL HURRICANE LOSSES*	RETURN PERIOD (YEARS)
$ -	to	$500	2,675,359	126	21169	53.5	2.0
$501	to	$1,000	3,569,334	722	4944	71.4	2.7
$1,001	to	$1,500	3,732,329	1,233	3026	74.6	3.2
$1,501	to	$2,000	3,590,196	1,738	2066	71.8	3.6
$2,001	to	$2,500	3,483,987	2,239	1556	69.7	4.0
$2,501	to	$3,000	3,535,056	2,740	1290	70.7	4.3
$3,001	to	$3,500	3,475,486	3,242	1072	69.5	4.7
$3,501	to	$4,000	3,282,193	3,738	878	65.6	5.1
$4,001	to	$4,500	3,269,385	4,240	771	65.4	5.4
$4,501	to	$5,000	3,111,737	4,744	656	62.2	5.8
$5,001	to	$6,000	5,948,234	5,482	1085	119.0	6.3
$6,001	to	$7,000	5,737,339	6,483	885	114.7	7.1
$7,001	to	$8,000	5,545,139	7,493	740	110.9	7.9
$8,001	to	$9,000	5,184,117	8,513	609	103.7	8.7
$9,001	to	$10,000	4,794,690	9,494	505	95.9	9.5
$10,001	to	$11,000	4,683,761	10,502	446	93.7	10.3
$11,001	to	$12,000	4,717,920	11,479	411	94.4	11.2
$12,001	to	$13,000	4,481,608	12,484	359	89.6	12.1
$13,001	to	$14,000	3,441,166	13,495	255	68.8	13.0
$14,001	to	$15,000	4,070,578	14,486	281	81.4	13.9
$15,001	to	$16,000	4,150,876	15,488	268	83.0	15.0
$16,001	to	$17,000	3,429,274	16,487	208	68.6	16.1
$17,001	to	$18,000	3,374,743	17,486	193	67.5	17.0
$18,001	to	$19,000	3,403,648	18,498	184	68.1	18.2

LOSS RANGE (MILLIONS)			TOTAL LOSS	AVERAGE LOSS (MILLIONS)	NUMBER OF HURRICANES	EXPECTED ANNUAL HURRICANE LOSSES*	RETURN PERIOD (YEARS)
$19,001	to	$20,000	2,965,142	19,508	152	59.3	19.3
$20,001	to	$21,000	2,771,782	20,532	135	55.4	20.3
$21,001	to	$22,000	3,264,451	21,477	152	65.3	21.5
$22,001	to	$23,000	2,318,815	22,513	103	46.4	22.7
$23,001	to	$24,000	2,910,755	23,474	124	58.2	23.9
$24,001	to	$25,000	2,178,115	24,473	89	43.6	25.1
$25,001	to	$26,000	2,427,373	25,551	95	48.5	26.2
$26,001	to	$27,000	2,624,078	26,506	99	52.5	27.7
$27,001	to	$28,000	2,505,684	27,535	91	50.1	29.1
$28,001	to	$29,000	2,423,191	28,508	85	48.5	30.6
$29,001	to	$30,000	1,918,409	29,514	65	38.4	32.1
$30,001	to	$35,000	9,510,135	32,347	294	190.2	36.3
$35,001	to	$40,000	8,230,427	37,411	220	164.6	44.2
$40,001	to	$45,000	7,995,004	42,527	188	159.9	53.6
$45,001	to	$50,000	6,913,242	47,351	146	138.3	64.8
$50,001	to	$55,000	5,611,666	52,445	107	112.2	77.2
$55,001	to	$60,000	4,753,328	57,269	83	95.1	90.7
$60,001	to	$65,000	5,244,384	62,433	84	104.9	107.3
$65,001	to	$70,000	3,981,495	67,483	59	79.6	126.3
$70,001	to	$75,000	3,557,032	72,592	49	71.1	144.5
$75,001	to	$80,000	3,637,874	77,402	47	72.8	170.1
$80,001	to	$90,000	5,043,673	85,486	59	100.9	200.8
$90,001	to	$100,000	4,917,815	94,573	52	98.4	263.2
$100,001	to	$ Maximum	22,466,919	138,685	162	449.3	892.9
		Total	**216,858,942**	**4,654**	**46,597**	**4,337.2**	**n/a**

**Personal and commercial residential zero deductible statewide loss using 2012 FHCF personal and commercial residential exposure data – file name: hlpm2012c.exe.*

Table 70. Part B: Personal and Commercial Residential Probable Maximum Loss for Florida

		Based on 100K Bootstrap
Return Period (Years)	Estimated Loss Level (Millions)	Uncertainty Interval (Millions)
Top Event	345,145	297891 to -
1,000	151,039	137182 to 159900
500	120,994	112477 to 128366
250	96,993	93053 to 101415
100	64,559	61569 to 66956
50	43,914	42091 to 45366
20	22,335	21489 to 23018
10	11,264	10959 to 11614
5	4,044	3908 to 4173

The 95% uncertainty intervals for the individual return periods were calculated using the method of bootstrapping. To derive the intervals, we repeatedly sampled with replacements from our dataset of 50,000 modeled occurrence losses. We then ranked and identified the return period losses of interest in Form A-8 for each of the samples drawn. The procedure was repeated 100,000 times, yielding a bootstrap distribution at each of the return periods of interest. The 95% uncertainty intervals shown in Form A-8 represent the 0.025 and 0.975 percentiles of the 100K bootstrap distribution determined for each return period.

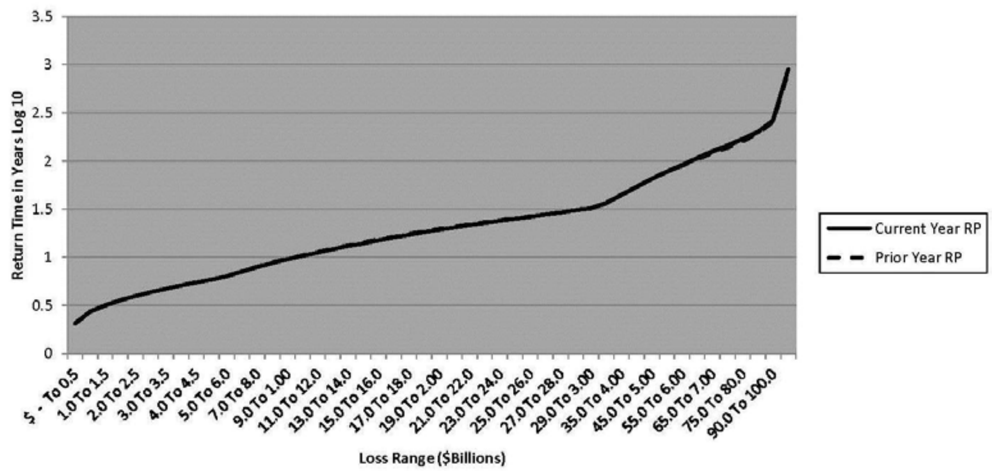


Figure 104. Part C: Personal and Commercial Residential Loss Curve Comparison

[Standard A-6, Disclosure 10]

Appendix 6: PIAF Form

AIR Worldwide Corp.
PIAF Background and Explanation

The Project Information and Assumptions Form (PIAF) is a tool AIR uses to clarify project parameters prior to beginning an analysis. This form documents the project timeline, perils modeled, data received and project deliverables. AIR prepares the PIAF after a review of the client's data. In the PIAF, we document our analysis of the data and any assumptions necessary to accurately model the data.

After the client has reviewed and signed the PIAF, AIR will begin the analysis. While AIR endeavors to complete the analysis as rapidly as possible, the project due date indicated in the PIAF includes built-in estimates for analysis time, report preparation and internal peer-review and quality checks. We encourage clients to make AIR aware of their internal deadlines so that these can be accounted for when establishing the project timeline. We also ask clients to be aware that requests to provide deliverables in advance of the project due date will be accommodated to the extent possible, but cannot be guaranteed.

Once the analysis has begun AIR may need to update the PIAF to reflect analysis options or data questions which require clarification. In these cases AIR will contact the client and issue an updated PIAF so that the list of all assumptions is documented. Please note that changes requiring additional analyses that are made to the PIAF after it has been signed may be subject to additional fees. We encourage clients to review the PIAF in detail and direct any questions to your AIR account manager prior to signing the PIAF.

A copy of the PIAF will be included with the final deliverables prepared for the client at the end of the project.

Project Information & Assumptions Form

Project Summary & Contact Information

Subscriber: Florida Commission on Hurricane Loss Projection Methodology

Contact: Donna Sirmons
Email: Donna.Sirmons@sbafla.com
Phone: (850) 413 - 1349
Fax:

AIR Contact: Brandie Andrews
Email: bandrews@air-worldwide.com
Phone: (617) 267-6645
Fax: (617) 267-8284

Contract #:
Analysis Type: Property
☑ Initial Analysis ☐ Follow-up

Exposure Summary Sent: n/a
Report Due: November 1, 2014

Perils & Models

#	Peril	Model	Implementation	Version	Simulation Years
1	Tropical Cyclone	Atlantic Tropical Cyclone	Touchstone	15.0.0	50,000
2	Tropical Cyclone	Atlantic Tropical Cyclone	Touchstone	15.0.0	Historical

Reports & Deliverables

Report Options

Report Format: ☑ Electronic File ☑ Bound Report

Standard Reports

☐ Distribution of Potential Catastrophe Losses
☐ Portfolio ☐ State ☑ Other: Outputs and Forms required by the November 1, 2013 Report of Activities

☐ Average Annual Losses
☐ State ☐ Other:

☐ Loss Cost and Pure Premium
☐ State ☐ Other:

☐ Selected Event Scenarios
☐ Rank ☐ Return Period ☐ Other:

Customized Reports

☐ CLF™ Submission Pack (UNICEDE®/2, Company Loss Files)
☐ Other:

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Original Data File Information

Original file name(s): hlpm2012c.txt
Date Received: November 1, 2013 **Data in-force Date:** October 20, 2013
Date Logged: November 1, 2013 **Data Media:** Compact Disc

File Format:
☐ MS Access ☐ MS Excel ☑ Text ☐ Other:

Level of Location Detail:
☐ Geocode ☐ 9-digit Zip ☐ Street ☑ 5-digit Zip
☐ City ☑ County ☐ State ☐ Territory

Original Data File Summary

Total Replacement Value	Total Deductible Value	Total Records	Total Risks	Total Insured Value
2,076,280,603,137	-	235,870	6,368,313	2,076,280,603,137

Excluded Records

Reason for Exclusion	Records	Risks	Insured Value
Zero Risk Count set to 1 (See Exposure Note 1)		-2,514	
Total Excluded:	-	**-2,514**	-
Reduced Number of Records due to Aggregation:	-	N/A	N/A
Net Exposures to be Modeled:	**235,870**	**6,370,827**	**2,076,280,603,137**

Geocode Record Summary

Number of zipcodes remapped prior to geocoding:	463	
Book Name:		
Geocoded Level of Location Detail	**Records**	
Matched at Exact Address:		
Matched at 9-digit Zip:	-	
Matched at Relaxed Address:	-	
Matched at Postal Code:	-	235,870
Matched at City:	-	
Matched at County:	-	
Records already geocoded by client:	-	
Total number of records:	-	235,870

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Line of Business & Coverage Summary														
	Limits	A Building			B Other Structures			C Contents			D Loss of Use			
LOB	Apply	Rep	Lim	Ded	Rep	Lim	Ded	Rep	Lim	Ded	Rep	Lim	Ded	
Residential	C	L	P	NO	L	P	NO	L	P	NO	L	P	NO	
Mobile Home	C	L	P	NO	L	P	NO	L	P	NO	L	P	NO	
Tentants (Renters)	C	L	P	NO	L	P	NO	L	P	NO	L	P	NO	
Condominium Owners	C	L	P	NO	L	P	NO	L	P	NO	L	P	NO	
Commercial	C	L	P	NO	L	P	NO	L	P	NO	L	P	NO	

CLASIC/2 Key:

Limit Application Code ("Limits Apply"):
N = None
C = Applies by Coverage
S = Applies to sum of all coverages

Replacement Value ("Rep"):
P = As Provided
L = Equal to limit

Limit Value ("Lim"):
P = As Provided
R = Equal to Replacement Value

Deductible Application Code ("Ded"):
NO = None
SA = Combined flat
SP = Combined percent of coverage
SL = Combined percent of loss
CA = By coverage flat
CP = By coverage percent
BA = Combined flat, excluding time element loss
BP = Combined percent of coverage, excluding time
MA = Mini-policy flat
MP = Mini-policy percent
AA = Annual Deductible

Analysis Options

Aggregation of Input Data: ☑ Modeled as provided ☐ Aggregated by:

Geographic Resolution of Results: ☐ Location ☐ Postal Code ☐ County ☐ State ☐ Country ☑ Event Total

Analysis Save Results: ☐ Contract ☐ Contract/Summary ☐ Layer ☐ Coverage ☐ Injury

Analysis Specifications:
☐ Reinsurance Quota Share ☐ Reinsurance Per Risk XOL
☐ Reinsurance Surplus Share ☐ Reinsurance Facultative
☐ TC Storm Surge (Flooding, default is 10% of separately modeled surge loss)
☑ Average Properties ☑ Demand Surge (Post Event Inflation)
☐ Uncertainty ☐ Global Overrides

Analysis Notes:

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Location Detail Characteristics		
Characteristic	*Provided*	*Modeled*
Age	✓	✓
Height		
Floor of Interest		
Building Condition		
Proximity Exposure		
Tree Exposure		
Small Debris Source		
Large Missile Source		
Terrain Roughness		
Avg Height of Adjacent Buildings		
Building Orientation		
Building Shape		
Torsion Elements		
Soft Story		
Structural Irregularity		
Special Earthquake Resistant Systems		
Retrofit Measures		
Roof Geometry	✓	✓
Roof Pitch		
Roof Covering		
Roof Deck	✓	✓
Roof Covering Attachment		
Roof Deck Attachment		
Roof Anchorage		
Year Roof Built		
Wall Type		
Wall Siding		
Glass Type		
Glass Percent		
Window Protection	✓	✓
Exterior Doors		
Bldg Foundation Connection		
Foundation Type		
Internal Partition Walls		
Wall Attached Structures		
Appurtenant Structures		
Roof Attached Structures		

Notes:

1) For constrcution types, "Masonry with Reinforced Concrete Roof" and "Superior with Reinforced Concrete Roof", roof deck is coded as reinforced concrete; For other types of construction without roof deck specifications, roof deck is coded as 0 (unknown).

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Exposure Notes & Customized Assumptions
1) Some values in the 2012 FHCF exposure data, field 7 "Total Insured Risks" are zero because companies report endorsements as separate risks from the policies as noted in Donna's email, "Modeler 2013 ROA Q&A". 2514 locations have a Total Insured Risks value of zero. In order to import into the AIR software, AIR will update these values to 1. This update will not alter the total insured value or impact the calculation of loss costs or other modeled outputs. 2) Year Built for construction type, "Mobile Home - Fully Tied Down, manufactured before 7/13/94" , is set to 1981; Year Built for construction type, "Mobile Home - Fully Tied Down, manufactured on or after 7/13/94", is set to 1995; Year Built for construction type, "Mobile Home - Other than Fully Tied Down or Unknown", is set to 0 (unknown). 3) For other types of construction, Year Built coded "Unknown or Mobile Home" is set to 0 (unknown); Year Built coded "1994 or earlier" is set to 1994; Year Built coded "1995-2001" is set to 1995. Year Built coded "2002 or later" is set to 2002. 5) Field 13 "Structure Opening Protection" is mapped to the AIR field "IRWindowProt". "No credit is given to policyholder" are modeled as No Protection; "Credits is given to policyholder" are modeled as Engineered Shutters. 6) Field 14 "Roof Shape" is modeld using the AIR field "IRRoofGeometry". Locations with Roof Shapes that are "Hip, Mansard or Pyramid" are modeld as Hip; locations with Roof Shapes that are "Gable, Other or Unknown" and Year Built is coded as "2002 or later" are modeled as Gable end with bracing; locations with Roof Shapes that are "Gable, Other or Unknown" and Year Built is coded as "Unknown or Mobile Home", "1994 or earlier" or "1995 - 2001" are modeled as Gabel end without bracing. 7) For construction types, "Masonry with Reinforced Concrete Roof" and "Superior with Reinforced Roof", roof deck is coded as reinforced concrete; For other types of construction without roof deck specifications, roof deck is coded as 0 (unknown).

Attachments & Exhibits			
Construction/Occupancy Information and Data Mapping:	☑		
Insured Value Summary by LOB:	☐ State	☐ County	☐ Coverage
Replacement Value Summary by LOB:	☐ State	☐ County	☐ Coverage
Deductible Summary by LOB:	☐ State	☐ County	☐ Coverage
Premium Summary:	☐ State	☐ County	
Deductible by Coverage:	☐ State	☐ County	
Construction Summary:	☐		

Exposure Summary & Modeling Assumption Approval

I agree that the control totals presented reflect the data provided for modeling, the data assumptions detailed here are those intended and the modeling assumptions are those requested.

Subscriber Signature: ______________________ *Date:* ______________

Print Name: ______________________ *Title:* ______________

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Exhibit I: 2012 Florida Hurricane Catastrophe Fund Industry Data

Construction/Occupancy Information and Data Mapping

Client TOB/LOB	*Client Construction/Occupancy*	*AIR_CC*	*AIR_OC*	*AIR Construction*	*AIR Occupancy*	*Risks*	*Insured Value*
Commercial/Com_MultiPeril	Frame	101	306	Wood Frame	Apartment/Condominium	20,143	13,435,222,074
Commercial/Com_MultiPeril	Masonry	111	306	Masonry	Apartment/Condominium	68,962	45,979,638,357
Commercial/Com_MultiPeril	Masonry_ReinfConcrete_Rf	111	306	Masonry	Apartment/Condominium	454	2,590,021,394
Commercial/Com_MultiPeril	Masonry_Veneer	103	306	Wood Masonry Veneer	Apartment/Condominium	83	57,751,900
Commercial/Com_MultiPeril	Superior	131	306	Rein.Concrete	Apartment/Condominium	113	2,591,823,659
Commercial/Com_MultiPeril	Superior_ReinfConcrete_Rf	131	306	Rein.Concrete	Apartment/Condominium	291	6,003,240,489
Commercial/Com_MultiPeril	Unknown	100	306	Unknown	Apartment/Condominium	38	108,123,000
Commercial/Fire&Allied	Frame	101	306	Wood Frame	Apartment/Condominium	14,593	7,492,638,653
Commercial/Fire&Allied	Masonry	111	306	Masonry	Apartment/Condominium	65,809	40,281,404,306
Commercial/Fire&Allied	Masonry_ReinfConcrete_Rf	111	306	Masonry	Apartment/Condominium	11,703	26,378,097,061
Commercial/Fire&Allied	Superior	131	306	Rein.Concrete	Apartment/Condominium	275	1,506,281,109
Commercial/Fire&Allied	Superior_ReinfConcrete_Rf	131	306	Rein.Concrete	Apartment/Condominium	2,914	52,841,193,092
Commercial/Fire&Allied	Unknown	100	306	Unknown	Apartment/Condominium	4,897	218,919,807
Commercial/Inland_Marine	Superior_ReinfConcrete_Rf	131	306	Rein.Concrete	Apartment/Condominium	25	917,188
Condominium Owners/Com_MultiPeril	Frame	101	306	Wood Frame	Apartment/Condominium	36	9,354,788
Condominium Owners/Com_MultiPeril	Masonry	111	306	Masonry	Apartment/Condominium	94	14,696,866
Condominium Owners/Com_MultiPeril	Masonry_Veneer	103	306	Wood Masonry Veneer	Apartment/Condominium	1	168,000

Client TOB/LOB	Client Construction/Occupancy	AIR_CC	AIR_OC	AIR Construction	AIR Occupancy	Risks	Insured Value
Condominium Owners/Com_MultiPeril	Superior	131	306	Rein.Concrete	Apartment/Condominium	6	795,000
Condominium Owners/Fire&Allied	Frame	101	306	Wood Frame	Apartment/Condominium	11,855	1,002,861,158
Condominium Owners/Fire&Allied	Masonry	111	306	Masonry	Apartment/Condominium	40,298	3,525,901,204
Condominium Owners/Fire&Allied	Masonry_ReinfConcrete_Rf	111	306	Masonry	Apartment/Condominium	7,909	997,907,627
Condominium Owners/Fire&Allied	Masonry_Veneer	103	306	Wood Masonry Veneer	Apartment/Condominium	682	59,875,684
Condominium Owners/Fire&Allied	Superior	131	306	Rein.Concrete	Apartment/Condominium	10,858	1,417,933,511
Condominium Owners/Fire&Allied	Superior_ReinfConcrete_Rf	131	306	Rein.Concrete	Apartment/Condominium	16,958	3,583,543,578
Condominium Owners/Fire&Allied	Unknown	100	306	Unknown	Apartment/Condominium	865	121,740,196
Condominium Owners/FO_MultiPeril	Frame	101	306	Wood Frame	Apartment/Condominium	5	703,400
Condominium Owners/FO_MultiPeril	Masonry	111	306	Masonry	Apartment/Condominium	4	1,016,525
Condominium Owners/HO_MultiPeril	Frame	101	306	Wood Frame	Apartment/Condominium	56,712	5,480,401,620
Condominium Owners/HO_MultiPeril	Masonry	111	306	Masonry	Apartment/Condominium	436,315	41,323,127,942
Condominium Owners/HO_MultiPeril	Masonry_ReinfConcrete_Rf	111	306	Masonry	Apartment/Condominium	81,018	8,495,845,302
Condominium Owners/HO_MultiPeril	Masonry_Veneer	103	306	Wood Masonry Veneer	Apartment/Condominium	6,458	677,395,369
Condominium Owners/HO_MultiPeril	Superior	131	306	Rein.Concrete	Apartment/Condominium	54,868	6,702,832,292
Condominium Owners/HO_MultiPeril	Superior_ReinfConcrete_Rf	131	306	Rein.Concrete	Apartment/Condominium	59,363	9,772,662,292
Condominium Owners/HO_MultiPeril	Unknown	100	306	Unknown	Apartment/Condominium	775	372,513,824
Condominium Owners/Inland_Marine	Frame	101	306	Wood Frame	Apartment/Condominium	551	15,220,242
Condominium Owners/Inland_Marine	Masonry	111	306	Masonry	Apartment/Condominium	4,562	132,324,400
Condominium Owners/Inland_Marine	Masonry_ReinfConcrete_Rf	111	306	Masonry	Apartment/Condominium	530	35,135,529

Client TOB/LOB	Client Construction/Occupancy	AIR_CC	AIR_OC	AIR Construction	AIR Occupancy	Risks	Insured Value
Condominium Owners/Inland_Marine	Masonry_Veneer	103	306	Wood Masonry Veneer	Apartment/Condominium	126	8,397,744
Condominium Owners/Inland_Marine	Superior	131	306	Rein.Concrete	Apartment/Condominium	130	54,229,026
Condominium Owners/Inland_Marine	Superior_ReinfConcrete_R f	131	306	Rein.Concrete	Apartment/Condominium	633	371,192,832
Condominium Owners/Inland_Marine	Unknown	100	306	Unknown	Apartment/Condominium	7	1,406,449
Mobile Home/Com_MultiPeril	MH_Unknown	191	301	Mobile Homes	General Residential	67	3,020,759
Mobile Home/Fire&Allied	MH_Tied_after_7/13/94	194	301	Mobile Homes: Full Tie Down	General Residential	22,011	1,696,144,024
Mobile Home/Fire&Allied	MH_Tied_before_7/13/94	194	301	Mobile Homes: Full Tie Down	General Residential	70,674	2,946,898,333
Mobile Home/Fire&Allied	MH_Unknown	191	301	Mobile Homes	General Residential	3,667	225,402,040
Mobile Home/FO_MultiPeril	MH_Unknown	191	301	Mobile Homes	General Residential	36	4,458,182
Mobile Home/HO_MultiPeril	MH_Tied_after_7/13/94	194	301	Mobile Homes: Full Tie Down	General Residential	13	515,760
Mobile Home/HO_MultiPeril	MH_Unknown	191	301	Mobile Homes	General Residential	35	1,572,393
Mobile Home/Inland_Marine	MH_Tied_after_7/13/94	194	301	Mobile Homes: Full Tie Down	General Residential	99	671,132
Mobile Home/Inland_Marine	MH_Tied_before_7/13/94	194	301	Mobile Homes: Full Tie Down	General Residential	66	341,894
Mobile Home/Inland_Marine	MH_Unknown	191	301	Mobile Homes	General Residential	17	88,805
Mobile Home/Mobile_Home	MH_Tied_after_7/13/94	194	301	Mobile Homes: Full Tie Down	General Residential	116,794	13,100,485,539
Mobile Home/Mobile_Home	MH_Tied_before_7/13/94	194	301	Mobile Homes: Full Tie Down	General Residential	176,767	12,439,885,584
Mobile Home/Mobile_Home	MH_Unknown	191	301	Mobile Homes	General Residential	12,281	1,135,487,924
Residential/Com_MultiPeril	Frame	101	301	Wood Frame	General Residential	804	146,695,282
Residential/Com_MultiPeril	Masonry	111	301	Masonry	General Residential	1,234	280,261,882
Residential/Com_MultiPeril	Masonry_Veneer	103	301	Wood Masonry Veneer	General Residential	7	1,325,700

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Client TOB/LOB	Client Construction/Occupancy	AIR_CC	AIR_OC	AIR Construction	AIR Occupancy	Risks	Insured Value
Residential/Fire&Allied	Frame	101	301	Wood Frame	General Residential	209,484	53,125,780,379
Residential/Fire&Allied	Masonry	111	301	Masonry	General Residential	670,986	185,662,417,801
Residential/Fire&Allied	Masonry_Veneer	103	301	Wood Masonry Veneer	General Residential	29,399	6,788,894,704
Residential/Fire&Allied	Unknown	100	301	Unknown	General Residential	101,646	22,746,352,748
Residential/FO_MultiPeril	Frame	101	301	Wood Frame	General Residential	1,976	701,936,582
Residential/FO_MultiPeril	Masonry	111	301	Masonry	General Residential	2,477	1,366,045,305
Residential/FO_MultiPeril	Masonry_Veneer	103	301	Wood Masonry Veneer	General Residential	109	54,669,851
Residential/FO_MultiPeril	Unknown	100	301	Unknown	General Residential	201	129,621,404
Residential/HO_MultiPeril	Frame	101	301	Wood Frame	General Residential	651,307	276,232,542,474
Residential/HO_MultiPeril	Masonry	111	301	Masonry	General Residential	2,446,035	1,091,153,164,838
Residential/HO_MultiPeril	Masonry_Veneer	103	301	Wood Masonry Veneer	General Residential	203,877	98,881,163,477
Residential/HO_MultiPeril	Unknown	100	301	Unknown	General Residential	992	1,716,713,442
Residential/Inland_Marine	Frame	101	301	Wood Frame	General Residential	7,281	263,113,927
Residential/Inland_Marine	Masonry	111	301	Masonry	General Residential	28,862	2,391,728,597
Residential/Inland_Marine	Masonry_Veneer	103	301	Wood Masonry Veneer	General Residential	2,382	101,686,328
Residential/Inland_Marine	Unknown	100	301	Unknown	General Residential	85	4,120,218
Tenants(renters)/Com_MultiPeril	Frame	101	306	Wood Frame	Apartment/Condominium	4	32,000
Tenants(renters)/Com_MultiPeril	Masonry	111	306	Masonry	Apartment/Condominium	1	10,000
Tenants(renters)/Com_MultiPeril	Unknown	100	306	Unknown	Apartment/Condominium	5	745,000
Tenants(renters)/Fire&Allied	Frame	101	306	Wood Frame	Apartment/Condominium	5,364	101,693,886

Client TOB/LOB	Client Construction/Occupancy	AIR_CC	AIR_OC	AIR Construction	AIR Occupancy	Risks	Insured Value
Tenants(renters)/Fire&Allied	Masonry	111	306	Masonry	Apartment/Condominium	10,173	222,047,410
Tenants(renters)/Fire&Allied	Masonry_ReinfConcrete_Rf	111	306	Masonry	Apartment/Condominium	52	3,371,400
Tenants(renters)/Fire&Allied	Masonry_Veneer	103	306	Wood Masonry Veneer	Apartment/Condominium	8	356,000
Tenants(renters)/Fire&Allied	Superior	131	306	Rein.Concrete	Apartment/Condominium	256	18,442,350
Tenants(renters)/Fire&Allied	Superior_ReinfConcrete_Rf	131	306	Rein.Concrete	Apartment/Condominium	198	19,844,880
Tenants(renters)/Fire&Allied	Unknown	100	306	Unknown	Apartment/Condominium	1	16,800
Tenants(renters)/FO_MultiPeril	Frame	101	306	Wood Frame	Apartment/Condominium	34	3,685,684
Tenants(renters)/FO_MultiPeril	Masonry	111	306	Masonry	Apartment/Condominium	37	2,330,024
Tenants(renters)/FO_MultiPeril	Masonry_Veneer	103	306	Wood Masonry Veneer	Apartment/Condominium	2	729,500
Tenants(renters)/HO_MultiPeril	Frame	101	306	Wood Frame	Apartment/Condominium	61,809	1,989,192,638
Tenants(renters)/HO_MultiPeril	Masonry	111	306	Masonry	Apartment/Condominium	123,241	4,851,017,433
Tenants(renters)/HO_MultiPeril	Masonry_ReinfConcrete_Rf	111	306	Masonry	Apartment/Condominium	719	35,594,885
Tenants(renters)/HO_MultiPeril	Masonry_Veneer	103	306	Wood Masonry Veneer	Apartment/Condominium	12,067	477,389,772
Tenants(renters)/HO_MultiPeril	Superior	131	306	Rein.Concrete	Apartment/Condominium	3,976	166,099,907
Tenants(renters)/HO_MultiPeril	Superior_ReinfConcrete_Rf	131	306	Rein.Concrete	Apartment/Condominium	555	45,263,394
Tenants(renters)/HO_MultiPeril	Unknown	100	306	Unknown	Apartment/Condominium	152,668	3,987,388,759
Tenants(renters)/Inland_Marine	Frame	101	306	Wood Frame	Apartment/Condominium	5,181	643,036,139
Tenants(renters)/Inland_Marine	Masonry	111	306	Masonry	Apartment/Condominium	13,397	1,697,025,274
Tenants(renters)/Inland_Marine	Masonry_ReinfConcrete_Rf	111	306	Masonry	Apartment/Condominium	64	17,389,544
Tenants(renters)/Inland_Marine	Masonry_Veneer	103	306	Wood Masonry Veneer	Apartment/Condominium	1,377	143,240,472

Client TOB/LOB	*Client Construction/Occupancy*	*AIR_CC*	*AIR_OC*	*AIR Construction*	*AIR Occupancy*	*Risks*	*Insured Value*
Tenants(renters)/Inland_Marine	Superior	131	306	Rein.Concrete	Apartment/Condominium	522	125,511,007
Tenants(renters)/Inland_Marine	Superior_ReinfConcrete_Rf	131	306	Rein.Concrete	Apartment/Condominium	94	34,939,470
Tenants(renters)/Inland_Marine	Unknown	100	306	Unknown	Apartment/Condominium	235,432	4,726,547,712
					Total Insured Value to be Modeled:	**6,370,827**	**2,076,280,603,137**

Analysis Log

```
********************************
**      Touchstone      **
********************************

o Analysis Header Info

  Analysis Type:        Detailed Loss Analysis
  Analysis Name:        FormA8_50K_Wind_DS_AP_ET_LocSum_Cov
  Template Name:        AIR Default Loss Template
  Analysis SID:         39
  Result SID:           13
  Activity ID:          50
  HPC Job ID:           7941
  Description:          N/A
  User:                 AIR-WORLDWIDE\I50138
  Time Submitted:       10/14/2014 16:44:35
  Time Started:         10/14/2014 19:12:34
  Time Ended:           10/14/2014 11:05:01 PM
  Duration:             00:03:52:27
  Status:               Completed


o Error Summary


o System Info

  System Version:       2.1.0.220
  SQL Server Name:      CSGSTTSDB\SQL2012
  HPC Head Node:        CSGSTTSAPP


o Analysis Target Info

  Analysis Target Type:     Portfolio
  Analysis Target Name:     2012FHCF_Non_OR_FHCF_ZRO_DED_20140714
  Exposure View Filter:     Not Applied

  Exposure Set(s):          Database : Exposure Set Name
                   --------   -----------------
                   AIRExp_FCHLPM_13_TS2_1_A_Forms_RC2 : Non_OR_FHCF_zro_ded_20140714_2012FHCF

  Analysis Statistics:      Analyzed
                            --------
    Policy Count:           5
    Total Location Count:   235870
      Property Location Count: 235870
      Workers Location Count: 0
    Layers Count:           0
    SubLimits Count:        0
    Reinsurance Count:      0
    Total Replacement Value:    2,076,280,603,137


o Event Set Options

  Event Set Name:       50K US AP (2015) - Standard
  Event Set Type:       Stochastic
  Event Filter:         Off
  Demand Surge:         On

  Perils:               Tropical Cyclone - Wind


  Hazard Models:                     Model:  Model Version:  Catalog:                 Catalog Version:  Events:   Scenarios:
  AIR Hurricane Model for Hawaii              23      3.9.0     AIR Hurricane Model for Hawaii            04.01.0509    10330   50000
  AIR Hurricane Model for the United States     27 (21)  15.0.0    AIR North Atlantic Basinwide Hurricane Model    16.01.0811    723844    50000
  AIR U.S. Hurricane Model for Offshore Assets   27 (24)  1.9.0     AIR North Atlantic Basinwide Hurricane Model    16.01.0811    723844    50000
  AIR Tropical Cyclone Model for the Caribbean   27 (25)  9.0.0     AIR North Atlantic Basinwide Hurricane Model    16.01.0811    723844    50000
```

AIR Tropical Cyclone Model for Mexico 27 (29) 1.0.0 AIR North Atlantic Basinwide Hurricane Model 16.01.0811 723844 50000
AIR Tropical Cyclone Model for Central America 27 (67) 2.1.0 AIR North Atlantic Basinwide Hurricane Model 16.01.0811 723844 50000

o Financial Model Options

Correlation: Off
Disaggregation: Off
Average Properties: On
Invalid Con/Occ Pairs: Ignore
Apply residential location terms: AIR Default behavior
Intra-Policy Correlation factor: 0%
Inter-Policy Correlation factor: 0%

o Reinsurance Options

Program Name: N/A
Order of application of Fac: Off
FAC Reinsurance Count: 0
Treaty Reinsurance Count: 0

o Output Options

Loss Perspectives: Ground Up
Retained
Gross
Net of Pre-CAT

Event Losses By: Portfolio
Geography: Event Total
Summary (AAL Only): Location Summary

Loss Details: Coverage

o Analysis Management Options

Min-Max Cores: 1-7
Scheduled On: Execute Immediately
Result Server: CSGSTTSDB\SQL2012
Result Database: AIRResult_FCHLPM_13_TS2_1_A_Forms_RC2
Results Currency: USD
Move Marine Craft Geocodes: On
Commodity Prices
Gas: 3.65
Oil: 96

o Flexibility Options

Not available.

Import Log

```
*********************************
**      Touchstone      **
*********************************

********** Log header **********
Start Date/Time: 10/14/2014 10:56:54 AM
Owner [AIR-WORLDWIDE\I50138]
Description: [Import] initiated by [AIR-WORLDWIDE\I50138] on [CSGSTTSAPP]

********** Log Data Source Information **********
Import Type: [UPX]
Import Date Format: [Default]
Data Source: [\\CSGSTTSAPP\AIRWork\IMPORT\20.Non_OR_FHCF_zro_ded_20140714_2012FHCF.upx
Data Tables: [20.Non_OR_FHCF_zro_ded_20140714_2012FHCF.upx 20.Map_2e48ffcb-a1b0-4 ]
Delimiter: [,]
Text Qualifier: [Double Quote]

********** Log Import Options **********
Destination Database: [AIRExp_FCHLPM_13_TS2_1_A_Forms_RC2]
Destination SQL Server: [CSGSTTSDB\SQL2012]
Target Type: [Exposure Set]
Target Name: [Non_OR_FHCF_zro_ded_20140714_2012FHCF]
Mapping Set: [UNICEDE_Import_150]
Continue Geocode with Import Errors: [Y]
Duplicate Contract: [Skip+Error]
Location Error: [Reject Location]
Fail After: [Unlimited]
Max Errors: [0]
Existing Geocode: [Preserve]
Geocoder: [AIR Geocode]
Min HPC Cores: [1]
Max HPC Cores: [2]
Currency: [USD]


********** Log Summary Statistics **********
Elapsed Time: [00.00:11:20]
Total No. of records: [235875]
No. of records successfully processed: [235875]
Percentage of records successfully Imported: [100.0%]
```

```
********** Log Detailed Statistics **********
Summary of Property Records Imported: |
No. of Contracts            : |[5]|
No. of Locations            : |[235870]|
No. of Location Details     : |[235870]|
No. of Sublimits            : |[0]|
No. of Layers               : |[0]|
No. of Treaty               : |[0]|
No. of Facultative          : |[0]|
No. of Step Functions       : |[0]|
No. of Location Groups      : |[0]|

Summary of Property Records   NOT IMPORTED: |
No. of Contracts            NOT IMPORTED: |[0]|
No. of Locations            NOT IMPORTED: |[0]|
No. of Location Details     NOT IMPORTED: |[0]|
No. of Sublimits            NOT IMPORTED: |[0]|
No. of Layers               NOT IMPORTED: |[0]|
No. of Reinsurance Treaty   NOT IMPORTED: |[0]|
No. of Reinsurance Facultative  NOT IMPORTED: |[0]|
No. of Reinsurance (Unknown)   NOT IMPORTED: |[0]|
No. of Step Functions       NOT IMPORTED: |[0]|
No. of Location Groups      NOT IMPORTED: |[0]|

Summary of Property Exposure Data            : |
Total of Replacement Value A Imported        : |[1316155218995.00]|
Total of Replacement Value A Not Imported    : |[0.00]|
Total of Replacement Value B Imported        : |[81712121901.00]|
Total of Replacement Value B Not Imported    : |[0.00]|
Total of Replacement Value C Imported        : |[514837110256.00]|
Total of Replacement Value C Not Imported    : |[0.00]|
Total of Replacement Value D Imported        : |[163576151985.00]|
Total of Replacement Value D Not Imported    : |[0.00]|
Total Number of Risks Imported               : |[6370827]|

Geocode Statistics :|
GeoCoding Elapsed Time: [00.00:05:53]

[235870] locations records required geocoding
[235870] locations records were successfully geocoded
[0] location records were not geocoded

Summary of Geocode Match Level :|
[0] address(es) are matched at the Exact Address level
```

[0] address(es) are matched at the ZIP9 Address level
[0] address(es) are matched at the Relaxed Address level
[235870] address(es) are matched at the Postal Code Centroid Address level
[0] address(es) are matched at the Street level
[0] address(es) are matched at the City Centroid level
[0] address(es) are matched at the County Centroid level
[0] address(es) are matched at the CRESTA level
[0] address(es) are not matched
[0] address(es) are matched at the User Supplied level

********* Error Summary **********

********* Business Errors **********

********* Exceptions **********

[10/14/2014 11:08:15 AM]: DataImport PostProcess has ended.

Standard G-3, Disclosure 3

Appendix 7: Curriculum Vitæ

Dr. Carol Friedland P.E.

Assistant Professor of Construction Management

College of Engineering

Louisiana State University

Baton Rouge, Louisiana 70803-6405

(225) 578-1155

friedland@lsu.edu

Carol Friedland has been engaged in wind and hurricane engineering research, practice, and education for eleven years and in civil engineering and construction for the past sixteen years. She is the Industrial Specialty Contractors LLC Assistant Professor of Construction Management at LSU, and has been a registered professional engineer since 2003. Dr Friedland's areas of research include risk assessment; combined wind and flood loading; multi-criteria decision making for sustainable and hazard resistant building systems; GIS-enabled modeling and decision-making; use of airborne and satellite-based remote sensing for hurricane, wind, and flood damage detection; and residential construction. Her academic pursuits are in the fields of structural and wind engineering, engineering for natural hazards, and hazard-resistant construction.

Dr. Friedland has studied wind and hurricane effects on buildings and structures through structural analysis and post-storm investigations for over a decade. To support her research, she has developed integrated GIS and imagery (ground-based and aerial/satellite) field validation data archives since 2005 for Hurricanes Katrina, Ike, Isaac, and Sandy and has collected georeferenced-high definition video from Hackleburg, Alabama, and Smithville, Mississippi, after the April 2011 tornado outbreaks. She has received funding from NSF to collect and catalog natural hazard damage data and from NIST to evaluate data collection practices for wind and coastal flood events. Based on her work with NIST, her team also developed a prototype "Wind and Flood Data Collection" application for the Android mobile operating system.

Dr. Friedland was the technical lead for the 2014 State of Louisiana Hazard Mitigation Plan Update, responsible for tropical cyclone, flood, and coastal land loss hazard risk assessment, in addition to providing overall direction for the project team. She was the engineering lead for the Louisiana State University System Disaster Resistant University (DRU) Hazard Mitigation Plan, where her team collected detailed building data for probabilistic loss modeling using FEMA's Hazus-MH Hurricane Model and Comprehensive Data Management System (CDMS). Hazus model results were also used to create real-time estimates of hurricane damage for Katrina and Rita which were provided to state and federal emergency managers during the events. After Hurricanes Katrina and Rita, Dr. Friedland conducted studies of the effectiveness of building mitigation practices in Louisiana, Mississippi and Alabama, the results of which were distributed to members of the Louisiana State Legislature and used to help create building code reform in Louisiana.

Dr. Friedland has held internships at Cermak, Peterka, Petersen, Inc. (CPP), Swiss Reinsurance, and ImageCat, Inc. At CPP, Dr. Friedland assisted with wind tunnel testing, analytical evaluation of wind flow patterns, dynamic response of buildings, and development of a research plan to evaluate the wind response of a building cladding system. At Swiss Reinsurance, Dr. Friedland worked with the Catastrophe Perils group to evaluate and validate in-house wind vulnerability models for residential buildings based on data collected after Hurricane Charley. At ImageCat, Inc., she developed comprehensive procedures for systematically cataloging building attribute and damage information from high-definition video taken during post-hurricane damage reconnaissance missions. She also developed methods to link GIS building attribute and damage databases with ground- and remote sensing-acquired data.

Dr. Friedland has developed and taught an online-accessible graduate course focusing on aspects of hazard-resistant construction which is offered through LSU's Bert S. Turner Department of Construction Management. She has served as the assistant faculty advisor for the LSU Construction Student Association and as the faculty advisor for the LSU ABC Student Chapter.

Professional Registration and Memberships

Licensed Professional Civil Engineer, Wyoming Registration No. 10094
Certified Floodplain Manager, National Certification No. US-12-06337

Member, American Association of Wind Engineers
Steering Committee, 12th Americas Conference on Wind Engineering (12ACWE)

Member, American Society of Civil Engineers
Structural Engineering Institute (SEI)
Member, Multiple Hazard Mitigation Committee
Committee Member, *Flood Resistant Design and Construction Standard (SEI/ASCE 24)*
Member, Flood Load Subcommittee, *Minimum Design Loads for Buildings and Other Structures (ASCE/SEI 7)*

Technical Council on Wind Engineering (TCWE)

Member, Structural Wind Engineering Committee
Coasts, Oceans, Ports & Rivers Institute (COPRI)
Member

Honors/Awards

Industrial Specialty Contractors L.L.C. Professorship in Construction Management

State Farm Doctoral Dissertation Award

Donald Clayton Assistantship Supplement

National Science Foundation Graduate Fellowship Research Program Honorable Mention

LSU Graduate School Enhancement Award

Vincent A. Forte Fellowship – Louisiana Engineering Foundation

Professional Preparation

Ph.D. in Civil Engineering, 2009, Louisiana State University

MS in Civil Engineering, 2006, Louisiana State University

BS in Civil Engineering, 1998, University of Wyoming

Appointments

2010 – present. Idustrial Specialty Contractors L.L.C. Assistant Professor, Bert S. Turner Department of Construction Management, Louisiana State University, Baton Rouge, LA

2009 – 2010	Assistant Professor, Department of Construction Management, Louisiana State University, Baton Rouge, LA
2007 – 2009	Instructor, Construction Management & Industrial Engineering, Louisiana State University, Baton Rouge, LA
2003 – 2007	Graduate Research & Teaching Assistant, Depts. of Civil & Environmental Engineering and Construction Management & Industrial Engineering, Louisiana State University, Baton Rouge, LA
Summer 2006	Research Intern, ImageCat, Inc., Long Beach, CA
Summer 2005	Intern, Swiss Reinsurance, Armonk, NY
Summer 2004	Engineering Intern, Cermak, Peterka, Petersen, Inc., Fort Collins, CO
1999 – 2003	Project Engineer, Kiewit Industrial Co., Overland Park, KS
1998 – 1999	Staff Engineer, MSE-HKM, Inc., Billings, MT

Publication List for Dr. Carol Friedland, P.E.

PAPERS

1. "A critical analysis of hazard resilience measures within sustainability assessment frameworks," Matthews, E. C., Sattler, M., & C. J.Friedland, *Environmental Impact Assessment Review, 2014*, *49*(0), 59-69. doi: http://dx.doi.org/10.1016/j.eiar.2014.05.003.

2. "Statistical representation of design parameters for hurricane risk reduction structures," Dunn, C. L., C. J. Friedland & M. L. Levitan, *Structural Safety*, 2013, 45, 36-47. doi: http://dx.doi.org/10.1016/j.strusafe.2013.08.009.

3. "Collection and organization of hurricane damage data for civil infrastructure," Baradaranshoraka, M., C. J. Friedland & D. A. Reed. *12th Americas Conference on Wind Engineering (12ACWE)*. Seattle, WA, June 16-20, 2013.

4. "H*Wind hurricane time history extraction for defined locations," Madani, S. A., M. Baradaranshoraka & C. J. Friedland. *12th Americas Conference on Wind Engineering (12ACWE)*. Seattle, WA, June 16-20, 2013.

5. "Enforceability of limitation of liability clauses in engineering contracts," Ittmann, J., Friedland, C. & A. Okeil, 2013, *Journal of Legal Affairs and Dispute Resolution in Engineering and Construction*, 5, 128-135. doi: http://dx.doi.org/10.1061/(ASCE)LA.1943-4170.0000125.

6. "The true cost of hurricanes – a case for a comprehensive understanding of multi-hazard building damage," Friedland, C.J. and M. Gall, *Leadership and Management in Engineering*, 2012, 12(3), 134-146. doi: http://dx.doi.org/10.1061/(ASCE)LM.1943-5630.0000178.

7. "Unmanned aerial vehicle data acquisition for damage investigations in disaster events," Stuart M. Adams, Marc L. Levitan and Carol J. Friedland, *ATC & SEI Advances in Hurricane Engineering Conference*, Miami, Florida, October 24-26, 2012.

8. "Development of a loss-consistent wind and flood damage scale for residential buildings," Friedland, C.J. and M.L. Levitan. Proceedings, *Solutions to Coastal Disasters 2011*. Anchorage, AK: American Society of Civil Engineers.

9. "Integrated Aerial-Based and Ground-Based Damage Assessment of Single Family Dwellings at the Neighborhood and Per-Building Spatial Scales", Carol J. Friedland, Carol C. Massarra, and Earl Henderson, *9th International Workshop on Remote Sensing for Disaster Response,* September 14-16, 2011, Stanford University

10. "Residential building damage from hurricane storm surge: proposed methodologies to describe, assess and model building damage," Friedland, C.J. May, 2009, Louisiana State University: Baton Rouge, LA. p. 214 p. Available from: http://etd.lsu.edu/docs/available/etd-04152009-092337/.

11. "Loss-consistent categorization of hurricane wind and storm surge damage for residential structures," Friedland, C. and M. Levitan. Proceedings, *11th Americas Conference on Wind Engineering*. 2009. San Juan, Puerto Rico: American Association for Wind Engineering.

12. "Modeling performance of residential wood frame structures subjected to hurricane storm surge," Friedland, C.J., A.M. Okeil, and M.L. Levitan. Proceedings, *Structures Congress 2009*. 2009. Austin, TX: American Society of Civil Engineers. Available from: http://dx.doi.org/10.1061/41031(341)139.

13. "Visual rule-based classification of combined wind and surge hurricane data for residential buildings," Friedland, C.J., B.J. Adams, and M.L. Levitan. Proceedings, *Seventh International Workshop on Remote Sensing for Post-Disaster Response*. 2009. Austin, TX.

14. "Development of a hurricane storm surge damage model for residential structures," Friedland, C.J., M.L. Levitan, and B.J. Adams. Proceedings, *Solutions to Coastal Disasters 2008*. 2008. Oahu, Hawaii: American Society of Civil Engineers. Available from: http://dx.doi.org/10.1061/40968(312)75.

15. "Suitability of remote sensing per-building damage assessment of residential buildings subjected to hurricane storm surge," Friedland, C.J., B.J. Adams, and M.L. Levitan. Proceedings, *Sixth International Workshop on Remote Sensing for Post-Disaster Response*. 2008. Pavia, Italy. Available from: http://tlc.unipv.it/6_RSDMA.

16. "Remote sensing and field reconnaissance for rapid damage detection in Hurricane Katrina," Womble, J.A., B.J. Adams, S. Ghosh, and C.J. Friedland. Proceedings, *ASCE Structures Congress 2008*. 2008. Vancouver, Canada: American Society of Civil Engineers. Available from: http://dx.doi.org/10.1061/41016(314)264.

17. "Remote sensing classification of hurricane storm surge structural damage," Friedland, C.J., B.J. Adams, and M.L. Levitan. Proceedings, *ASCE Structures Congress 2007*. 2007. Long Beach, CA: American Society of Civil Engineers. Available from: http://dx.doi.org/10.1061/40943(250)7.

18. "Results of neighborhood level analysis of structural storm surge damage to residential structures," Friedland, C.J., B.J. Adams, and M.L. Levitan. Proceedings, *Fifth International Workshop on Remote Sensing for Post-Disaster Response*. 2007. Washington, DC. Available from: http://www.gwu.edu/~spi/.

19. "A hydrologic flood forecasting system for Mesoamerica," Villalobos-Enciso, J.E. and C. Friedland. Proceedings, *32nd International Symposium on Remote Sensing of Environment*. 2007. San José, Costa Rica.

20. "Deployment of remote sensing technology for multi-hazard post-Katrina damage assessment within a spatially-tiered reconnaissance framework," Adams, B.J., J.A. Womble, S. Ghosh, and C. Friedland. Proceedings, *Fourth International Workshop on Remote Sensing for Post Disaster Response*. 2006. Cambridge, UK. Available from: http://www.arct.cam.ac.uk/curbe/4thInt_workshop.html.

21. "Remote sensing and advanced technology for estimating post-hurricane structural storm surge damage," Friedland, C.J., B.J. Adams, and M.L. Levitan. Proceedings, *Fourth International Workshop on Remote Sensing for Post-Disaster Response*. 2006. Cambridge, UK. Available from: http://www.arct.cam.ac.uk/curbe/4thInt_workshop.html.

22. "Hurricane public health research and Katrina search and rescue mapping," Peele, R.H., S.A. Binselam, K. Streva, I.L. van Heerden, J. Snead, D. Braud, E. Boyd, H. Brecht, R. Paulsell, and C. Friedland. Proceedings, *2006 ESRI Health GIS Conference*. 2006. Denver, CO.

23. "Development of vulnerability functions for industrial/petrochemical facilites due to extreme winds and hurricanes," Hill, C. and M. Levitan. Proceedings, *Solutions to Coastal Disasters 2005*. 2005. Charleston, SC: American Society of Civil Engineers. Available from: http://dx.doi.org/10.1061/40774(176)50.

24. "Design and suitability of shelters of last resort for remote areas," Hill, C., M. Levitan, D. Fratta, and I. van Heerden. Proceedings, *10th Americas Conference on Wind Engineering*. 2005. Baton Rouge, LA: American Association for Wind Engineering.

CONFERENCE POSTERS & PRESENTATIONS

1. "Developing a risk assessment for a hazard mitigation plan: Lessons from Louisiana," Joyner, T.A., C.J Friedland, J. Gilliland, K. Mecholsky, R.V. Rohli, and N. English, Poster presented at *Annual Meeting of the Association of American Geographers*, Tampa, Florida, April 10, 2014.

2. Exhibit of Hazard Resistant Construction Research at *Louisiana Civil Engineering Conference & Show*, Kenner, LA, September 25-26, 2013.

3. Collection and organization of hurricane damage data for civil infrastructure," Baradaranshoraka, M., C. J. Friedland & D. A. Reed. *12th Americas Conference on Wind Engineering (12ACWE)*. Seattle, WA, June 16-20, 2013.

4. "H*Wind hurricane time history extraction for defined locations," Madani, S. A., M. Baradaranshoraka & C. J. Friedland. *12th Americas Conference on Wind Engineering (12ACWE)*. Seattle, WA, June 16-20, 2013.

5. "Cross-correlation Modeling of European Wind Storms: A Cokriging Approach for Optimizing Surface Wind Estimates." Poster Presented at the *12th Americas Conference on Wind Engineering (12ACWE)*. Seattle, WA, June 16-20, 2013.

6. "Estimating Longer Return Period Flood Events," Bohn, F. and C. Friedland, *Structures Congress*, American Society of Civil Engineers, Pittsburg, PA, May 2-4, 2013.

7. "Cokriging for European Wind Storm Surfaces: Where There's a Wind, There's a Way," Joyner, T.A., Rohli, R.V., Friedland, C.J., Treviño, A.M., Paulus, G., Poster presented at *AAG Annual Meeting*, Los Angeles, CA, April 11, 2013.

8. Field Planning and Data Collection Practices for Conducting Detailed Natural Hazard Vulnerability Assessments of Campus Structures, Ogea, S., Friedland, C.J., *Disaster Resistant University Workshop: Linking Mitigation and Resilience*, University of New Orleans Center for Hazards Assessment, Response and Technology (UNO-CHART), New Orleans, LA, March 20-22, 2013.

9. "Unmanned aerial vehicle data acquisition for damage investigations in disaster events," Stuart M. Adams, Marc L. Levitan and Carol J. Friedland, *ATC & SEI Advances in Hurricane Engineering Conference*, Miami, Florida, October 24-26, 2012.

10. "Interpolating European wind storms: A cokriging analysis of wind speed estimates," Joyner, T.A., A.M. Treviño, C.J. Friedland, R.V. Rohli, and G. Paulus. Poster presented at *Deutsche Forschungsgemeinshaft (DFG-NSF) "Reckoning with the Risk of Catastrophe" Conference*, Washington, DC, October 4, 2012.

11. "Optimizing peak gust and maximum sustained wind speed estimates for European wind storms," Joyner, T.A., A.M. Treviño, C.J. Friedland, R.V. Rohli, and G. Paulus, Poster presented at *Geoinformatics Forum*, Salzburg, Austria, July 4, 2012.

12. "Post-disaster imagery collection utilizing a multi-rotor unmanned aerial vehicle (UAV)," Stuart M. Adams and Carol J. Friedland. Poster presented at *2012 UAS Symposium at Mississippi State University* May 14-16, 2012. (2nd Place in Conference Poster Competition)

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3. "Disaster Resistant University Multi-Hazard Mitigation Plan." Draft Report. Gall, M., Friedland, C., Joyner, T.A., Orgera, R., Fu, C., Ogea, S. submitted to the Louisiana State University System Office, November 2012.

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11. "Residential wind damage in Hurricane Katrina: preliminary estimates and potential loss reduction through improved building codes and construction practices," Levitan, M.L. and C. Hill. October 2005, LSU Hurricane Center: Baton Rouge, LA.

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Highly accomplished Executive with more than 21 years of progressive experience in management, software development, software/hardware architecture, service, desktop, engineering, IT, compliance, project management, software/hardware implementation healthcare and biotechnology. Well-versed in high-impact direction of diverse teams of 180+ members on a global scale in a variety of highly competitive industries, cutting-edge markets, and fast-paced environments. Seeking a role with a company that values flexibility and the ability to maintain a sense of humor under pressure.

Areas of Expertise

- Global & Multi-site Direction
- Financial Management
- Design estimates
- Cost Reduction
- Architecture and Design
- Guidelines and Code Standards
- Hardware/Software Upgrades
- Database and Data warehousing
- Infrastructure Management
- Negotiation
- Resource Allocation
- Team Building

Technical Knowledge

- Java, .Net, C, C#, C++, MATLAB
- Oracle, SQL, Data Warehouse
- Software/Hardware upgrades
- Security Compliance & Data Protection
- SaaS, ERP, CRM, PMBOK
- Software architecture and design
- Healthcare, Bio-Medical
- FDA, SSL, AES, SAS, TLS,TCP/IP, HTTP, SOX
- SDLC, Agile and Waterfall Development
- IT Contracts and Software Licensing
- Purge, Audit, Upgrade
- Patches & Disaster Plans

Key Accomplishments

IBM Rational

- Managed global teams of 140 Software Developers, Support, Architects, IT staff, and Project Manager, QA Engineers, and Technical Support Level -1-3 staff ($10 M) Honored with “IBM Strategy Award” for this effort.
- Led a series of upgrades and application enhancements, including the replacement of obsolete systems, hardware and software at 16 locations, completing the project $2.9M under budget.
- Established critical partnerships with high level industry leaders such as Cisco, American Express and Bank of America in implementing IBM Rational Software products during the current recession. Resulting contracts accounted for 10% of Rational's sales.
- Developed on-going future business plan by merging departments' IT Infrastructure and secured $10M in both institutional and strategic financing during the current recession.
- Saved $1.9M for IBM by developing and expanding the business intelligence infrastructure to ensure data integrity.
- Oversaw software design and technical architecture of large complex software application, using project management and planning skills to minimize development time and maximize client acceptance and was awarded with "IBM Ovation Award".
- Honored with "IBM Highest Customer Satisfaction Award" for partnering with 5 other regional representatives and developing support policies agreements that reduced average work backlog from 30 days to 1 day and resulted in $5.9M in annualized savings.

NetBio (Start-up Company)

- Managed, architecture and design the DNA analyzer system for FBI and Homeland security using AES-512
- Developed the PDR/CDR for DNA processing for Government agency and Homeland security.

The Commonwealth of Massachusetts Executive Office of Labor and Workforce Development

- Architectured the new Unemployment Benefit software
- Developed policy, process and created new QA and build teams
- Set up Agile development process for the first time
- Managed and created new implementation for Healthcare software tool for unemployment office

ZOLL

- Led team through new product development and successfully completed clinical trials and FDA approvals; contributed to optioning patents for Biphasic waveforms and contributed greatly to a share price increase from $6 to $44.

Professional Experience

TJX, Framingham, MA
Consultant 01/2013 Present

Oversee software/IT projects and software deployments meet business requirements and goals, and comply with all applicable security, privacy, and audit requirements and regulations.

- Manage the development and deployment of new applications, systems software, and/or enhancements to existing applications using agile methodology
- Software products and services recommendations on in support of procurement and development efforts.

The Commonwealth of Massachusetts Executive Office of Labor and Workforce Development
Director of Application and Development /Acting Deputy CIO 2012- 2013

Handle all management, architecture, software development, defects and enhancement, desktop, database administration, data warehousing, web application development, healthcare and support.

- Supervised up to 129 employees.
- Manage Software as a Service for 5 state agencies including unemployment office and desktop teams.
- Maintain software, database, deployment, Mainframe; liaised with vendors (Deloitte, etc).
- Coordinate all projects using management tools, techniques, and systems development methodologies and lifecycles, including Waterfall and Agile.
- Build relationships, engage and influence others, work with diverse internal, global business units and global network providers/outsourcers.
- Working relationships with business department heads to understand business requirements and direction

NetBio, Waltham, MA
Director Software/Service Engineering, 2009-2012

Handle all architecture, software development of Rapid DNA Analysis (RDA). Managed the software development group using Agile/Scrum methodizes. Successfully built human identification system and medical diagnostic instrumentation system.

- Supervised up to 40 employees.
- Spearheaded breakdown, prioritization, resource allocation and problem solving.
- Led Software team, QA, Project Managers and Management on new and exciting products.

- Utilized the Agile software development methods on key projects.
- Managed Software Application as a Service for FBI and DoD.
- Applications include criminal forensics, identification, biothreat detection, and clinical diagnostics.
- Performed security communication Using SSL, Data Transfer to DOD, FBI, and FIPS-140.
- Communicated through TCP/IP, UDP/IP, and HTTP protocols.

IBM Corporation, Lexington, MA
Director, Software/Support/desktop/Project Management, 2005-2009

Responsible for global software development, product implementation Project Managers, Service/Compliance and Support teams for Rational Software's entire product line.

- Led up to 5 teams of 140 technical staff, software developers, project, and program managers.
- Supervised up to 189 employees.
- Honored with the "IBM Strategy Award".
- Oversaw all technology aspects within IBM Rational Information Systems.
- Maintained 200 environments hosting IBM Rational leading compliance department.
- Coordinated all customer installations and sizing, partnered with Sales and Marketing to evaluate technology impact on customer environments.

Senior Project Manager/Implementation Manager/PMO, 2003-2005

- Implemented and managed IT infrastructure, Software development and installation projects.
- Directed global open source software project for IBM/Rational called Jazz, a best seller.
- Launched IBM.com Blog Portal, reducing costs and saving more than $4M.
- Developed project plans, specifications, and other related project administration tasks.
- Documented customers' technical, functional and business requirements.
- Coordinated teams of 18 Technical and 6 Sales Support staff for products deployments at major customers such as Cisco, Siemens and American Express.
- Supported products like, Rational Robot, ClearCase, Rose, Rational Quality Manager, and Rational Project management tools.

Technical Support/Desktop Manager, 2000–2003

- Managed the global support/call center.
- Collaborated with Territory Managers, inside sales,Support, Architects and Project Managers.
- Developed annual budget and implemented process models.
- Negotiated vendor contracts and co-chaired committee evaluating new software North American offices.
- Honored with "IBM Highest Customer Satisfaction Award" in 2003

Zoll Medical Corporation, Burlington, MA
Senior Electrical Engineering Manager, 1994-2000

- Led a team of 43 Software/Hardware Engineers, Project Managers, and Technical Sales Support and Quality Assurance staff.
- Managed the team that earned ZOLL Medical its first ISO9001 Certification.
- Spearheaded the 40% annual growth for defibrillator product supplier serving a wide variety of clients.
- Headed product development and successfully completed clinical trials and FDA approvals.
- Contributed to optioning patents for Biphasic waveforms, which increased the stock from $6 to $44.

Education and Training

- Executive MBA, Global Management, Northeastern University, Boston,
- BS, Electrical Engineering, University of Lowell, Lowell, MA
- Software Developer and Project Management , Boston University, Boston, MA
- Cardiology and Physiology for Scientists and Engineers , MIT, Cambridge, MA
- Certified ISO 9000 Auditor and Project Management Professional

Patents and Publications

- Generated patents for new wave form and obtained FDA approvals. High-energy, high-frequency pulse defibrillator" Granted 3/02.
- Own the medical patent for the *SmartPillCap* "Low Cost Pill Box, " granted 1/13
- Article in Journal of Emergency Medical Services (1995), Special EMS Edition, 1-2, 2

Yingqun Wang

Professional Skills:

- Deep knowledge in Catastrophe model simulation.
- Over 15 years' experience in C/C++ on Linux, Win32/64 (STL, ATL/COM).
- Extensive experience with system and network programming on Windows. Especially, multi-threaded, multi-process.
- Extensive experience in full life-cycle software development (object-oriented analysis, design, coding, debugging and testing).
- Extensive experience in database MS/SQL, PostgreSQL.
- Massive experience in HPC.
- Extensive knowledge in mathematics probability theory applies in statistic analysis.
- Extensive business knowledge in risk management and modeling in insurance industry.

Professional Accomplishments and Experience:

June 2013- Now: Team Lead at Air Worldwide. AIR Worldwide is the scientific leader and most respected provider of risk modeling software and consulting services.

- Training Hyderabad office developer with new knowledge AIR product Touch loss analytic all tiers.
- Lead team implement Touchstone 2.0 release new features: U.S. and Canada Earth Quake model; U.S. Flood model; Deterministic Terrorism; U.S. Sever Thunderstorm update;

2010– June 2013: Senior Software Engineer at Air Worldwide.

Work as key member in new product Touchstone.

1. Update Data Access Layer between Touchstone engine and database.
2. Architect/Design and implement the CATXOL all tiers components: engine, HPC, database.
3. Implemented Second Uncertainty components and plug into Loss Analysis work flow.

Sep 2007– 2010 Software Engineer III at Air Worldwide.

- As a key software team member, I have design and implementation of the CLAISC/2, the best seller product for primary insurance client, analyst financial engine development in VC++ with sophisticated statistical analysis, mathematical method (probabilistic analysis, correlations), specifically; I also have deep knowledge of sophisticate catastrophe models and develop risk measurements in financial module. Extensive database experience with store procedures and functions.
  4. Design and implement insurance financial model loss analyst layer term loss in coverage and risk analyst model for Gulf of Mexico Hurricane Hazard.
  5. Designed/implemented client specific insurance financial term with PDF and CDF.
  6. Designed/implemented data connection layer between C++ application and MSSQL database. Create complex database store procedure, function and views.
  7. Design and implementation solution for a several main engine performance issues with strong problem solving skills.
  8. Implementation test application for engine COM using C#.
  9. Created management wrapper for native DLLs.

Jan 2007– Sep 2007: Core Quality Assurance Engineer at AIR Worldwide.

- As a key QA engineer, I have created test plan, analysis intensive data
  1. Design and create data analysis test plan for CLASIC/2 release.

2. Design and implement risk model test application for CATRADER with Visual Basic using EXCEL.
3. Design and implement VC++ program for multiple year CAT BOND risk measurement.
4. Implement and maintain a support program for AIR ALTER for real catastrophe events.

Jan 2005 – Oct 2006 Program Analyst at University of California Riverside

- Designed and implemented PostgreSQL database and data analyst program with PL/SQL on Linux.
- Debugged and performed maintenance MPI C++ language program of Model Performance Evaluation Program.
- Developed C language program to extract data from netCDF into ASCII files which imported into ACCESS.
- Work as program analyst. Implemented Microsoft Access database data analyst. Automated PDF report generation using Visual Basic, SQL queries.

Education:

M. S. in computer science, California State University, San Bernardino. 2004

Appendix 8: Model Evaluation

Model Evaluation by Dr. Carol Friedland

2013 Vulnerability Standards

External Reviewer Comments

AIR's 2013 Vulnerability Standard submission has been reviewed. Comments are provided for each topic area.

V-1 Derivation of Vulnerability Functions

A. Development of the building vulnerability functions shall be based on at least one of the following: (1) historical data, (2) tests, (3) rational structural analysis, and (4) site inspections. Any development of the building vulnerability functions based on rational structural analysis, site inspections, and tests shall be supported by historical data.

The vulnerability functions in the AIR hurricane model were developed using research results published in the engineering literature, post-hurricane damage investigations conducted by experts in wind engineering, and insurance loss data.
AIR has used results of structural analysis performed by wind engineering experts, post-hurricane field survey results, updated engineering literature, computational simulations, and analysis of loss data to update and improve the vulnerability standards since their initial development.

B. The method of derivation of the building vulnerability functions and their associated uncertainties shall be theoretically sound and consistent with fundamental engineering principles.

AIR's Hurricane Model vulnerability functions and associated uncertainties were derived by experts in wind and structural engineering from published literature and have been validated by results of damage surveys and historical claims data. To deal with the uncertainties, the damage functions include probability distributions about a mean damage ratio that varies as a function of wind speed. The vulnerability functions have been peer reviewed, both internally and externally. This overall approach to development of the vulnerability functions is theoretically sound and consistent with fundamental engineering principles.

C. Residential building stock classification shall be representative of Florida construction for personal and commercial residential properties.

The building stock classification set has been derived from census, tax assessor, engineering surveys, and construction report data representative of Florida building stock.

D. Building height/number of stories, primary construction material, year of construction, location, building code, and other construction characteristics, as applicable, shall be used in the derivation and application of vulnerability functions.

The AIR model includes vulnerability functions for 32 construction types (e.g., wood frame, masonry veneer – detailed in Disclosure V-1.7) of single family residential (traditional construction and manufactured housing) and commercial residential (apartment buildings and condominiums). For single family residences, which are most commonly just one or two story, there is no variation of vulnerability functions with height. Building height is categorized for commercial residential structures based on construction type, with a maximum of three height categories. Building code and enforcement are accounted for regionally and temporally through application of vulnerability adjustment modifiers. Other construction characteristics are addressed through the Individual Risk Model.

E. Vulnerability functions shall be separately derived for commercial residential building structures, personal residential building structures, mobile homes, and appurtenant structures.

The AIR Model includes separate vulnerability functions for commercial residential and personal residential structures, mobile homes, and appurtenant structures.

F. The minimum windspeed that generates damage shall be consistent with fundamental engineering principles.

The AIR model uses a sustained (one-minute) average wind speed of 40 mph as the minimum threshold for wind damage. This lower bound has been verified through damage surveys and claims data.

G. Building vulnerability functions shall include damage as attributable to windspeed and wind pressure, water infiltration, and missile impact associated with hurricanes. Building vulnerability functions shall not include explicit damage to the building due to flood, storm surge, or wave action.

The AIR vulnerability functions explicitly account for damage as a function of wind speed (and by extension, wind pressure). Damage due to water infiltration and windborne missile impacts are handled implicitly, having been calibrated and validated using insurance claims data. Storm surge, flooding, and wave action are not included in the AIR model.

Disclosures

1. Describe any modifications to the building vulnerability component in the model since the previously accepted model

The building vulnerability component of the AIR model has address four key updates: mobile home vulnerability has been updated to reflect regional vulnerability impacts and changes in vulnerability based on year built; residential vulnerability has been updated to account for building size; storm surge vulnerability model has been updated and enhanced; and base wind structural vulnerability factors have been updated to be relevant through 2014. The AIR hurricane model team members presented papers detailing the impact of building size on wind vulnerability and a component-level storm surge model framework at the 12th Americas Conference on Wind Engineering and the 2014 ASCE Structures Congress, respectively.

2. Provide a flow chart documenting the process by which the building vulnerability functions are derived and implemented.

Figure 29 of AIR's V-1 response shows the process by which the vulnerability functions were derived and implemented. The flowchart shows how published research, engineering expertise, and results of damage surveys are combined to create the vulnerability functions, which are calibrated and validated by insurance industry claims and loss data.

3. Describe the nature and extent of actual insurance claims data used to develop the model's building vulnerability functions. Describe in detail what is included, such as, number of policies, number of insurers, date of loss, and number of units of dollar exposure, separated into personal residential, commercial residential, and mobile home.

AIR has made extensive use of insurance claims data in validation of the model, from multiple companies and multiple storms since 1986. In addition to data specific to Florida, loss data from other areas has also been evaluated, including 2012 Hurricanes Isaac and Sandy. Several different comparisons of actual versus modeled losses are provided in Figure 30 to Figure 35 of AIR's V-1 response. These figures demonstrate the generally good agreement between modeled and actual losses. As expected, the actual loss data show more scatter around the mean than the modeled data. This is due to many factors, not the least of which includes variation in rainfall amounts in different storms and different locations in the same storm, and differences within the loss data, including level of detail and methods of reporting by different insurance companies.

4. Describe the data, methods, and processes used for the development of the building vulnerability functions.

The vulnerability functions are based on engineering analysis, post-event damage surveys, expert consultation, and analysis of claims and industry loss data. In addition to the academic and industry background of AIR's engineering team, assessment of peer-reviewed literature and input from external reviewers ensure reasonable results.

5. Summarize site inspections, including the source, and a brief description of the resulting use of these data in development, validation, or verification of building vulnerability functions.

AIR has fielded post-hurricane investigations for every significant landfalling hurricane since Hugo in 1989, including several more recent hurricanes in 2004, 2005, 2008, 2011, and 2012. These site inspections have served to enhance the in-house expertise on wind damage vulnerabilities and to help identify and confirm performance issues of different types of construction. Generalizations regarding the performance of buildings in past events have found that "engineered" structures perform better that their "non-engineered" counterparts (both commercial and residential), the importance of year built on residential vulnerability, wind effects on non-structural elements, damage regimes for residential buildings based on windspeed, the improved wind resistance of masonry full-height exterior walls compared with wood-framed construction, and the importance of time effects for building vulnerability.

6. Describe the research used in the development of the model's vulnerability building functions.

Members of the AIR hurricane model development team actively participate in wind engineering research meetings and conferences, and review the latest information in the wind engineering research literature and incorporate those findings in their model as appropriate. Research activities also include post-storm site visits and detailed analysis of claims data, which are particularly relevant in validating and updating vulnerability functions.

7. Describe the categories of the different building vulnerability functions. Specifically, include descriptions of the structure types and characteristics, building height, number of stories, regions within the state of Florida, year of construction, and occupancy types in which a unique building vulnerability function is used. Provide the total number of building vulnerability functions available for use in the model for personal and commercial residential classifications.

Vulnerability functions are included in the AIR Hurricane Model for approximately 32 separate construction types that address the majority of personal and commercial residential construction in Florida, classified by primary construction characteristics. These functions can be further modified for secondary risk characteristics, including region, year of construction, and building codes. Vulnerability functions for commercial residential occupancies are developed considering building height, as such structures can be more than the typical 1-2 stories for single family residences.

8. Describe the process by which local construction practices and building code adoption and enforcement are considered in the model.

To account for variations in building code provisions, the AIR model divides the state of Florida into separate regions based on wind speed, terrain exposure, and code requirements for Windborne Debris Regions (WBDR) and High Velocity Hurricane Zones (HVHZ). Variations in local construction practices, building code adoption, code enforcement, and their effects on projected losses are handled as secondary risk characteristics in the Individual Risk Model, where detailed information can be input by the model user.

9. Describe the development of the vulnerability functions for appurtenant structures.

Vulnerability functions for appurtenant structures were developed through analysis of claims data, published literature, and damage surveys using the same process implemented for building vulnerability functions.

10. Describe the relationship between building structure and appurtenant structure vulnerability functions.

The building structure and appurtenant structure vulnerability functions are calculated independently. Damage to an appurtenant structure is calculated separately from the primary structure based on the hazard and known characteristics of the appurtenant structure.

11. Identify the assumptions, data, methods, and processes used to develop building vulnerability functions for unknown residential construction types.

Data provided by client companies, the census, and tax assessors are used to identify typical residential construction types within a region. Using these data, vulnerability functions for unknown residential construction types are developed through a weighted average of residential building vulnerability curves based on the prevalence of building construction types in that region. This is a sound practice, as residential buildings tend to exhibit similar regional characteristics. This weighting does not apply to mobile homes.

12. Identify the assumptions, data, methods, and processes used to develop building vulnerability functions when some primary characteristics are unknown.

Similar to the procedure discussed in V-1.11, the AIR model uses a weighted average of vulnerability functions and known regional distribution of primary building characteristics (i.e., construction, occupancy, height, year built) to estimate an average vulnerability function representative of the distribution of known building characteristics.

13. Identify the assumptions, data, methods, and processes used to develop building vulnerability functions for various construction types for renters and condo-unit owners.

Development of vulnerability functions for construction types related to renters and condo-unit owners are developed using the process previously described for single family residential exposures.

14. Describe any assumptions, data, methods, and processes used to develop and validate building vulnerability functions concerning insurance company claims.

AIR uses insurance company claim data to validate the building vulnerability functions at multiple levels. For supplied exposure data, building vulnerability model results will be calculated before application of policy conditions and after the application of policy terms and compared, as appropriate, with provided claims data. Figure 36 of AIR's V-1 response shows good model agreement between actual and modeled damage ratios for building and appurtenant structures.

15. Demonstrate that building vulnerability function relationships (building structures and appurtenant structures) are consistent with insurance claims data.

Comparisons of actual versus modeled damage ratios for building and appurtenant structures are provided in Figure 37 to Figure 39 of AIR's V-1 response for frame construction, masonry construction, and mobile homes. These figures demonstrate that the vulnerability functions are generally in good agreement with insurance claims data.

16. Identify the one-minute average sustained windspeed and the windspeed reference height at which the model begins to estimate damage.

The AIR model uses a sustained (one-minute) average wind speed of 40 mph as the minimum threshold for wind damage, measured at a reference height of 10 m, which is the standard for measurement and reporting of wind speeds. This lower bound wind speed is consistent with damage surveys and published literature.

17. Describe how the duration of windspeeds at a particular location over the life of a hurricane is considered.

The AIR hurricane model includes the effects of hurricane duration using a stepwise procedure. For each given location, for the first time period during the storm when the sustained winds exceed 40 mph, the damage occurring during this time period is estimated, and the remaining undamaged portion of the exposure is determined. For each successive time period where the winds exceed 40 mph, the same procedure is followed, and the remaining undamaged portion is subjected to damage in each time interval. In this manner, longer duration storms having the same maximum speed as shorter duration storms will show accumulation of additional damage, as has been reflected in damage surveys. There is very little information in the technical literature on this topic. The AIR hurricane model team members presented a well-received paper on duration effects and how to model them at the 11th America's Conference on Wind Engineering in Puerto Rico in June 2009.

18. Describe how the model addresses wind borne missile impact damage and water infiltration.

The AIR hurricane model includes the effects of hurricane duration using a stepwise procedure. For each given location, for the first time period during the storm when the sustained winds exceed 40 mph, the damage occurring during this time period is estimated, and the remaining undamaged portion of the exposure is determined. For each successive time period where the winds exceed 40 mph, the same procedure is followed, and the remaining undamaged portion is subjected to damage in each time interval. In this manner, longer duration storms having the same maximum speed as shorter duration storms will show accumulation of additional damage, as indicated by actual loss data. The AIR hurricane model team members presented a well-received paper on duration effects and how to model them at the 11th America's Conference on Wind Engineering in Puerto Rico in June, 2009.

19. Provide a completed Form V-1, One Hypothetical Event. Provide a link to the location of the form here.

See the section entitled Form V-1: One Hypothetical Event for reviewer comments.

V-2 Derivation of Contents and Time Element Vulnerability Functions

A. Development of the contents and time element vulnerability functions shall be based on at least one of the following: (1) historical data, (2) tests, (3) rational structural analysis, and (4) site inspections. Any development of the contents and time element vulnerability functions based on rational structural analysis, site inspections, and tests shall be supported by historical data.

The vulnerability functions for contents and time element impact in the AIR hurricane model were developed using research results published in the engineering and insurance literature, post-hurricane damage investigations conducted by experts in wind engineering and damage, and insurance loss data. AIR has used results of post-hurricane field surveys, updated research literature, computational simulations, and analysis of loss data to update and improve the contents and time element impact on vulnerability functions since their initial development

B. The relationship between the modeled structure and contents vulnerability functions and historical building and contents losses shall be reasonable.

The relationship between modeled and historical structure and contents loss is demonstrated in Figure 41 of AIR's V-2 response. This figure demonstrates that modeled and historical losses are generally in good agreement.

C. Time element vulnerability function derivations shall consider the estimated time required to repair or replace the property.

The time element vulnerability is based on the mean building damage, the estimated time to repair or replace the property, and the estimated cost of time element coverage.

D. The relationship between the modeled building and time element vulnerability functions and historical building and time element losses shall be reasonable.

The relationship between building and time element vulnerability functions, demonstrated in Figure 42 of AIR's V-2 response, shows good agreement between modeled and historical data.

E. Time element vulnerability functions used by the model shall include time element coverage claims associated with wind, flood, and storm surge damage to the infrastructure caused by a hurricane.

The time element vulnerability functions include time element coverage claims associated with wind, flood, and storm surge damage to infrastructure to the extent that these data are reflected in the model validation data.

Disclosures

1. Describe any modifications to the contents and time element vulnerability component in the model since the previously accepted model.

There have been no changes to the AIR U.S. Hurricane Model contents and time element vulnerability components related to wind hazards. For storm surge hazards, vulnerability of contents and building vulnerability functions have been updated.

2. Provide a flow chart documenting the process by which the contents vulnerability functions are derived and implemented.

Derivation and implementation of the contents vulnerability functions follow the same process used in the derivation and implementation of the building vulnerability functions, which is sound.

3. *Describe the data and methods used to develop vulnerability functions for contents coverage associated with personal and commercial residential buildings.*

Vulnerability functions for contents coverage are calculated as a function of building damage. Contents vulnerability functions are treated differently for personal and commercial residential structures, where contents loss is generally lower for low personal residential structure building damage ratios. For commercial residential structures, significant contents losses are often seen at relatively low structure damage ratios because of the increased engineering attention these buildings receive. Therefore, cladding damage is much more typical than structural damage, increasing the likelihood of higher contents losses.

4. Describe the number of contents vulnerability functions and whether different contents vulnerability relationships are used for personal residential, commercial residential, mobile home, condo unit owners, apartment renter unit location, and other similar building classes for wind related damage.

Because contents vulnerability is a function of building vulnerability, there is a unique contents vulnerability function for each building construction/occupancy type. There are separate underlying contents vulnerability functions for personal and commercial residential buildings, as described in V-2.3.

5. Provide a flow chart documenting the process by which the time element vulnerability functions are derived and implemented.

Derivation and implementation of the time element vulnerability functions follow the same process used in the derivation and implementation of the building vulnerability functions, which is sound.

6. Describe the data and methods used to develop vulnerability functions for time element coverage associated with personal and commercial residential structures. State whether the model considers both direct and indirect loss to the insured property. For example, direct loss could be for expenses paid to house policyholders in an apartment while their home is being repaired. Indirect loss could be for expenses incurred for loss of power (e.g., food spoilage).

The time element vulnerability is based on the mean building damage, the estimated time to repair or replace the property, and the estimated cost of time element coverage. For low wind speeds, building damage is low and time element vulnerability is also low; however, at high wind speeds with significant damage, time element vulnerability can be significant, which has been seen in recent events. Direct and indirect losses are accounted for to the extent they are in the validation dataset.

7. State the minimum threshold at which time element loss is calculated (e.g., loss is estimated for building damage greater than 20% or only for category 3, 4, 5 events). Provide documentation of validation test results to verify the approach used.

The minimum threshold at which time element loss is calculated occurs when local one-minute sustained wind speed of 40 mph is achieved, which is the lowest bound for damage in the AIR model. Validation of actual and modeled time element losses (Figure 44 of AIR's V-2 response) show significant scatter, which is expected based on the wide variation in time element loss conditions after a hurricane event.

8. Describe how modeled time element loss costs take into consideration the damage (including damage due to storm surge, flood, and wind) to local and regional infrastructure.

Time element vulnerability functions implicitly take into consideration local and regional infrastructure damage to the extent they are reflected in the historical insurance loss data used in model validation.

9. Describe the relationship between building structure and contents vulnerability functions.

The vulnerability functions for contents coverage is calculated as a function of mean building damage. The contents damage functions have been developed from claims data, published studies, and engineering judgment. Values for contents losses are provided separately from building damage.

10. Describe the relationship between building structure and time element vulnerability functions.

The time element vulnerability is based on the mean building damage, the estimated time to repair or replace the property, and the estimated cost of time element coverage. The relationship between building loss of use and building damage has been established based on published construction data and engineering judgment. Validation data implicitly include infrastructure damage in the time element vulnerability functions.

11. Describe the assumptions, data, methods, and processes used to develop contents and time element vulnerability functions for unknown residential construction types.

Contents and time element vulnerability functions are a function of the building vulnerability functions. To develop contents and time element vulnerability functions for unknown residential construction types, the procedure to develop the unknown building vulnerability function (V-1.11) is followed, and used as the basis to for the unknown contents and time element vulnerability functions. Separate basic content and time element functions are used for personal and commercial residential occupancies.

12. Describe the assumptions, data, methods, and processes used to develop contents and time element vulnerability functions when some of the primary characteristics are unknown.

To develop contents and time element vulnerability functions when some primary characteristics are unknown, the corresponding procedure to develop the building vulnerability function (V-1.12) is followed, and used as the basis to for the contents and time element vulnerability functions as discussed in V-2.11.

13. Describe any assumptions, data, methods, and processes used to develop and validate contents and time element vulnerability functions concerning insurance company claims.

AIR uses insurance company claim data to validate the contents and time element vulnerability functions at multiple levels. For supplied exposure data related to contents or time element coverage, vulnerability model results will be calculated before application of policy conditions and after the application of policy terms and compared, as appropriate, with provided claims data in the same way used for building vulnerability validation (V-1.13). AIR's V-2 response shows general agreement between actual and modeled losses for contents (Figure 43) and time element (Figure 44) losses. Significant scatter is expected in these comparisons due to the complex nature of cladding/opening failures and the profound impact these non-structural failures have on contents and time element losses, even at low levels of building loss.

14. Demonstrate that contents and time element vulnerability function relationships are consistent with insurance claims data.

Comparisons of actual versus modeled damage ratios are provided in Figure 45 and Figure 46 of AIR's V-2 response for contents and time element vulnerability, respectively. These figures demonstrate that the vulnerability functions are generally in good agreement with insurance claims data.

V-3 Mitigation Measures

A. Modeling of mitigation measures to improve a building's wind resistance and the corresponding effects on vulnerability shall be theoretically sound and consistent with fundamental engineering principles. These measures shall include fixtures or construction techniques that enhance the performance of the building and its contents and shall consider:

- *Roof strength*
- *Roof covering performance*
- *Roof-to-wall strength*
- *Wall-to-floor-to-foundation strength*
- *Opening protection*
- *Window, door, and skylight strength*

AIR's Individual Risk Module incorporates features to allow consideration of the identified wind mitigation measures. The Individual Risk Model allows for consideration of a range of mitigation measures through modification functions, which vary with wind speed. This approach to modeling the effectiveness of mitigation measures is theoretically sound and consistent with fundamental engineering principles.

B. Application of mitigation measures that enhance the performance of the building and its contents shall be justified as to the impact on reducing damage whether done individually or in combination.

The effects of mitigation measures within the AIR model have been validated from previous hurricane damage reports, engineering judgment, and loss data. The percentage change in losses associated with the individual mitigation measures demonstrates their relative effectiveness in various wind speed regimes. Combinations of mitigation measures provide additional protection compared to single measures, but the benefits are appropriately not always equal to the linear sum of benefits from the individual measures. For example, a building having storm shutters that protect impact resistant windows would have a mitigation credit of less than the sum of these two individual measures, as there is some redundancy in the protection offered by shutters and impact glass.

Disclosures

1. Describe any modifications to mitigation measures in the model since the previously accepted model.

There have been no changes to the AIR U.S. Hurricane Model wind mitigation measures. For storm surge hazards, mitigation measures and options have been added.

2. Provide a completed Form V-2, Mitigation Measures – Range of Changes in Damage. Provide a link to the location of the form here.

See comments provided in the section entitled Form V-2, Mitigation Measures –Range of Changes in Damage.

3. Provide a description of the mitigation measures used by the model that are not listed in Form V-2, Mitigation Measures – Range of Changes in Damage.

The mitigation measures listed in Table 18 of AIR's V-3 response are comprehensive and reasonable reflections of factors that affect building performance in windstorms.

4. Describe how mitigation is implemented in the model. Identify any assumptions.

Mitigation is implemented through AIR's Individual Risk Model using modification functions. Each modification function captures the changes in building vulnerability from the computed base vulnerability function associated with a particular mitigation measure as a function of wind speed. This modification is reflective of the effectiveness of the mitigation feature(s) in reducing damage under different intensity winds. Mitigation effects are determined based on structural engineering expertise and building damage observations. Mitigation modification functions that represent a combination of building features are applied to the base vulnerability functions to provide vulnerabilities for mitigated buildings. The way in which mitigation is modifies the base vulnerability function is based on various 'rates and weights.' Rates account for the prevalence of use among the various mitigation options. Weights account for situations where more than one mitigation option is present. The AIR Individual Risk Model assigns two types of weights to each mitigation measure, one for when the multiple mitigation features are related to performance of the same system (e.g., the roof system), and the other for combinations of the effects of features that are more complex. The values of the weighting functions are dependent on wind speed. AIR's system for handling mitigation options is robust and capable of handling mitigation of single elements, whole building systems (e.g., roof systems—comprised of roof coverings, decking, framing, and attachment of decking and framing), and combinations of multiple elements and systems,

5. Describe the process used to ensure that multiple mitigation factors are correctly combined in the model.

Within the AIR model, the effects of mitigation measures are not simply calculated as the linear sum of individual measures, but consider the combination of effects with multiple mitigation and across varying wind speeds. This is a sound theoretical approach, and validation is performed to ensure that modeled mitigation factors are representative of historical insurance loss data . The system of weighting functions appears well designed and able to account for the wide range of possible interactions of various mitigation measures.

Form V-1: One Hypothetical Event

A. Windspeeds for 96 ZIP Codes and sample personal and commercial residential exposure data are provided in the file named "FormV1Input13.xlsx." The windspeeds and ZIP Codes represent a hypothetical *hurricane track. Model the sample personal and commercial residential exposure data provided in the file against these windspeeds at the specified ZIP Codes and provide the damage ratios summarized by windspeed (mph) and construction type.*

The windspeeds provided are one-minute sustained 10-meter windspeeds. The sample personal and commercial residential exposure data provided consists of four structures (one of each construction type – wood frame, masonry, mobile home, and concrete) individually placed at the population centroid of each of the ZIP Codes provided. Each ZIP Code is subjected to a specific windspeed. For completing Part A, Estimated Damage for each individual windspeed range is the sum of ground up loss to all structures in the ZIP Codes subjected to that individual windspeed range, excluding demand surge and storm surge. Subject Exposure is all exposures in the ZIP Codes subjected to that individual windspeed range. For completing Part B, Estimated Damage is the sum of the ground up loss to all structures of a specific type (wood frame, masonry, mobile home, or concrete) in all of the windspeed ranges, excluding demand surge and storm surge. Subject Exposure is all exposures of that specific type in all of the ZIP Codes.

One reference structure for each of the construction types shall be placed at the population centroid of the ZIP Codes. Do not include contents, appurtenant structures, or time element coverages.

<u>Reference Frame Structure</u>: One story Unbraced gable end roof Normal shingles (55mph) ½" plywood deck 6d nails, deck to roof members Toe nail truss to wall anchor Wood framed exterior walls 5/8" diameter anchors at 48" centers for wall/floor/foundation connections No shutters Standard glass windows No door covers No skylight covers Constructed in 1980	**<u>Reference Masonry Structure</u>:** One story Unbraced gable end roof Normal shingles (55mph) ½" plywood deck 6d nails, deck to roof members Toe nail truss to wall anchor Masonry exterior walls No vertical wall reinforcing No shutters Standard glass windows No door covers No skylight covers Constructed in 1980
<u>Reference Mobile Home Structure</u>: Tie downs Single unit Manufactured in 1980	**<u>Reference Concrete Structure</u>:** Twenty story Eight apartment units per story No shutters Standard glass windows Constructed in 1980

Based on experience, the AIR Model results presented in Parts A and B appear reasonable in absolute magnitude and in the ranges and trends. For example, in Part A, damage remains relatively modest up to wind speeds on the order of 100 mph, and then begins to start increasing very rapidly. In the Part B submission, the relative performance of the construction types appears reasonable. Mobile (i.e., manufactured) homes have a long and well documented history of poor performance compared to site built homes (although the performance of newer manufactured homes has been improving). This expected result is demonstrated. Similarly, concrete buildings historically outperform wood framed or masonry buildings, which is reflected in Part B results. Masonry buildings are shown to slightly outperform wood framed buildings, which is also expected due to the increased strength of the exterior walls.

B. Confirm that the structures used in completing the form are identical to those in the above table for the reference structure. If additional assumptions are necessary to complete this form (for example, regarding structural characteristics, duration, or surface roughness), provide the reasons why the assumptions were necessary as well as a detailed description of how they were included.

The AIR model requires a sustained (one-minute) wind speed time profile to calculate damage ratios. A hypothetical storm was used to provide responses for V-1.

C. Provide a plot of the Form V-1 (One Hypothetical Event), Part A data.

Form V-1 Part A data are plotted in Figure 82. The results are reasonable for the reference structures and wind speeds.

Form V-2: Mitigation Measures – Range of Changes in Damage

A. Provide the change in the zero deductible personal residential reference building damage rate (not loss cost) for each individual mitigation measure listed in Form V-2 (Mitigation Measures – Range of Changes in Damage) as well as for the combination of the four mitigation measures provided for the Mitigated Frame Building and the Mitigated Masonry Building below.

The effectiveness of different hurricane mitigation measures is presented in the tables of AIR's Form V-2 response. The values appear reasonable and appropriate in magnitude and variation with wind speed, based on reviewer experience. For example, the use of 110 mph roof shingles in lieu of 55 mph roof shingles provides significant mitigation benefit at lower wind speeds. As expected, that benefit shrinks at higher wind speeds, where damage to the roof deck or roof structure becomes more common, making improvements in roof coverings less relevant. Similarly, improved roof to wall connections provide negligible benefits at 60 mph, as that wind speed generally will not cause roof to wall failures. The mitigation value of improved roof to wall connections then increases with increasing wind speed, again as expected. The use of plywood shutters provides moderate reductions at 60 mph, increasing in effectiveness to 110 mph, when windborne debris is more prevalent, then decreasing in effectiveness at higher wind speeds with greater missile energy.

The general magnitudes and trends in change in damage for the fully mitigated frame and masonry buildings appear reasonable and in line with reviewer experiences and expectations. For example, damage for the mitigated frame and masonry buildings is approximately half as much as the reference structure for sustained wind speeds of 85-110 mph. This very significant improvement in performance is expected, as the selected mitigation options address several of the most common design and construction deficiencies that prevent buildings from performing satisfactorily at speeds near design code values.

B. If additional assumptions are necessary to complete this form (for example, regarding duration or surface roughness), provide the rationale for the assumptions as well as a detailed description of how they are included.

The AIR model requires a sustained (one-minute) wind speed time profile to calculate damage ratios. Duration effects were not accounted for in the response to V-2.

C. Provide this Form in Excel format without truncation. The file name shall include the abbreviated name of the modeling organization, the standards year, and the form name. A hard copy of Form V-2 (Mitigation Measures – Range of Changes in Damage) shall be included in a submission appendix.

All comments in this review are based on a PDF copy of AIR's submission.

Reference Frame Building:	**Reference Masonry Building**:
One story Unbraced gable end roof Normal shingles (55mph) ½" plywood deck 6d nails, deck to roof members Toe nail truss to wall anchor Wood framed exterior walls 5/8" diameter anchors at 48" centers for wall/floor/foundation connections No shutters Standard glass windows No door covers No skylight covers Constructed in 1980	One story Unbraced gable end roof Normal shingles (55mph) ½" plywood deck 6d nails, deck to roof members Toe nail truss to wall anchor Masonry exterior walls No vertical wall reinforcing No shutters Standard glass windows No door covers No skylight covers Constructed in 1980
Mitigated Frame Building:	**Mitigated Masonry Building**:
Rated shingles (110mph) 8d nails, deck to roof members Truss straps at roof Plywood Shutters	Rated shingles (110mph) 8d nails, deck to roof members Truss straps at roof Plywood Shutters

Reference and mitigated buildings are fully insured building structures with a zero deductible building only policy.

Place the reference building at the population centroid for ZIP Code 33921.

Windspeeds used in the form are one-minute sustained 10-meter windspeeds.

Form V-3: Mitigation Measures—Mean Damage Ratio (Trade Secret Item)

A. Provide the mean damage ratio (prior to any insurance considerations) to the reference building for each individual mitigation measure listed in Form V-3 (Mitigation Measures – Mean Damage Ratios and Loss Costs, Trade Secret item) as well as the percent damage for the combination of the four mitigation measures provided for the Mitigated Frame Building and the Mitigated Masonry Building below.

The table in the V-3 form response provided to the Reviewer contains Mean Damage Ratios for the reference and mitigated frame and masonry structures, as well as for structures with single mitigation options. The general magnitudes and trends of the mean damage ratio variation with wind speed for these structures and mitigation options appear reasonable and in line with reviewer experiences and expectations. As discussed in V-2, mean damage ratios for the mitigated wood frame structure are on the order of half as much as the reference structure for sustained wind speeds of 85-110 mph, which is an expected result, as the selected mitigation options address several of the most common design and construction deficiencies that prevent buildings from performing satisfactorily at speeds near design code values. At sustained winds of 160 mph, the mitigation measures still provide significant improvement in mean damage ratio, but relatively less compared to the reference structure (mean damage ratio of the mitigated frame structure is about 73% of that for the reference structure). This again is an expected result, as wind loads and debris associated with these higher wind speeds are well beyond those anticipated in the design code, exposing many more potential failure modes than the common ones addressed by the four selected mitigation options.

B. Provide the loss cost rounded to three decimal places, for the reference building and for each individual mitigation measure listed in Form V-3 (Mitigation Measurers – Mean Damage Ratios and Loss Costs, Trade Secret item) as well as the loss cost for the combination of the four mitigation measures provided for the Mitigated Frame Building and the Mitigated Masonry Building below.

The loss cost reflects the mean damage ratio presented in V-3 applied to the structure value. As detailed in V-3.A, the mean damage ratios are in line with expected results, yielding appropriate loss cost.

C. If additional assumptions are necessary to complete this Form (for example, regarding duration or surface roughness), provide the rationale for the assumptions as well as a detailed description of how they are included.

The AIR model requires a sustained (one-minute) wind speed time profile to calculate damage ratios. Duration effects were not accounted for in the response to V-3.

D. Provide a graphical representation of the vulnerability curves for the reference and the fully mitigated building.

Graphical representation of the mean damage data presented in V-3 accurately represent the tabular values provided, and are appropriate, as discussed in V-3.A.

Reference Frame Building: One story Unbraced gable end roof Normal shingles (55mph) ½" plywood deck 6d nails, deck to roof members Toe nail truss to wall anchor Wood framed exterior walls 5/8" diameter anchors at 48" centers for wall/floor/foundation connections No shutters Standard glass windows No door covers No skylight covers Constructed in 1980	**Reference Masonry Building:** One story Unbraced gable end roof Normal shingles (55mph) ½" plywood deck 6d nails, deck to roof members Toe nail truss to wall anchor Masonry exterior walls No vertical wall reinforcing No shutters Standard glass windows No door covers No skylight covers Constructed in 1980
Mitigated Frame Building: Rated shingles (110mph) 8d nails, deck to roof members Truss straps at roof Plywood Shutters	**Mitigated Masonry Building:** Rated shingles (110mph) 8d nails, deck to roof members Truss straps at roof Plywood Shutters

Reference and mitigated buildings are fully insured building structures with a zero deductible building only policy.

Place the reference building at the population centroid for ZIP Code 33921.

Windspeeds used in the form are one-minute sustained 10-meter windspeeds.

CONCLUSION

AIR's response to the Florida Commission's 2013 Vulnerability Standards appears thorough and complete. The vulnerability functions have been developed and validated through research reported in the insurance and wind and structural engineering literature, engineering analysis, post-storm field investigations by engineering experts, and historical insurance claims data. The AIR team has significant experience and expertise in this area, and has actively presented results of its vulnerability research at national and international engineering conferences. The methodology used in development of the vulnerability functions is theoretically sound. Implementation of these vulnerability functions produces reasonable damage ratios in line with insurance loss data and reviewer expectations.

Carol Friedland, Ph.D., PE

October 28, 2014

Software Development Process: Audit Report

October 27, 2014

Angelo Jeyarajan

Independent Audit Consultant

Software Audit Review of

HURSIM, Model 21

&

Touchstone

Implementation

Report made for

AIR Worldwide

Table of Contents

Audit Issuance Letter:

Issuance Date: October 27, 2014

Audit Dates: October 14 - 17 2014

The objective(s) and scope of this engagement is noted in the Audit Objective and Scope section of this report. A summary of the audit procedures performed is noted in the Audit Details and Observations section of this report.

Responses have been obtained from the applicable owner for each recommendation developed from our examination. All findings, recommendations, and management responses (in their entirety) have been incorporated in the Findings and Recommendations section of this report.

Internal Audit notes that sufficient and appropriate audit procedures have been conducted and evidence gathered to support the accuracy of the conclusions reached and contained in this report. The conclusions were based on a comparison of the situations, as they existed at the time against audit criteria. The conclusions are only applicable for the process examined. The evidence gathered meets professional audit standards and is sufficient to provide senior management with proof of the conclusions derived from the internal audit.

Executive Summary:

This document summarizes the Audit I conducted on October 14 - 17 of 2014 for AIR Worldwide's implementation of their HURSIM model, Atlantic Tropical Cyclone Model (internally referred to as Model 21) and Touchstone software. The intent of the audit is to ensure not only the software development process and application development in a whole, but also complies with the best practice of software standards and requirements established by the Florida Commission on Hurricane Loss Projection Methodology.

Audit Objective and Scope:

Objective:

The objective of the software development and implementation review of HURSIM, Model 21 and Touchstone is as follows:

1. An independent assessment of the progress, quality and attainment of project objectives, at defined milestones within the project, based off of company policies and procedures.
2. An assessment of the adequacy of project management methodologies and that the methodologies are applied consistently across all projects.
3. An evaluation of the internal controls of proposed business processes at a point in the development cycle where enhancements can be easily implemented and processes adapted.
4. An assessment of the adequacy of security controls implemented.
5. An assessment of the test cases, quality assurance and bug tracking process.

Scope of Audit:

The scope of this audit is:

- The audit of the software development life cycle (SDLC) process.
- Compliance with company procedures, regulations and internal controls
- To perform other procedures deemed necessary to achieve the audit objectives.

General Background:

The Audit is based on HURSIM, Model 21 (version 15.0) and Touchstone (version 2.1). The findings are grouped according to the seven computer standards established by the Florida Commission on Hurricane Loss Projection Methodology as of December 2013. During my audit, I interviewed Documentation, Touchstone Software Development Manager, Product Manager, Product Consultant, Release Engineer, Application Support, Technical Services Group, Database Development and Geocoding, Client Services Manager, Database Engineer, Analysis, Research Group, ZIP Centroid Development, Catalog Generation, Physical Properties, Vulnerability, HURSIM Model, Model 21 Porting and Development, Testing and Security (AIR Worldwide staff interviewed during the audit are listed in the Appendix). Each team walked through their process and demonstrated their internal processes. In this interview process, the requirements for all sections C1-C7 of the Florida Commission's standards were discussed and reviewed with the personnel face to face or via online web conference. I have also reviewed all documentation (via theAIR Intranet (AIRPort)) as related to the implementation of HURSIM, Model 21 and Touchstone.

Audit Details & Observations:

I performed an audit of the HURSIM, Model 21 and Touchstone Software and System Implementation (the "Project") based on the system development lifecycle, which consisted of the following phases:

1. **Product Management Process & Project Planning**
2. **System Development – Design & Build**
3. **Testing**
4. **Data Conversion**
5. **Support & Maintenance**

(Phases 1–3: Pre-System Implementation; Phases 4–5: Post-System Implementation)

Notes the results of each phase, as follows:

1. **Product Management Process & Project Planning**
   I reviewed the product management process including requirements, and the process of hand off to other developments and testing teams. Also saw evidence of testing against each requirement. Also showed me the steps that where taken when requirement gets changed. I also reviewed the project plan and milestones and each iteration phases.

2. **System Development – Design & Build Phase**
   The software development teams are distributed between USA and India. They have daily scrum meeting between both teams. The HURSIM model is built by the research team in US and handed over to the India team for conversion to C++ libraries. The C++ libraries are used by the Touchstone team in US. I reviewed the release and handover process of each team. The research team runs certain tests on their model and the overseas team ensures they get the same results after conversion. I did review the code review process as well.

3. **Testing Phase**
   The test cases are well documented and some of the teams used Clear-Quest for defect tracking. Testing team does have a very good knowledge of the application.

4. **Data Conversion Phase**
   I audited their data collection process from various third party agencies and how they convert the data to their internal structures. They verify the fidelity of the incoming data and if they find any discrepancy they me the process how they verify.

5. **Support & Maintenance**
   AIR-Worldwide has well established Support and Maintenance process, similar to IBM process. It is every well documented.

Computer Standards Audit Florida Commission on Hurricane Loss Projection Methodology:

Standard C-1: Documentation:

AIR Worldwide maintains a Central Repository, AIRPort, is where all the model functionality and technical description are documented, which includes software documentation, design, test case and requirements. All documents maintain a primary repository which contains model structure, detail software description, dates and best practices. This entire repository is accessible online. A complete hard copy set of these documents also available with references to online sources. These documents are created separately from the source code and are easily accessible to all the internal staff.

The documents are categorized as follows:

Version-Specific Updates, which includes updates and enhancements to both Model 21 version 15.0 and Touchtone 2.1, which fulfills the Florida Commission requirement from Section C-1 Computer Standards.

Procedural documentation, which documents the development, implementation and validation processes. This includes software and model revision change control and versioning documentation.

Model 21 Documentation, which documents the development, implementation and verification of Model 21 and its component, including requirements and data files.

Touchtone Development Documentation, which includes implementation, setting-up and validation, processes for the Loss Analysis Engine, Model 21 hazard model framework, UI, as well as databases reference manuals.

Touchtone User Documentation, which includes the release notes, installation and system configuration manual, system requirements, reference and user's guides, client-facing database reference manual, UNICEDE px/fx data exchange format preparer's guide, and various documents that discuss how to use specific catastrophe models within the Touchstone application.

HURSIM, there were no significant formula or calculation changes. The annual HURDAT and ZIPAll data updates impact the Catalog Generation, Physical Properties, and ZIPAll centroid components of the model, which resulted in an update of these components accordingly.

The pertinent C2-C6 Standards were verified for each of these categories, including: code review, change history in the source control management tool, requirements, implementation, and verification.

ZIPAll updates, including updates to average properties, were discussed. For each new ZIP code centroid, the distance from coastline, elevation and surface roughness needs to be re-estimated. Also the verification procedure for creating the centroids of census blocks mapping to the ZIP codes was reviewed.

The ZIPAll implementation process uses Microsoft SQL Server, which utilizes stored procedure. In addition to the speed of generation and access to the data, this process allows some criteria to be passed dynamically as an argument to these stored procedures rather than hard coded in the scripts. The enhancement of the ZIPAll tool was reviewed.

FTP site is used for transferring any data.

Standard C-2: Requirements:

The online central repository (AIRPort) stores the requirement documentation required for the development of the Model 21 hurricane model. These requirements, which are available both on AIRPort and within additional printed documentation, address:

- Touchtone and the Model 21 release-based enhancements,
- Requirements for the Loss Analysis Engine, the Touchtone user interface, hardware, software, and security,
- Model 21 and related subcomponents requirements,
- Data Sources requirements, such as databases and third party applications required for operation of Model 21 and Touchstone
- Security and quality assurance requirements.

The hardware, software, and security requirements were documented and verified. It was requested by all groups to demonstrate how they access the "requirement document", how the content is transferred to the design documentation, and what module will be changed.

Model 21 requirements are reviewed annually and the HURDAT and ZIPAll components are updated every year. The document also includes the HURSIM, Individual Risk, Loss Data, and Demand Surge requirements. These requirements specify the format of the loss estimate output data files and summarize the business rules and processes that are applied to create the output data. The *Loss Data* requirements indicate that, as part of the process to validate U.S. hurricane damage functions, AIR analyzes client claims data.

A demonstration of Touchtone illustrated the import of exposure data, filtering, logging mechanisms, generating a loss analysis, and exporting loss data into a simple text file for review.

Standard C-3: Model Architecture and Component Design:

Technical personnel in Research, Modeling, Software Development, and Database groups were interviewed in regards to the architecture and structure of the pertinent components. The Development documentations details the technical construction (software components and database) of Touchstone and includes architectural diagrams, model frameworks, class definitions, and logical, workflow, and other flowcharts. In particular, it describes the business and architecture overview of Touchtone. The high-level process steps for porting the model to C++ and implementing it into touchtone are shown via flowcharts and diagrams, which include:

- Developing Touchstone 2.1 flowchart
- Developing the AIRGeography and AIRAddressServer databases
- Model 21 validation flowchart
- Testing Touchstone 2.1 flow chart
- Touchstone 2.1 packaging

The Model 21 documentation includes Model 21 component and HURSIM diagrams. Flow charts depict the high-level process steps for developing the model in FORTRAN, as well as it components. These components flow charts in the document were reviewed:

- ZIPAll
- Physical Properties
- Catalog Generation
- Individual Risk Module
- HURSIM
- Loss Data

The Touchstone 2.1 data is organized into several inter-related SQL databases as well as binary data files. The primary tables of interest to users are:

- AIRGeography and AIRAddressServer databases, which contains detailed exposure information used to uniquely identify various geographic areas.
- AIRExposures, which contains the user-supplied user exposure data.
- AIRProject, which contains options and event sets used during analyses.
- AIRResults, which contains the results of analyses.

It was verified that all related database table and their schema definitions were tabulated and documented.

Standard C-4: Implementation:

The developers in Research, Modeling, and Software Development were interviewed to discuss the implementation and development of Model 21 and Touchstone 2.1. They discussed the interaction and communication of the different groups in regards to data transfer, code reviews and guidelines. The code development and implementation is performed by the following groups in FORTRAN, C++, C#/.NET, SQL and Java programming languages:

- Research group, which develops HURSIM using FORTRAN.
- Modeling group, which ports the ASCII model into C++ and creates the Model 21 library for use in Touchstone 2.1

- Software Development group, which implements the user interface, data import, and other required tools in C#/.NET and SQL
- Other software tools, such as Microsoft® HPC (for job management) or AIR Release Management System- ARMS (build tool).
- Other tool required for modeling data adjustment (i.e. add/removal of catalog storms) which is written in Java by research/modeling group.

The documentation provides flowcharts that describe how the various classes and the functions interact in the model.

It is verified that AIR Worldwide maintains the technical documentation, coding standards and guidelines for all the utilized programming languages. The developers were questioned in regards to following these guidelines.

The Database engineer presented a complete overview of all database maintenance, including how all the database scripts, which are used for table creation/definition, are stored in a Source Control Management tool. The connectivity of database servers was discussed, including security thorough linked servers, backup, database server access, database access credentials. The presentation covered all subjects related to:

- Database table creation, naming conventions for column/field name, and versioning of database in relation to the Touchtone
- Use of different database for development and testing and how the database is detached for release (replicate of the final version of development).
- Method of importing data into the database, as well as exporting data from database for review or usage in other components.
- How the requirements for change of data definition or content is relayed (creating a ticket in the Clear-Quest tracking system).
- Database administration and data definitions, as well as scripts were also reviewed and discussed.

Research uses Microsoft® Visual SourceSafe (VSS) and the Model 21 and Touchstone development teams uses Microsoft Visual Studio® Team Foundation Server for source control management and to track software and documentation change history. During the interview the location and change history of the component in source control were verified.

Built for to 64-bit windows compiler

Standard C-5: Verification:

As part of interviews with Research, Modeling and Software Development, the processes for testing and verification of Model 21 and Touchstone 2.1 software and data were extensively discussed and reviewed. The documents provide comprehensive testing documentation, which include test cases for the Research model components, Model 21, Data file Converter, and Touchstone 2.1.

During the process of implementing the Model 21 into Touchstone 2.1, the following testing is performed:

- Data Files Testing (Catalog, Damage Function, and Building Code Factor data)
- Loss Number Testing
- Unit Testing of Model 21 in Touchstone 2.1, in which the core functionality of the methods that are sensitive to inputs or are responsible for loss changes.
- Model 21 Basic QA Test Cases and Final QA Test cases which are the same type of test but include all test cases for HURSIM and Touchstone 2.1 respectively.

The overall testing, including user interface and integration testing, is performed using automated SILK testing tool. AIR Worldwide uses Microsoft SQL Server SQL Management Studio to verify and view SQL information and to retrieve data. A text file comparison is used to compare text files, log files, output files, results and changes in scripts, etc.

It is verified that smoke, regression and aggregation testing is driven by test cases using SILK.

The crosschecking procedures and results for verifying equations was reviewed and verified in the documentation.

Standard C-6: Model Maintenance and Revision:

The control process, including revisions and versioning, for Model 21 and Touchstone 2.1 was discussed with the personnel of each group involved in modeling, implementation, validation, and documentation.

Model Change Control Process:

AIR Worldwide continually reviews model assumptions in regards to new meteorological, more recent research papers and findings, and periodically enhances the model. An updated model is identified with a new version number. The following areas of Model 21 are subject to annual review and enhancement:

- Catalog generation
- Windfield generation
- Damageability
- Insured loss calculations
- Zip code centroids and corresponding physical parameters of elevation, surface friction and distance to coast.

Source Code, Data and Documentation Maintenance :

Research uses Microsoft® Visual SourceSafe (VSS) and the Model 21 and Touchstone development teams uses Microsoft Visual Studio® Team Foundation Server for source control management and to track software and documentation change history.

AIR also uses Microsoft SharePoint® to manage project, archive and monitor requirements, store and share end user's or internal Touchstone 2.1 user's documentation.

Standard C-7: Security:

AIR Worldwide has instituted multiple security measures to ensure the safety and integrity of its software.

AIR Worldwide has implemented access control at both the physical level and at the software level. A security badge with picture ID and proper electronic encoding is required in order to access AIR Worldwide's office. Only badge employees with special authorization are allowed to enter the server room.

In addition to discussing security measurements with the Research, Modeling, Software Development groups, the head of the Technical Services group was interviewed in regards to overall security measurements.

Access to AIR Worldwide's software resources is safeguarded by firewall, internal and external network logon, virtual private network (VPN), and secure File Transfer Protocol. AIR Worldwide performs a weekly full virus scan of all the files.

Procedures for disaster management and backup procedure for source code, documentation and as well as off-site storage of backup data, was discussed.

Conclusion:

After carefully reviewing the process followed by AIR-Worldwide team, it is my opinion that of the implementation of HURSIM, Model 21 and Touchstone are in compliance with the computer standards established by the Florida Commission on Hurricane Loss Projection Methodology. It is also my opinion that the software engineering practices at AIR Worldwide are in accordance with current software industry standards.

Appendix

List of AIR Worldwide staff interviewed for this audit:

Documentation:

Tanya Bedore- Principal Technical Writer, Software Development Group

Touchstone Software Development:

Laxmi Balcha- Director, Software Development Group
Yingqun Wang- Team Lead, Software Development Group
Aditya Jinna- Senior Software Engineer, Software Development
Gayatri Natarajan- Product Manager
Anush Mani Subramanian- Product Consultant, Product Management
James Bachand- Release Engineer, Software Development Group
Don Alcombright- Team Lead- Application Support, Technical Services Group

Database Development and Geocoding:

Ken Roller- Client Services Manager, Product Management
David Wilson – Senior Product Management
Yili Yao – Principal Database Engineer, Software Development Group
Alex Wong – Software Engineer III, Software Development Group

ZIP Centroid Development:

Anthony Hanson- Senior Principal Analyst, Research Group
Cheryl Hayes- Assistant Vice President, Research Group

Physical Properties:

Todd Keller- Analysis, Research Group
Dr. Sylvie Lorsolo- Scientist, Research Group

Catalog Generation:

Scott Stransky- Manager, Principal Scientist, Research Group
Dr. Suilou Huang- Scientist, Research Group
Adam Reichert- Scientist, Research Group

Vulnerability:

Dr. Kyle Butler- Senior Engineer, Research Group
Dr. Karthik Ramanathan- Engineer, Research Group

HURSIM Model:

Kyle Butler- Senior Engineer, Research Group
Todd Keller- Analysis, Research Group
Dr. Sylvie Lorsolo- Scientist, Research Group

Model 21 Porting and Development:

Suryanarayana Datla – Assistant Vice President and Director of Modeling group, Software Development Group
Indumathi Sagyari – Senior Software Engineer II, Software Development Group
Narendra Kodi – Senior Software Engineer II, Software Development Group
Phaninath Dheram – Manager, Model Implementation, Software Development Group
Asha Prabhu - Senior Software Engineer I, Software Development Group

Testing (Software, Model and Core):

Ram Nagulpally – Assistant Vice President of QA, Product Management
Prashant Annabattuni – Director, Software Quality Assurance Group
Subhashis Barik – Senior Manager, Model QA Team, Software Quality Assurance Group
Kiran Lalam – Manager, Software QA Team, Software Quality Assurance Group
Andrew Rahedi – Team Lead, Core QA, Software Quality Assurance Group
Dr. Baldvin Einarsson – Associate II, Core QA, Software Quality Assurance Group

Security:

Alex McCollom – Manager, IT Infrastructure, Technical Services Group

Touchstone Demo / Florida Commission Report Generation

Brandie Andrews- Assistant Vice President, Consulting and Client Services
Christy Shang- Risk Consultant, Consulting and Client Services

Appendix 9: U.S. Hurricane Model: Accounting for Secondary Risk Characteristics

Executive Summary

This document provides an overview of AIR's methodology for modeling the impact of secondary risk characteristics on damageability and insured hurricane losses in the United States. The capability is part of the vulnerability component of the AIR Hurricane Model for the United States and is included in AIR's detailed loss estimation software, Touchstone®. This document facilitates a better understanding of the impact of secondary building and environmental features on damage and loss. It will also assist clients in deriving mitigation factors to be used for property loss costs.

AIR's approach is a knowledge-based expert system designed to estimate the performance of residential and commercial buildings under wind loads. It is based on engineering principles and data regarding building performance during high winds.

The general, or base, damage functions used by the AIR Hurricane Model for the United States are individually developed for the "typical" building with certain "primary" risk characteristics, which include age, height, construction type and occupancy class. The construction and occupancy classes are broadly defined, without reference to individual—or secondary—structural characteristics. AIR's general damage functions were validated and calibrated using extensive and detailed actual hurricane loss data. The relative abundance of hurricane loss data greatly facilitates the determination of average or "typical" building performance.

Modification functions (or secondary modifiers) are applied to the general damage functions to reflect the performance enhancement or diminution of a wide variety of secondary structural and environmental characteristics. These might include roof covering, roof pitch, type of window protection or proximity to trees (which are potential sources of wind-borne missiles). Detailed claims data from 2004 and 2005 storms have been used to validate the impact of these secondary risk characteristics on building vulnerability.

The modification functions referenced above reflect the difference between the performance of a building with known structural and environmental characteristics and that of the typical building. For example, the modification function for a residential wood frame building with hip roof indicates how it would perform differently from a typical residential wood frame building whose roof is mathematically defined to exhibit average performance.

The modification functions are themselves functions of wind speed. That is, the effectiveness of mitigating characteristics varies according to the wind speed. In addition, the combined effect of the modification functions for different secondary risk characteristics is complex and not necessarily additive or multiplicative.

With the release of Version 12.0 of the AIR Hurricane Model for the United States (July 2010), users will observe that the marginal impact of secondary risk characteristics on building vulnerability is dependent on the year that the structure was built and on its location. This is due to the fact that for a class of structure, the AIR model defines a *typical* building in terms of *typical* secondary risk characteristics for each location and year built. User input of secondary risk characteristics will overwrite the *default secondary risk characteristics*, and a new vulnerability function is created. The new function may reflect lower or higher vulnerability than the default, depending on the effect of user's input relative to default features.

For example, if a user inputs "engineered shutters," this will result in no, or minor, reductions in vulnerability for a home built in Miami after 2002 but a large reduction in vulnerability for a home built before 1995 in Tallahassee, Florida. This coherent, logic-based approach provides a framework to properly account for the overlap of the impact of different vulnerability modifiers (e.g., year-built and mitigation modifiers) and avoids potential double counting of modifiers in the model.

The AIR methodology follows a structured approach to quantify the impact of more than 25 secondary risk characteristics, covering a range similar to that in the public domain—and, in particular, that used in the Florida Department of Community Affairs (DCA) study. Touchstone users may use these factors to develop

rating credits in a manner similar to the one presented in this document.

Introduction

The AIR Hurricane Model for the United States in Touchstone includes the capability to account for the impact of secondary building and environmental characteristics on the vulnerability of individual risks. The modeling methodology was developed using a knowledge-based expert system in a structured approach.

Based on structural engineering expertise and building damage observations made following historical hurricanes, more than 25 building features (see Table 1) have been identified as having a significant impact on building damage and losses. Options corresponding to each feature (see Table 2) are identified based on construction practice. Algorithms for modifying the damage functions are developed based on engineering principles and observational data. The AIR model in Touchstone supports any combination of multiple building features and produces a modification function that is applied to the base vulnerability function. The modification function captures the changes to building vulnerability that result when certain building features are present, and when information on such building features is known. The modification function varies with wind intensity to reflect the relative effectiveness of a building feature when subject to different wind speeds.

This document provides a brief overview of the component parts of all AIR natural hazard peril models, followed by a more detailed overview of the damage estimation, or vulnerability, component. That section is followed by details regarding wind-induced loads and resulting damage, a discussion of building and environmental features that affect building performance, and information on AIR's development of loss modification factors for a range of building features similar to those used in the Florida public domain study.

Overview of AIR Catastrophe Modeling Technology

Figure 1 illustrates the various components of AIR's catastrophe models. In the case of the U.S. Hurricane Model, the "Event Generation" module is used to create the stochastic storm catalog. More than one hundred years (1900-present) of historical data regarding the frequency of hurricanes and their meteorological characteristics are used to fit statistical distributions for each model parameter, including landfall location and storm heading at landfall, and the intensity variables of central pressure, radius of maximum winds, forward speed and storm track. By stochastically drawing from these distributions, the fundamental characteristics of each simulated storm are generated. The result is a large, representative catalog of potential events.

Once values for each of the important meteorological characteristics have been stochastically assigned, each simulated storm is propagated along its track. Peak 1-minute sustained wind speeds and wind duration are estimated for each geographical location affected by the storm to calculate "Local Intensity."

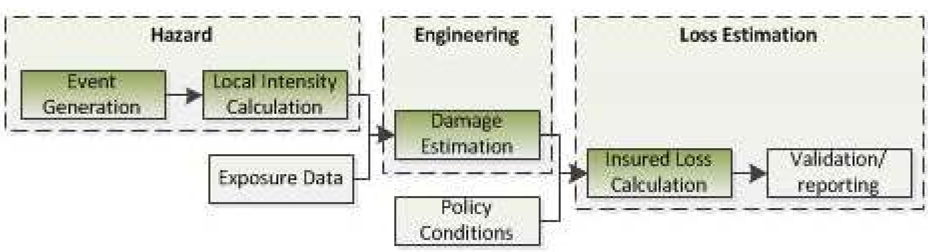

Figure 1. Components of AIR's Catastrophe Models

The "Damage Estimation" component of the model overlays the local intensity of the simulated event onto a database of exposed properties. The model then calculates the resulting monetary damage by applying damage functions, which capture the effects of the intensity of the event, which varies by location, on exposed buildings. Separate damage functions are developed for different construction types and occupancy classes. Similarly, separate damage functions for each of building, contents, loss of use, and business interruption are applied to the replacement value of the insured property to calculate losses for these coverages.

Finally, the "Insured Loss Calculation" is made by applying the policy conditions to the total damage estimates. Policy conditions may include deductibles by coverage, site-specific or blanket deductibles, coverage limits and sublimits, loss triggers, coinsurance, attachment points and limits for single or multiple location policies, and risk specific reinsurance terms.

After all of the insured loss estimations have been completed, they can be analyzed in ways of interest to risk management professionals. For example, the model produces complete probability distributions of losses, or exceedance probability curves, for gross and net losses and for both annual aggregate and annual occurrence losses. Output may be customized to any desired degree of geographical resolution down to location level, as well as by line of business, and within line of business, by construction class, coverage, etc. The model also provides summary reports of exposures, comparisons of exposures and losses by geographical area, and detailed information on potential large losses caused by the extreme events that make up the tail of the distribution.

Damage Estimation Overview

AIR scientists and engineers have developed mathematical functions, called damage functions, that describe the interaction between buildings (and contents) and the local intensity to which they are exposed. Damage functions have also been developed for estimating time element losses. These functions relate the mean damage level, as well as the variability of damage, to the measure of intensity at each location. That is, the AIR model estimates a complete distribution around the mean level of damage for each local intensity and each structural type. Because different structural types will experience different degrees of damage, the damage functions vary according to construction and occupancy. Losses are calculated by applying the appropriate damage function to the replacement value of the insured property.

The AIR damage functions incorporate the results of well-documented engineering studies, tests and structural calculations. They also reflect the relative effectiveness and enforcement of local building codes. AIR engineers refine and validate these functions through the use of post-disaster field survey data and through an exhaustive analysis of detailed loss data from actual events.

AIR damage functions have been extensively validated using detailed actual loss data provided by a number of clients for various storms. Typically the loss data is available by five-digit ZIP Code.

Validation is performed by comparing simulated and actual losses for client companies by state and/or county and line of business. For example, Figure 2 compares actual and modeled insured loss data, obtained from four different insurance companies (G, H, J, K), for four hurricanes that made U.S. landfall in 2004. All losses were normalized to the maximum loss event (Ivan) and are presented in event-year currency.

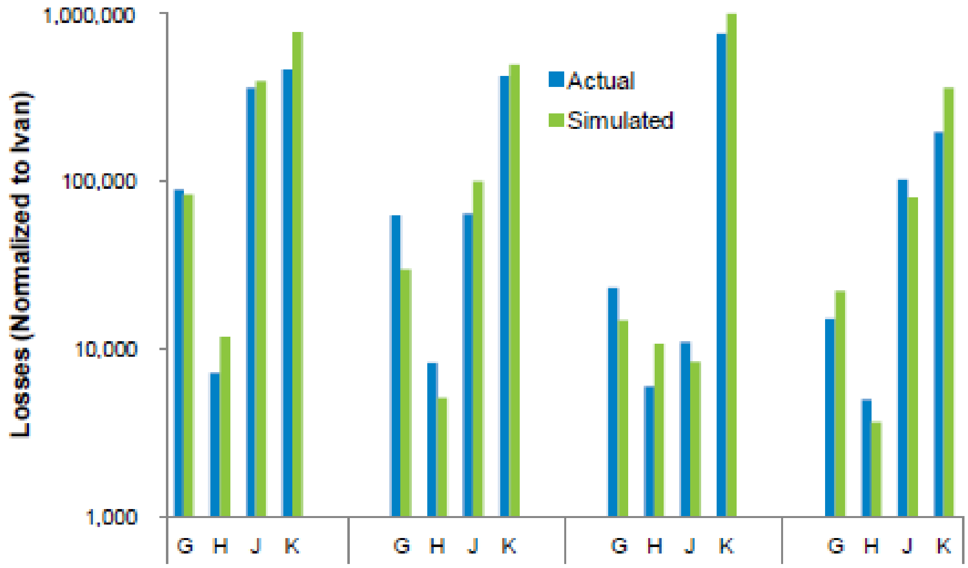

Figure 2. Actual vs. Simulated Losses (Normalized to Ivan) for Four Companies, Four Hurricanes

The detailed data available to AIR has enabled the fine-tuning of damage ratios by construction class, coverage type and wind speed. Examples of the comparison between actual loss data and the AIR wind damage functions are shown in Figure 3.

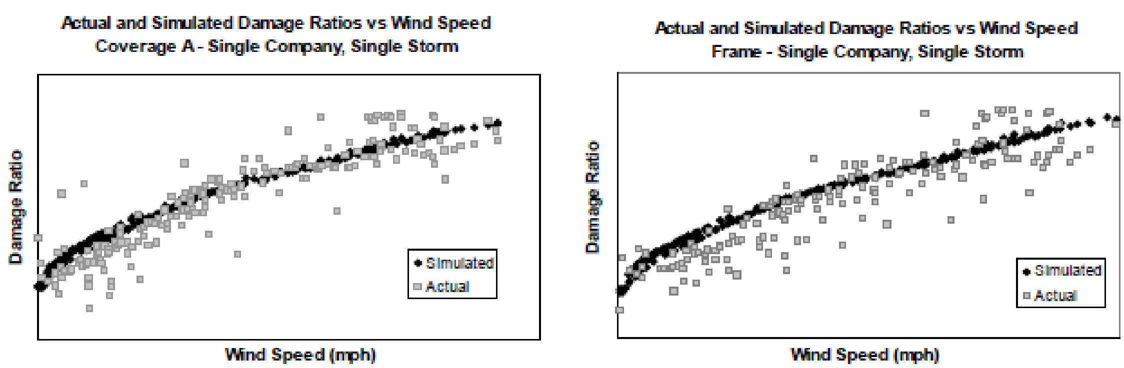

Figure 3. (a) Coverage A—Single Company, Single Storm; (b) Wood Frame—Single Company, Single Storm

Capturing the Effects of Wind Duration

The AIR Hurricane Model for the United States uniquely develops a complete time profile of wind speeds for each location affected by the storm, thus capturing the effect of wind duration on structures as well as the effect of peak wind speed.

Duration is particularly important in estimating wind damage, which manifests itself at the weak point in a structural system. As each connector is overwhelmed, loads are transferred to the next point of vulnerability. The longer the duration of high winds, the longer this process will continue and the greater the damage.

The AIR Hurricane Model for the United States calculates the cumulative effects of wind. That is, when estimating damage to a property at any point in time, the model accounts for the extent of damage that has occurred in the preceding period. Each damage ratio is applied, in succession, to the remaining undamaged portion of the exposure from the preceding period.

Construction and Occupancy Classes

AIR engineers have designed the wind damage functions for the AIR Hurricane Model for the United States to provide detailed breakdowns of loss estimates by coverage, construction type and occupancy class. The model includes six major lines of business (Homeowners, Tenants, Apartments/Condos, Commercial, Mobile Homes and Autos), which are further broken down into 39 distinct construction classifications.

Apartments and condominiums frequently receive a degree of engineering attention similar to that given to commercial construction. From a structural viewpoint, therefore, commercial construction and apartments/condominiums are similar. Nevertheless, apartments and condominiums have some building components, such as balconies, awnings and double sliding glass doors, that make them more susceptible to windstorms than commercial construction. As these components typically have less engineering input at the design and construction stages and are thus more vulnerable, AIR engineers have developed separate damage functions for apartments and condominiums.

Separate damage functions for each building, contents, and time element provide not only estimates of the mean, or expected, damage ratio corresponding to each wind speed, but also probability distributions around each mean. In the case of building damageability, the damage ratio is the dollar loss to the building divided by the corresponding replacement value of the building. As can be seen in Figure 4, the model ensures non-zero probabilities of zero and one hundred percent loss (for individual properties).

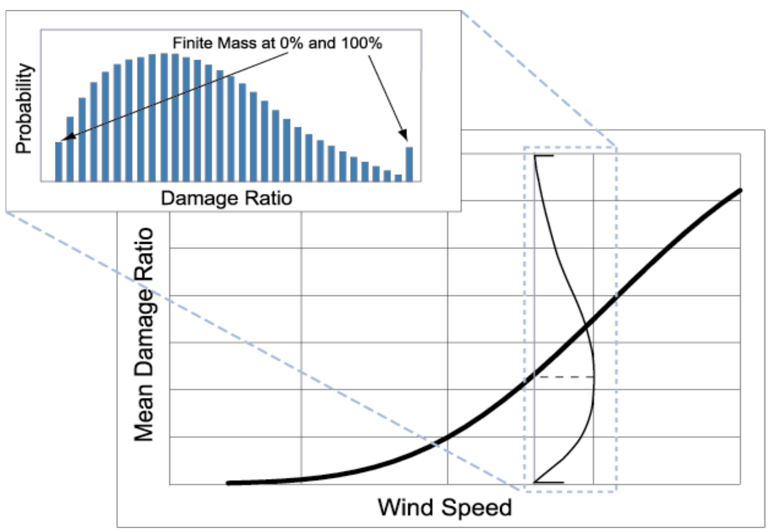

Figure 4. Representative Damage Function

The contents damage ratio is the dollar loss of contents divided by the replacement value of the contents. Contents vulnerability is a function of both building damage and wind speed. Figure 5 represents the relationship of mean building damage to mean contents damage used in the AIR models. At low wind speeds, the contents damage function is below the building damage function. This relationship reverses at high wind speeds.

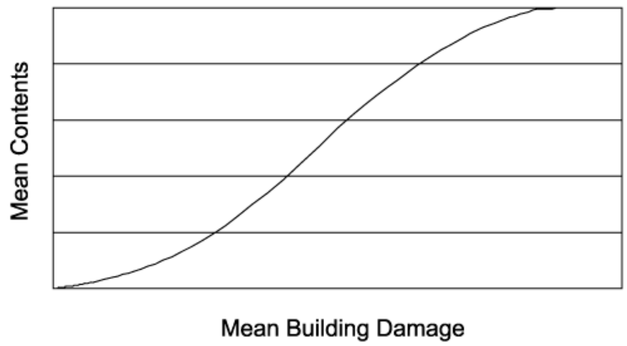

Figure 5. Contents Vulnerability Relationship

Contents damageability is a function not only of construction type, but also of occupancy class. Contents damageability for commercial and apartment buildings is different from the contents damageability of single family homes. For apartment and commercial properties, even if building damage is minimal, water may enter unsealed openings and gaps around windows and doors to damage contents. Recent damage reports indicate that small openings in a damaged roof may cause significant damage to contents in commercial properties.

In the case of time element coverage, the damage ratio represents *per diem* expenses or business interruption losses associated with the expected number of days that the building is uninhabitable (residential) or unusable (commercial). Time element damageability is a function of mean building damage, as well as the time it takes to repair or reconstruct the damaged building. The functional relationship between building damage and loss of use is established using detailed published building construction and restoration data and on engineering judgment. Figure 6 represents the relationship between repair/reconstruction time and the mean building damage.

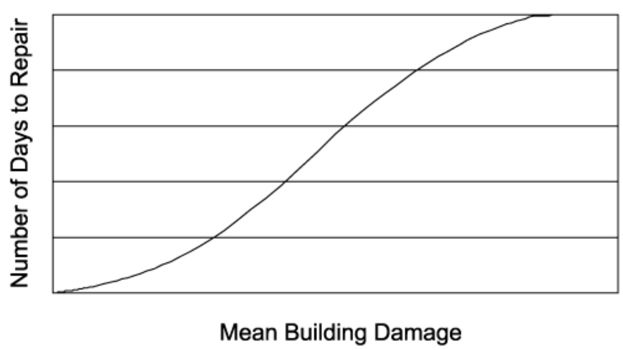

Figure 6. Time Element Vulnerability Relationship

Wind Induced Loads and Damage

This section provides a basic overview of how buildings respond to various wind speeds. A discussion of the typical wind forces applied explains the wind-induced building damage typically observed.

Wind Induced Loads

Close to the earth's surface, roughness of the surface retards winds. As the distance from the surface increases, these friction effects become less and less significant and at a certain height they become negligible. This height at which the surface roughness is negligible is referred to as the gradient height. The layer of air below this height, where the wind is turbulent and its speed increases with height, is known as the atmospheric boundary layer whose height ranges from the ground surface to between 1,000 and 2,000 feet. All structures are located in this atmospheric boundary layer and act as bluff bodies to wind.

When wind comes into contact with buildings, the airflow streamlines separate at the sharp corners of buildings such as wall corners, eaves, roof ridges and roof corners (Figure 7). This separation induces additional turbulence in airflow causing highly fluctuating pressures on the building surfaces. The direction of wind with respect to the building (angle of attack) is also a significant factor in the magnitude and fluctuation of pressures acting on the surfaces
of the building.

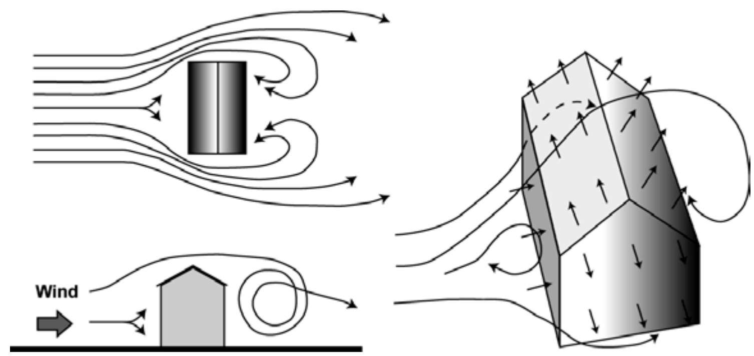

Figure 7. Wind Flow around Buildings can Generate Severe Pressure and Suction Forces

In general, when wind acts on a building, the windward wall experiences a pressure pushing inward (positive pressure) while the sidewall and the leeward wall will experience a suction pressure outward (negative pressure). The roof, depending on its slope, will experience uplift (negative pressure). Wind forces are significantly increased at corners, ridges and at abrupt changes in the direction of wind flow.

Two important flow mechanisms with respect to buildings are discussed below.

Flow Separation

When wind impinges the front wall, it flows upward past the roofline. The wind is unable to turn abruptly at the roofline and so continues past the roof edge, thus separating from the roof eave. Suction forces are often found on the roof under the separated flow, especially near the separation point. The wind that has separated slowly comes back to its original flow direction there by reattaching on the roof surface. The point of reattachment depends on the dimensions of the buildings, roof geometry, the wind speed and wind direction relative to the building.

Roof-Corner Vortex

Wind approaching the roof corner at a quartering angle flows up over the roof, and rolls up into two vortices of opposite rotational directions originating at the building corner. These vortices are much like miniature tornadoes, producing high speeds under the vortices. These roof-corner vortices are sometimes called the delta-wing vortices.

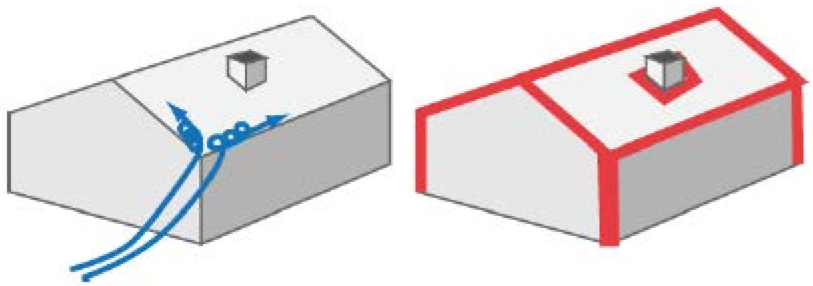

Figure 8. Wind Flow Separation Around Roof

Wind Damage

Traditionally, damage surveys have classified buildings into “engineered” or “non-engineered” structures. Most residential dwellings are classified as non-engineered. An example is a wood-frame single-family dwelling, which may not have received attention from a structural engineer during construction. Most commercial structures, built in accordance with building codes and under the supervision of a structural engineer, are classified as engineered structures. A typical engineered structure is a high-rise reinforced concrete building. In general, an engineered building will have less susceptibility to wind damage than a non-engineered building.

Wind Damage to Non-engineered Buildings

Figure 9 illustrates the dynamic process by which non-engineered buildings are damaged by wind. Wind primarily affects non-structural elements, such as different components of the building envelope. In most cases, damage is fairly localized. Roofs and openings in the façade (e.g., windows and garage doors) are typically the first elements to be damaged. Loss of the first shingle allows wind to penetrate and lift the next shingle. Unsecured slates may peel off; metal roofs may roll up and off.

Damage accelerates as wind speeds increase. The loss of the first window, either because of extreme pressure or of wind-induced projectiles, can create a sudden build-up of internal pressure that can blow the roof system off from inside, even if it is properly secured.

At high wind speeds, the integrity of the entire structure can be compromised, particularly in cases where the roof provides the lateral stability by supporting the tops of the building’s walls. Structural collapse may occur during extreme wind events. Even if the structure remains intact, once the building envelope is breached, contents are vulnerable to the wind itself or to accompanying rain.

Figure 9. Damage Profile of Non-Engineered Buildings

Wind Damage to Engineered Buildings

For engineered buildings, damage typically occurs to the following building (non-structural) components:

- Mechanical equipment
- Roofing
- Wall cladding
- Breaching of doors and windows

Complete structural collapse is a rare for well-engineered buildings. Even so, damage to non-structural components of a building can add up to a significant financial loss. Examples of typical damage patterns can be seen in Figure 10.

Figure 10. Damage to (a) Mechanical Equipment; (b) Roof; (c) Cladding and (d) Windows

Building and Environmental Features

The methodology used by AIR to account for the impact of secondary building and environmental characteristics, or features, on the wind vulnerability of individual risks was developed using a structured, knowledge-based system that is based on structural engineering expertise and building damage observations made in the aftermath of actual hurricanes.

In the AIR model, options for each characteristic are identified based on construction. Algorithms for modifying the vulnerability functions, for both structural and nonstructural damage, are developed based on engineering principles and observations of building performance. The AIR model supports the effects of any combination of building features on the building damage and produces a modification to the vulnerability function. The modification function captures the changes to building vulnerability that result when certain building features are present and when information on such building features is known. The modification function varies with wind intensity to reflect the relative effectiveness of a building feature when subjected to different wind speeds.

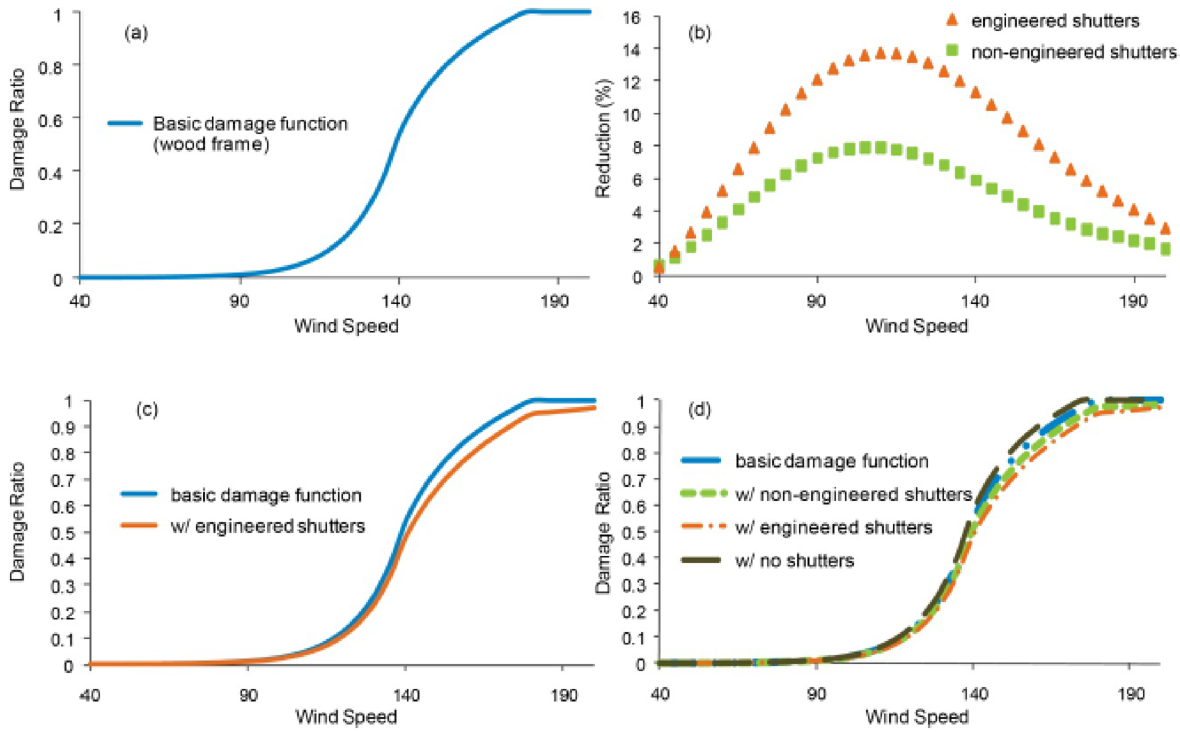

Figure 11. (a): Basic Damage Function for Wood Frame Construction; (b) Reduction in Damage for Engineered vs. Non-Engineered Shutters; (c) Basic Damage Function and Modified Function for Engineered Shutters; (d) Envelope of Damage Functions, All Protection Options

The first step in the development of the modification functions is to identify building and environmental characteristics that impact the performance of a building in high winds. These features are selected based on research and damage surveys which detail building performance in high wind. Some can be categorized as non-structural (cladding, for example), while others are structural (roof and wall systems, for example); still others address very general features such as building condition and, finally, environmental features include such things as the proximity to trees.

The secondary risk building characteristics that are supported by the AIR U.S. Hurricane Model in Touchstone include:

- Seal of Approval
- Floor Of Interest
- Building Condition
- Tree Exposure
- Small Debris Source
- Large Missile Source
- Terrain Roughness
- Adjacent Building Height
- Roof Geometry
- Roof Pitch
- Roof Anchorage
- Year Roof Built
- Wall Type
- Wall Siding
- Glass Type
- Glass Percent
- Window Protection
- Exterior Doors
- Building-Foundation Connection
- Internal Partition Walls

- Roof Covering
- Roof Deck
- Roof Covering Attachment
- Roof Deck Attachment
- Wall Attach Structures
- Appurtenant Structures
- Roof Attached Structures

Building Characteristic Options

The AIR model includes various options for each building and environmental feature. Different glass types, for example, have varying degrees of resistance to wind loads and debris impact. Table 2 provides the available options for supported secondary risk characteristics. This table is an excerpt from the UNICEDE®/px Data Exchange Format Preparer's Guide (which is available on AIR client website) and only includes those secondary modifiers that are applicable to the U.S. Hurricane Model.

Table 1. Available Options for Secondary Risk Characteristics

Description	Valid Options	Comments
Seal of Approval. This feature accounts for the level of professional engineering attention given to the design of a structure. Applies only when a known year is provided.	Enter a number 0-3: • 0 = Unknown/default • 1 = Fully Engineered Structure • 2 = Partially Engineered Structure • 3 = Minimally Engineered Structure	Note: This feature will not affect losses if the **Year Built** value in the corresponding Location record is *Unknown*. **Fully Engineered Structure**. The structure has been designed by a Professional Engineer, who is required by the local jurisdiction to seal the calculations and drawings **Partially Engineered Structure**. The structure has been inspected by a Professional Engineer and found "deemed-to-comply" with the respective building code. The local jurisdiction does not require the Professional Engineer to seal the calculations **Minimally Engineered Structure**. The structure does not satisfy any of the conditions mentioned above

Description	Valid Options	Comments
Floor of Interest: Identifies the floor concerned, if coverage is not for the entire building. Replacement values (building, contents, and BI) as well as policy terms should be entered for the floor of interest and not the whole building.	Enter a numeric value: • -1 = Basement (for use with the AIR Inland Flood Model for the United Kingdom only) or Cellar (for use with the AIR Inland Flood Model for Germany only) • 0 = Unknown/default (or no floor of interest) • 1 = Ground floor • 2 = First floor above the ground floor • 3 = Second floor above the ground floor • etc.	Different floors of the building experience varying degrees of damage. The nature of damage experienced by each floor can also be different. For the Hurricane peril, this field should be used in conjunction with the Terrain Roughness and Adjacent Building Height features.
Building Condition: A qualitative description of building condition based on visual inspection	Enter a number 0-3: • 0 = Unknown/default • 1 = Average • 2 = Good • 3 = Poor	The external appearance of cladding and maintenance give a qualitative estimate of expected performance. Earthquakes: Buildings with signs of distress or duress such as cracking due to aging and ground settlement or overloading or cracking due to damage from previous earthquakes are likely to experience additional damage during an earthquake. Hurricanes: Buildings with signs of distress or duress are likely to experience additional damage during a tropical cyclone. Some examples of these signs are: an aging roof, exterior walls, or cladding; loose roof tiles or chimney damage; or damage from previous tropical cyclones.
Tree Exposure: Describes the tree hazard around the building	Enter a number 0-2: • 0 = Unknown/default • 1 = No • 2 = Yes	Trees snap in strong winds, and can damage adjacent buildings.
Small Debris Source: Describes the potential of small debris in a radius of 200 feet	Enter a number 0-2: • 0 = Unknown/default • 1 = No • 2 = Yes	Small debris, such as roof gravel, trash bins, or tree branches may be picked up by high wind and breach window glass. Small debris can be carried to all elevations at high wind speed.

Description	Valid Options	Comments
Large Missile Source: Describes the potential of large missiles in a radius of 100 feet	Enter a number 0-2: • 0 = Unknown/default • 1 = No • 2 = Yes	Garden furniture, or wood planks or studs dislodged from nearby buildings may become missiles at high wind speed and breach the building envelope.
Terrain Roughness: Describes the terrain conditions	Enter a number 0-4: • 0 = Unknown/default • 1 = Terrain Type A • 2 = Terrain Type B • 3 = Terrain Type C • 4 = Terrain Type D	This field should be used in conjunction with the Average Adjacent Building Height feature. **Type A**. Large city centers with at least 50% of the buildings having a height in excess of 70 ft (21.3 m). Use of this exposure category shall be limited to those areas for which terrain representative of Exposure A prevails in the upward direction for a distance of at least 0.5 mi. (0.8 km) or 10 times the height of the building or other structure, whichever is greater. Possible channeling effecent building will be taken into account. **Type B**. Urban and suburban areas, wooded areas, or other terrain with numerous closely spaced obstructions having the size of single-family dwellings or larger. Use of this exposure category shall be limited to those areas for which terrain representative of Exposure B prevails in the upwind direction for a distance of at least 1,500 ft. (460 m) or 10 times the height of the building or other structure, whichever is greater. **Type C**. Open terrain with scattered obstructions having heights generally less than 30 ft (9.1 m). This category includes flat, open country and grasslands.
		Type D. Flat, unobstructed areas exposed to winds flowing over open water for a distance of at least 1 mi. (1.61 km). This exposure shall apply only to those buildings and other structures exposed to the winds coming off the water. Exposure D extends inland from the shoreline a distance of 1,500 ft (460 m), or 10 times the height of the building or structure, whichever is greater.

Description	Valid Options	Comments
Average Adjacent Building Height: Describes average height of buildings adjacent to the building of interest	Enter a number: • 0 = Unknown/default • N = Numeric value indicating the number of stories	This field should be used in conjunction with the Terrain Roughness feature.
Roof Geometry: Describes the shape of the roof	Enter a number 0-10: • 0 = Unknown/default • 1 = Flat • 2 = Gable end without bracing • 3 = Hip • 4 = Complex • 5 = Stepped • 6 = Shed • 7 = Mansard • 8 = Gable end with bracing • 9 = Pyramid • 10 = Gambrel	Geometry of the roof affects the intensity of wind pressures and the resulting uplift resistance.
Roof Pitch: Addresses the roof slope	Enter a number 0-3: • 0 = Unknown/default • 1 = Low (<10°) • 2 = Medium (10° to 30°) • 3 = High (> 30°)	Low pitch roofs have greater uplift forces acting on the roof as compared to high pitch roofs.
Roof Covering: The nature of material used to cover the roof	Enter a number 0-11: • 0 = Unknown/default • 1 = Asphalt shingles • 2 = Wooden shingles • 3 = Clay/concrete tiles • 4 = Light metal panels • 5 = Slate • 6 = Built-up roof with gravel • 7 = Single ply membrane • 8 = Standing seam metal roofs • 9 = Built-up roof without gravel • 10 = Single ply membrane ballasted • 11 = Hurricane Wind-Rated Roof Coverings[1].	Damage to the roof covering can result in significant water damage to the interior of the building and contents. [1] 11-Hurricane Wind-Rated Roof Coverings entry is not applicable with Australia Bushfire peril.

Description	Valid Options	Comments
Roof Deck: Material and construction type of the roof deck of building	Enter a number 0-8: • 0 = Unknown/default • 1 = Plywood • 2 = Wood planks • 3 = Particle board/OSB • 4 = Metal deck with insulation board • 5 = Metal deck with concrete • 6 = Pre-cast concrete slabs • 7 = Reinforced concrete slabs • 8 = Light metal	Roof decks transfer the roof loads to the underlying joists and purlins. Damage to the roof deck results in the breach of the building envelope resulting in significant building and interior damage. With respect to seismic performance, the weight of the roof can be critical. It is not desirable to make the roof heavy because it induces higher lateral forces in the structure during shaking.
Roof Covering Attachment: Nature of the connections used to secure the roof covering to the roof deck	Enter a number 0-4: • 0 = Unknown/default • 1 = Screws • 2 = Nails/staples • 3 = Adhesive/epoxy • 4 = Mortar	Damage to the roof can result due to the improper attachment of the roof covering to the underlying roof deck.
Roof Deck Attachment: Nature of the connections used to secure the roof deck to the underlying roof support system	Enter a number 0-7: • 0 = Unknown/default • 1 = Screws/bolts • 2 = Nails • 3 = Adhesive/epoxy • 4 = Structurally connected • 5 = 6d nails @ 6” spacing, 12” on center • 6 = 8d nails @ 6” spacing, 12” on center • 7 = 8d nails @ 6” spacing, 6” on center	Damage to the roof can result due to the improper attachment of the roof deck to the underlying roof support system.
Roof Anchorage: Nature of connections used to secure the roof support systems to the walls	Enter a number 0-7: • 0 = Unknown/default • 1 = Hurricane Ties • 2 = Nails/Screws • 3 = Anchor bolts • 4 = Gravity/friction • 5 = Adhesive epoxy • 6 = Structurally Connected • 7 = Clips	Roof anchorage establishes a load path to transfer wind loads from the roof to the walls. Hurricane straps provide such an anchorage.

Description	Valid Options	Comments
Year Roof Built: The year the roof was put in place	Enter a year: • 0 = Unknown/default • NNNN = Four-digit numeric value indicating the year in which the roof was built	With age, roofs lose their strength to resist wind loads and hence are more vulnerable.
Wall Type: Materials used for external walls of the building	Enter a number 0-9: • 0 = Unknown/default • 1 = Brick/unreinforced masonry • 2 = Reinforced masonry • 3 = Plywood • 4 = Wood planks • 5 = Particle board/OSB • 6 = Metal panels • 7 = Pre-cast concrete elements • 8 = Cast-in-place concrete 9 = Gypsum board	Different types of wall materials offer varying degrees of resistance to wind-induced lateral loads. Breaches in the wall can result in internal pressure buildup. With respect to seismic performance, some wall forms can contribute to increasing the lateral-load capacity of a building while others tend to act independently when shaken.
Wall Siding: Materials used for weathering protection of walls	Enter a number 0-7 • 0 = Unknown/default • 1 = Veneer brick/masonry • 2 = Wood shingles • 3 = Clapboards • 4 = Aluminum/vinyl siding • 5 = Stone panels • 6 = Exterior insulation finishing system (EIFS) • 7 = Stucco	Wall sidings offer protection from wind and rain. Different types of wall siding materials have varying degrees of wind load resistance. Breach in wall sidings can expose wall to wind and rain, resulting in water intrusion and internal pressure buildup. Different types of cladding materials offer varying degrees of resistance to earthquake induced lateral loads. Veneer and stone-panels in particular are more susceptible to falling off in an earthquake.
Glass Type: Type of glass used in building	Enter a number 0-5: • 0 = Unknown/default • 1 = Annealed • 2 = Tempered • 3 = Heat strengthened • 4 = Laminated • 5 = Insulating glass units	Different glass types have varying degrees of resistance to wind loads and debris impact.
Glass Percent: The percent area of the walls covered by glass	Enter a number 0-4: • 0 = Unknown/default • 1 = Less than 5% • 2 = Between 5% and 20% • 3 = Between 20% and 60% • 4 = Greater than 60%	The greater the percent of glass in a wall, the greater the vulnerability to damage, in general.

Description	Valid Options	Comments
Window Protection: Describes the nature of wind protection systems used	Enter a number 0-3: • 0 = Unknown/default • 1 = No protection • 2 = Non-engineered shutters • 3 = Engineered shutters	Protecting the windows can reduce the potential damage to a building.
Exterior Doors: Describes the nature of the exterior doors in the building	Enter a number 0-6: • 0 = Unknown/default • 1 = Single width Doors • 2 = Double width Doors • 3 = Reinforced single width doors • 4 = Reinforced double width doors • 5 = Sliding doors • 6 = Reinforced sliding doors	Exterior doors are weak in resisting wind loads and so is the frame that holds the doors. They deflect considerably under high wind loads and thus fail.
Building-Foundation Connection: Connection type between the structure and foundation For Industrial Facilities (locations in the U.S. with an occupancy class between 400 - 482), this field represents the anchorage of equipment at the facility.	Enter a number 0-6: • 0 = Unknown/default • 1 = Hurricane ties • 2 = Nails/Screws • 3 = Anchor Bolts • 4 = Gravity/Friction[2] • 5 = Adhesive/Epoxy • 6 = Structurally Connected	Transfers the vertical and lateral loads on the building to the foundation during wind events. Critical in single-family dwellings made of wood-frame and tilt-up construction. Loss of anchorage between building and foundation has been a common type of failure in California earthquakes. For Industrial Facilities (locations in the U.S. with an occupancy class between 400 - 482), enter one of the following values to indicate the equipment anchorage: • 0 = Unknown • 4 = Unanchored • 6 = Anchored [1] Reserved for future use in Japan Earthquake Model. [2] For U.S. Earthquake (M11): Gravity/Friction (4) must be selected if you want to use the **Retrofit Measures** (IrRetrofit) option Foundation anchorage bolting (4).

Description	Valid Options	Comments
Internal Partition Walls: Describes the nature of the interior partition walls	Enter a number 0-5: • 0 = Unknown/default • 1 = Wood • 2 = Gypsum boards • 3 = Plastered masonry • 4 = Brick • 5 = Other	Internal partitions, when effective, can protect the interior of the building when the building envelope is breached. The amount of loss caused by damage to internal partition walls depends on the type of materials used to construct them, such as masonry or gypsum board. Heavy, brittle materials, such as unreinforced brick masonry, have been known to experience great damage during an earthquake. If the building is breached at low hazard levels, then internal wall materials may protect some contents from wind or surge damage. However, at higher wind speeds, internal partition walls may fail, causing further structural or debris damage.
Wall Attached Structures: Components of a property that are not an integral part of the main building but are physically attached to it	Enter a number 0-8: • 0 = Unknown/default • 1 = Carports/ Canopies/Porches • 2 = Single Door Garages • 3 = Double Door Garages • 4 = Reinforced Single Door Garages • 5 = Reinforced Double Door Garages • 6 = Screened Porches/Glass Patio Doors • 7 = Balcony • 8 = No attached wall structures	Attached structures are often more vulnerable than the main building especially if there is inadequate anchorage. With respect to seismic performance, unreinforced masonry chimneys, as an example, generally collapse even under moderate levels of shaking. Under significant wind loads, wall attached structures may experience heavier damage than the main structure. They may also become dislodged and create a breach for wind or floodwaters, or become flying debris themselves.
Appurtenant Structures: Components of a property that are not an integral part of the main building and are not connected to it	Enter a number 0-7: • 0 = Unknown/default • 1 = Detached garage • 2 = Pool enclosures • 3 = Shed • 4 = Masonry boundary wall • 5 = Other fence • 6 = No appurtenant structures • 7 = No pool enclosures	Appurtenant structures may require a different treatment in analysis from the main building. For example, the masonry boundary wall can collapse under moderate shaking whereas the wood-frame house it surrounds may remain undamaged. A pool enclosure may provide protection of a recreational pool from everyday wind and sun exposure. However, if winds are high enough to damage the main building, a pool enclosure may become flying debris and increase the amount of damage.

Description	Valid Options	Comments
Roof Attached Structures: Description of the mechanical and other equipment on top of roofs	Enter a number 0-13: • 0 = Unknown/default • 1 = Chimneys • 2 = A/C Units • 3 = Skylights • 4 = Parapet Walls • 5 = Overhang/Rake (8-36 in.) • 6 = Dormers • 7 = Other • 8 = No Attached Structures • 9 = Overhang/Rake (< 8 in.) • 10 = Overhang/Rake (> 36 in.) • 11 = Waterproof membrane/ fabric • 12 = Secondary water resistance (e.g., bitumen tape) - Yes • 13 = Secondary water resistance – No	Attached structures are often more vulnerable than the main building especially if there is inadequate anchorage.

Example of Secondary Risk Characteristics: Roof System

This section provides an example of how individual elements of a structural system (in this case, the roof system) combine to influence damage and loss due to hurricanes.

The main function of a roof is to enclose the building space and protect it from the damaging effects of rain, wind, heat, and snow. Consideration is also given to factors such as strength and stability under anticipated loads, heat insulation, lighting, ventilation, sound insulation, and aesthetics, etc. In the AIR Hurricane Model for the United States as implemented in Touchstone, a roof system is comprised of the following features:

- Roof covering
- Roof covering attachment
- Roof deck
- Roof deck attachment
- Roof geometry
- Roof age
- Roof pitch

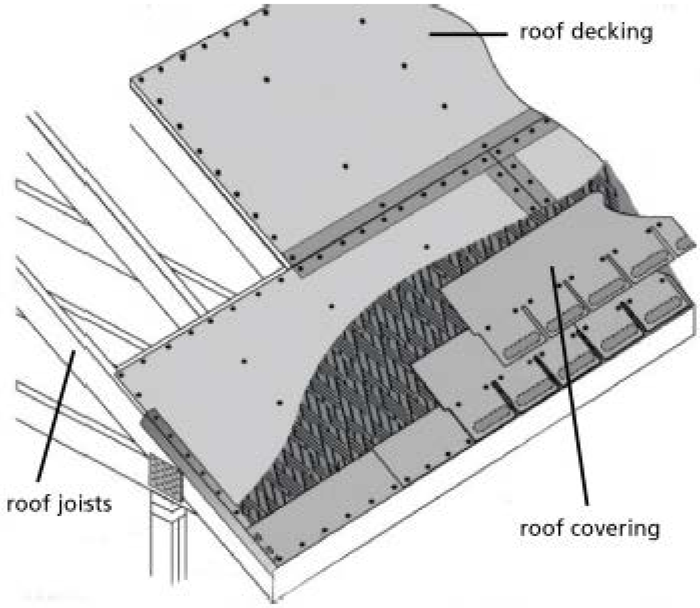

Figure 12. Illustration of Some Key Components of a Roof System

Roof Covering

The roof covering is the material covering the framework of the roof structure to safeguard the roof against the weather.

The roof covering is fixed to the underlying structure by means of a range of fittings and fixtures. Climatic conditions influence the performance and durability of roof coverings. Strong winds may blow off roof coverings, such as slates, tiles and asphalt shingles, if they are not properly fixed in position. Extreme temperature changes may cause the material to crack and joints to leak, if not properly protected. Atmospheric effects of fog, salt, smoke and other gases may result in corrosion of metal roofing if not protected by regular painting. Rubber membranes and asphalt shingles can become brittle and crack as a result of exposure to ultraviolet radiation over time. The various effects described above can result in poor roof performance, reduced roof life, or both.

Roof coverings are fastened to the roof-deck. The decks are supported by structural members such as girders, trusses or rigid frames. In the case of shell roofs, the decks serve as principal supporting member. In some cases, the roof covering and the deck are combined into one unit, such as corrugated roofing. Because of these relationships, the type of roof covering and the type of roof-deck should be selected concurrently.

The weight of roof covering affects the design, weight and the cost of both roof-deck and supporting structure or framework. A heavier roof covering requires a stronger supporting structure, which adds to the cost. For example, sheet metal coverings are very lightweight, and shingles can be classified as light to medium in weight, whereas clay tiles and slates are considered to be heavy roof-coverings. Supporting structure and roof deck are designed appropriate to the weight of the chosen roof covering. Figure 13 shows typical wind damage to a roof covering.

Figure 13. Damage to Roof Covering.

Roof Deck

The roof deck transfers the roof loads to the underlying trusses or rafters. Damage to the roof deck constitutes a breach of the building envelope and can result in significant building and interior damage. Some of the commonly used roof decks are plywood, precast concrete slabs, reinforced concrete slabs and light metal. Figure 14 illustrates damage to the roof deck.

Figure 14. Damage to Roof Deck

Roof Geometry

Roof geometry largely determines the magnitude of aerodynamic loads experienced by the roof. The geometry affects the intensity of wind pressures and the resulting uplift resistance. Common roof shapes include gable and hip, although a variety of roof shapes are possible. A brief description of some of the roof shapes is provided below.

Gable Roof: A gable roof slopes in two directions such that the end formed by the intersection of slopes is a vertical triangle (Figure 15).

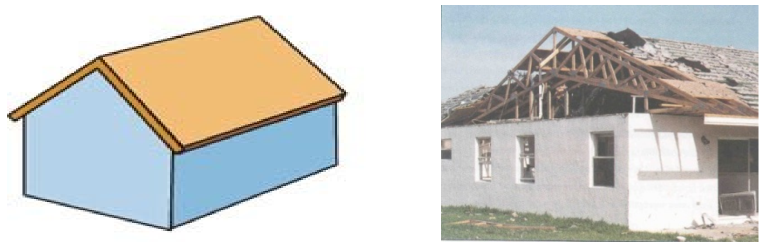

Figure 15. Illustration and Example of Gable Roof

Hip Roof: A hip roof slopes in four directions such that the end formed by the intersection of slopes is a sloped triangle (Figure 16).

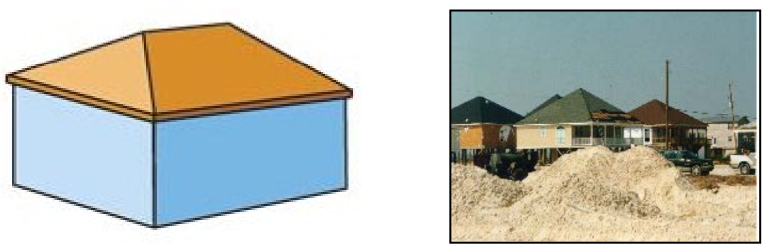

Figure 16. Illustration and Example of Hip Roof

Mansard Roof: Like the hip roof, this roof also slopes in four directions, but there is a break in each slope (Figure 17).

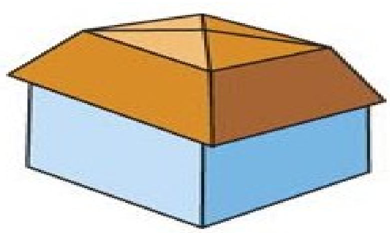

Figure 17. Illustration of Mansard Roof

Methodology for Accounting for Secondary Risk Characteristics

Building aerodynamics is a complex phenomenon. The performance of a building depends on the interaction of several building components. Moreover, damage due to wind is progressive, such that failure at a localized level can eventually grow to a catastrophic level. Thus it is important to recognize the way in which damage progresses and the role and importance of building components at each stage of failure.

AIR's methodology for accounting for secondary risk characteristics follows a structured, logical approach that groups building characteristics according to their function. In this way, the methodology reflects the contribution of each characteristic to the overall building performance. This knowledge-based methodology relies on expert experience in wind engineering, damage observation from post-disaster surveys and data from wind tunnel experiments. The ultimate goal is to develop a modification function that is applied to the base damage function—one that appropriately captures the impact of one or more selected building characteristics.

Weightings are used to combine the effects of secondary risk characteristics whose interaction is complex and not necessarily additive. These are introduced to evaluate features that modify the performance of the system. If we consider the roof system, age, pitch and geometry modify the performance of the roof as a whole and therefore the weight should be used as a multiplier. The weights are dependent on wind speed and construction class, and are appropriately selected to reflect the importance of a feature at certain levels of a building's damage state.

Evaluating Building Performance

There are two primary metrics for evaluating the impact of a building or environmental feature on overall building performance. The first is a weighted value assigned to the various *options* for building or environmental features. The value for any given option of any given feature reflects the relative prevalence of use among the options and is independent of other features. That is, the value is designed such that the most commonly used option is assigned a value close to 1.0. The implication is that a building with this option is expected to perform very similarly to the average, or "typical," building represented by the base damage functions.

The value assigned for an option that is considered to be more vulnerable (less wind resistive) than the most commonly chosen one is greater than 1.0. That is, a building with this option will be more vulnerable than the average building. Similarly, the value assigned for an option that is considered to be less vulnerable (more wind resistive) than the most prevalent one will be less than 1.0. Such a building will be less vulnerable than the average building. The value for a given option is a constant. If no information is available on the option, the default value is 1.00, which means that the base damage function is used without modification.

The second metric is of two types. One type is used to develop simple weighted averages, which are used to evaluate the loss contribution of several features that together constitute a system, such as a roof. They are wind-speed dependent; that is, the contribution of each feature varies with wind speed. For example, a roof system may consist of three features: roof covering, roof deck and roof attachment. The loss contribution to the roof system from these three features is expected to be different at different wind speeds. At low wind speeds, the roof covering drives the damage. As wind speeds increase, the roof deck becomes more vulnerable. In this case, roof deck failure will result in loss of roof covering regardless of the type (or option) of roof covering present. Therefore, as wind speed increases, the weight assigned to roof deck increases. In contrast, at higher wind speeds, the weight for roof covering decreases because it is already lost. The weights for the system as a whole add up to 1.0.

The second type of weighting combines the effects of features whose interaction is complex and not necessarily additive. These are introduced to evaluate features that modify the performance of the system. If we consider a roof system again, the roof age, roof pitch, and roof geometry modify the performance of the roof as a whole and therefore the weight should be used as a multiplier. The weights are dependent on wind speed and construction class, and are appropriately selected to reflect the importance of a feature at certain levels of building damage.

Example of Wind Speed Dependency

As noted above, the performance of secondary building characteristics is wind-speed dependent. This can be further explained by considering in detail a single feature, such as roof-wall anchorage. Roof-wall anchorage provides the means to establish a load path to transfer wind loads from the roof to the walls. This anchorage can be provided through:

- Hurricane straps
- Structural connections
- Nails
- Epoxy/adhesive
- Anchor bolts
- Gravity/friction

By selecting hurricane straps as one of the options for "roof wall anchorage" we can observe varying mitigation benefits in three different wind speed regimes.

- For lower wind speeds, the mitigation benefits (in terms of reduced damage) of hurricane straps are similar to any other roof-wall anchorage mechanism. Hence mitigation benefits are not high at these wind speeds.
- At higher wind speeds, hurricane straps are very effective in reducing damage. At these wind speeds, the presence of straps is most important. Hence mitigation benefits are high.
- At very high wind speeds, the effectiveness of hurricane straps in reducing the damage decreases. Hence, mitigation benefits are not high.

Because of its inherent weakness, there are no mitigation benefits for "epoxy/adhesive" as an option for "roof wall anchorage." In fact, "penalties" are applied and the size of the penalty is wind speed dependent.

- At low wind speeds, the effectiveness of "epoxy/adhesive" is similar to other roof-wall anchorage mechanisms. Hence we do not see any large penalties being exacted in this wind speed domain.
- At higher wind speeds, however, the choice of a weak roof-wall anchorage has a significant impact on damage. Hence we see high penalty being exacted.
- At very high wind speeds, most roof-wall anchorage mechanisms would be ineffective. Thus the penalty for choosing a weak one is small.

The above examples illustrate how different wind speeds impact the accrual or non-accrual of mitigation benefits for a particular feature (Figure 18).

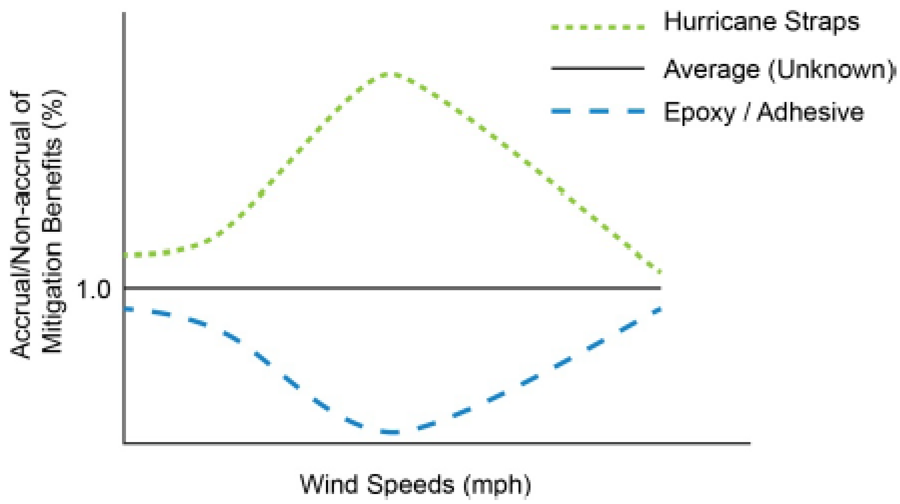

Figure 18. Mitigation Benefits of Various Roof-Wall Anchorage Options as a Function of Wind Speed (relative to the average)

Sample Mitigation Curves

Failure of windows during a hurricane is often due to the impact of flying debris or to the exceedance of the window's pressure capacity. Window failure is a breach of the building envelope and allows wind and water to enter the building. Even if there is no structural damage to the building, this intrusion of water would cause damage to contents and building interior finishes, which can lead to substantial losses. Protecting the windows is critical in reducing the potential damage to a building. One mitigation option is the installation of engineered storm shutters.

As can be seen in Figure 19, the percentage reduction in damage achieved by the installation of engineered storm shutters is wind speed dependent. At lower and high wind speeds the percentage of reduction in damage is comparable to that of any other equivalent window protection mechanism. Hence we do not see any higher order percentage reduction of damage at lower and higher wind speeds. The effectiveness of engineered storm shutters is greatest in the middle range of wind speeds, where shutters have the greatest marginal impact on damage reduction.

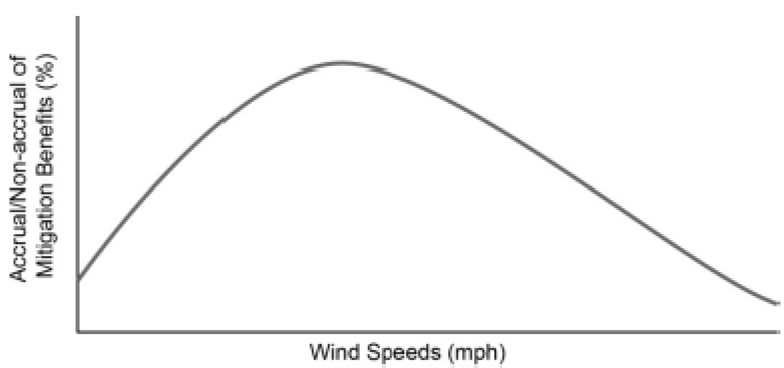

Figure 19. Modification Function for Engineered Storm Shutters

Damage to the roof covering can also result in significant water damage to the interior of the building and contents. A sample modification curve for roof covering comprised of slates is provided in Figure 20.

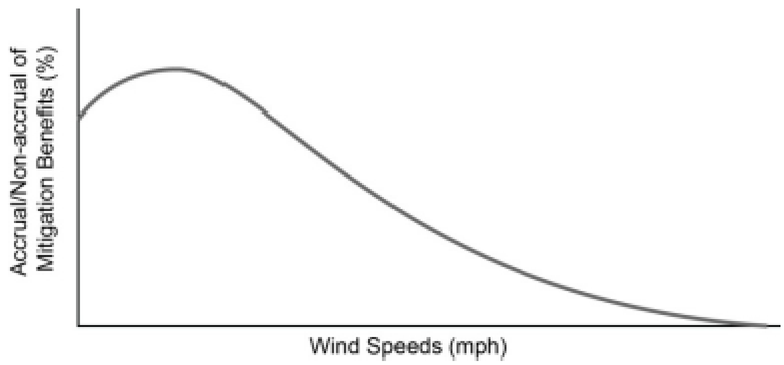

Figure 20. Modification Function for Slate Roofing

Spatial and Temporal Dependency of the Marginal Impact of Secondary Risk Characteristics

For a given construction type, occupancy class, and height, the AIR model defines a "typical" building in terms of "default" secondary risk characteristics for each location and year-built to estimate its vulnerability. Thus the marginal impact on vulnerability of input secondary risk characteristics is also dependent on the location of the structure and the year in which it was built. That is, user input of a secondary risk characteristic will overwrite the default characteristics, and a new vulnerability function is estimated depending on the user's input relative to default features. For example, an input of engineered shutter will provide no to minor reduction in vulnerability for a Miami home built after 2002, but will provide a large reduction in vulnerability for a pre-1995 built home in Tallahassee. This coherent approach provides a framework to properly account for the overlap of the impact of different vulnerability modifiers (e.g., year-built and mitigation modifiers) and avoids potential double counting in the model. However, overall vulnerability for a structure in Miami is likely to be lower than that of a building in Tallahassee. It is this marginal impact of secondary risk characteristics that will be different.

Validating the Impact of Secondary Risk Characteristics

The quality and level of detail of exposure and claims data has improved over time. Before the 2004 and 2005 hurricane seasons, most of the data was aggregated at the ZIP Code level with little to no information about individual building characteristics. Data from more recent storms indicates that most companies have started capturing exact addresses and primary building characteristics such as construction, occupancy, height and year-built. Many clients have also captured detailed building characteristics such as roof-covering type, type of opening protection and roof-sheathing connection, etc. AIR has analyzed this data to validate the impact of individual characteristics and characteristics in combinations. Figure 21 compares modeled and observed mitigating impacts of key individual building characteristics, as well as of the combined characteristics in a single building (i.e., "mitigated building").

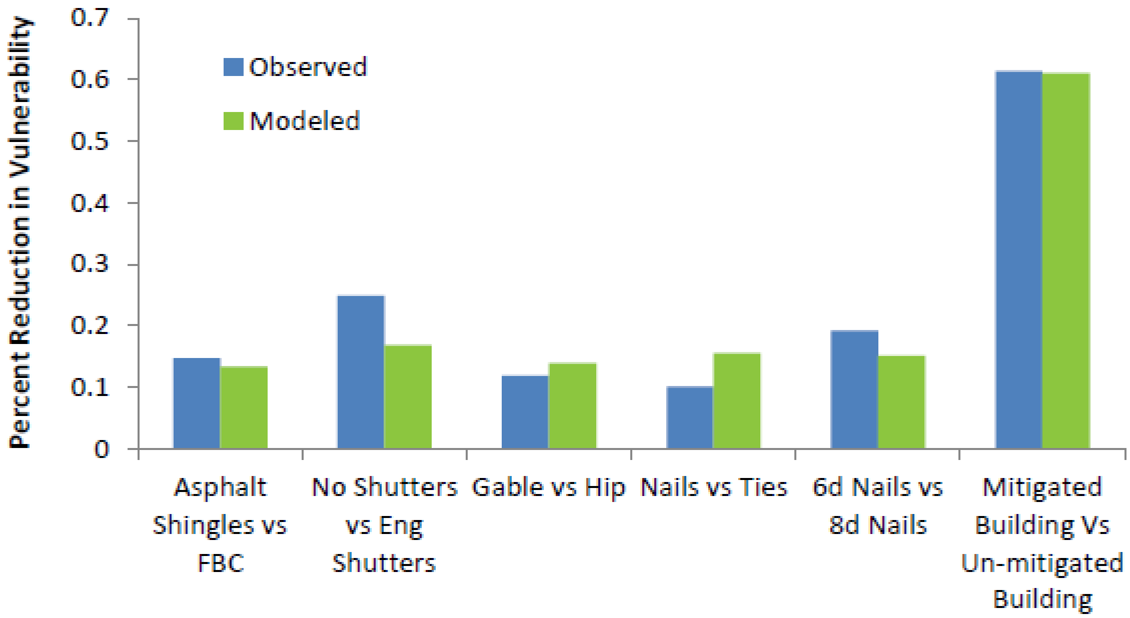

Figure 21. Validation of the Impact of Secondary Risk Characteristics Alone and in Combination

Proper Use of the Secondary Risk Characteristic "Seal of Approval"

Even when building codes are mandatory, the level of engineering participation in the design and construction of a structure can vary by region. In Florida, for example, a professional engineer typically performs an inspection and undertakes load calculations before engineering drawings are sealed. For many coastal counties in Texas, a professional engineer inspects the buildings, but design load calculations are not performed. For many other states, basic inspection is sufficient to meet the building code requirements.

In the AIR model, the secondary risk characteristic "Seal of Approval" was developed to account for the differing effects the same class of mitigation features may have on the vulnerability of a structure. For example, the impact of a good roof-to-wall connection (e.g., strap) may be much higher for a home that received engineering attention during construction (e.g., design calculations were completed to ensure there are continuous horizontal and vertical load paths) than the impact on a home where such detailed engineered attention was not paid. The purpose of these features is not to turn a house with bad building characteristics into a good house with mitigation features, but to distinguish between the impact of a mitigation feature based on the level of engineering attention. Thus, the Seal of Approval will not change the vulnerability of a structure with otherwise poor building characteristics.

There are three options for the Seal of Approval:

> *Fully Engineered Structure*: The structure has been designed by a Professional Engineer. The Professional Engineer is required to seal the calculations and drawings by the local jurisdiction.
>
> *Partially Engineered Structure*: The structure has been inspected by a Professional Engineer and found "deemed-to-comply" with the respective Building Code. The local jurisdiction does not require the Professional Engineer to seal the calculations.
>
> *Minimally Engineered Structure*: The Structure does not satisfy any of the conditions mentioned above.

Following are examples to illustrate the use of Seal of Approval in the model.

A structure in Miami built in 2009:

The model assumes a well mitigated and Fully Engineered Structure for this location and year-built. Thus, using the Partially or Minimally Engineered options under Seal of Approval would increase the vulnerability of structures.

A structure in Mississippi built in 1995:

The model does not assume a mitigated structure for this location and year-built. Thus, applying any option under Seal of Approval will not modify the vulnerability functions.

A structure in Mississippi built in 1995 with user-selected secondary risk characteristics, such as high-wind rated roof covering, hurricane ties, and engineered shutters:

Since the user has selected secondary risk characteristics that will make the structure a mitigated structure, selecting the Partially Engineered or Fully Engineered options will further reduce the vulnerability of the structure.

Please note that when year-built is unknown, the Seal of Approval characteristic does not have an impact on the vulnerability.

Mitigation Credits for Construction to Florida Building Code (FBC 2001)

For buildings built to the minimum requirements of the Florida Building Code (FBC 2001), AIR has identified six unique building categories for Florida, as listed in Table 3, by taking into consideration the design wind speed, terrain exposure category, and the requirements of Wind-borne Debris Region (WBDR) and High Velocity Hurricane
Zone (HVHZ).

Table 3. Building Categories as per Florida Building Code (FBC 2001)

Building ID	Wind Speed	Exposure	WBDR**
1	<120	B	No
2	≥110	C	Yes
3	≥120	B	No
4	≥120	B	Yes
5	≥120	C	Yes
6	HVHZ*	C	Yes

* Broward and Miami-Dade counties.

** In these areas, buildings can be designed for internal pressures instead of providing opening protections. In the model, explicit assumption about opening protection has not been made except for Region 6 where it is required to have the opening protection.

Figure 22 shows the geographical locations of these building categories in Florida. The vulnerability functions for these six unique building categories were derived by selecting the relevant building features and options from the AIR individual risk module that meet the minimum requirements of the Florida Building Code 2001. For example, AIR building category 6 is located in the High Velocity Hurricane Zone (HVHZ) and is designed for a wind speed of 146 mph and Exposure C (Open country), as specified in FBC 2001. The code stipulates all openings be protected in High Velocity Hurricane Zone.

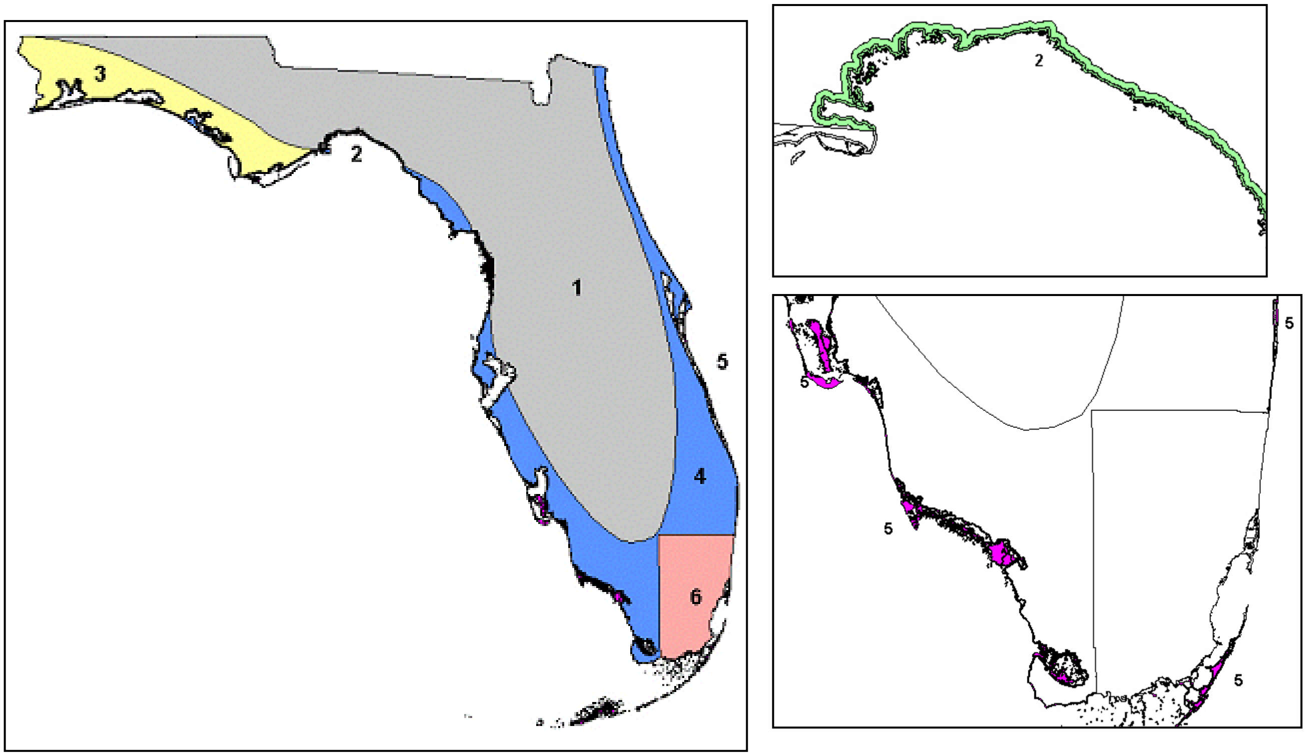

Figure 22. Buildings built to the minimum requirements of Florida Building Code (FBC 2001)

Table 4 illustrates the roof covering, roof deck, roof-deck attachment, roof anchorage, and opening protection options selected for residential wood frame category 6 buildings to meet the minimum requirements of the Florida Building Code.

Table 4. Model Parameters for Building Category 6 as per Minimum Requirements of FBC 2001

Parameter	Building 6
Wind Speed	146 mph
Exposure	C
WBDR	Yes
HVHZ	Yes
Roof Covering	FBC Equivalent
Roof Deck	Plywood
Roof-Deck Attachment	8d@6"/6"
Roof Anchorage	Hurricane Straps
Opening Protection	Engineered Shutters
Doors	Impact Resistant - Reinforced

Evaluating Wind Loss Mitigation Credits with the Touchstone Location Detail Record

On June 6, 2002, the Florida Department of Insurance issued an Informational Memorandum (0470M) which outlined provisions of the Florida Statute Section 627.0629(1). The new statute requires that rate filings received by the Florida Department of Insurance on or after June 1, 2002, include credits for "fixtures or construction techniques demonstrated to reduce the amount of loss in a windstorm". The statute further requires all insurers to make a rate filing which includes actuarially reasonable differentials by February 28, 2003.

This document provides guidance to companies who wish to use Touchstone for evaluating these wind mitigation credits. According to the statute, the following 6 areas must be considered:

- Roof strength
- Roof covering performance
- Roof-to-wall strength
- Wall-to-floor-to-foundation strength
- Opening protection
- Window, door, and skylight strength

The Information Memorandum states that other construction techniques have also been demonstrated to influence loss and thus should also be considered:

- Roof shape
- Wall Construction
- Opening Protection for non-glazed openings (e.g., doors)
- Gable End Bracing for roof shapes other than hip

The Touchstone Location Detail Record

The location detail record (record 64 in the UPX file and record 74 in the UFX file) contains several building and environmental features that influence loss from windstorms. Table 5 shows the features of particular relevance to the Florida Statute.

Note that some features can be used to address more than one area of interest. For example, while roof geometry is a separate category, it also influences roof strength.

Table 5. Building Features Relevant to Florida Statute

Mitigation Category	Touchstone Location Detail Field
Enhanced Roof Strength	Roof Deck Roof Deck Attachment Roof Covering Roof Covering Attachment Roof Geometry Roof Pitch Year Roof Built
Roof Covering Performance	Roof Covering Roof Covering Attachment
Roof to Wall Strength	Roof Anchorage Wall Type Wall Siding
Wall to Floor to Foundation Strength	Foundation Connection
Opening Protection	Window Protection
Window, Door, Skylight Strength	Glass Type Exterior Doors Wall Attached Structures
Roof Shape	Roof Geometry
Wall Construction	Wall Type Wall Siding
Opening Protection for Non-glazed openings	Exterior Doors Wall Attached Structures

Developing Mitigation Credits

In 2001, the Florida Department of Community Affairs (DCA) commissioned a study to estimate the loss reduction potential of different wind resistive building features. Loss cost relativities were presented for a set of primary rating factors, with various options for each factor. The Florida Department of Insurance recognizes the "public domain" DCA study as one basis for deriving credits, but notes that insurers may rely upon other studies. AIR has developed loss modification factors for a similar range of building features.

Touchstone users may use these factors to develop rating credits in a similar manner as presented in the public domain study. It is important to note that the AIR and DCA studies were developed independently, and as a result have differences in methodology, features, and conclusions. While there is no direct mapping of the rating tables used in the DCA study to the AIR secondary characteristics, AIR has developed a list of characteristics that provide a similar range of relativities. The DCA features and closest AIR selections are shown in Table 6.

Table 6. DCA Features and Corresponding AIR Secondary Characteristics

DCA Feature	Similar AIR Category and Selections
Roof Cover • Non FBC Equivalent • FBC Equivalent	Roof Covering + Roof Covering Attachment • Asphalt Shingles + Nails • FBC Equivalent + Nails
Roof Cover • A • B • C	Roof Deck + Roof Deck Attachment • Plywood + 6d nails @ 6"/12" • Plywood + 8d nails @ 6"/12" • Plywood + 8d nails @ 6"/6"
Roof Wall Connection • Toe Nails • Clips • Single Wraps • Double Wraps	Roof Anchorage Nails/Screws • Clips • Hurricane Ties • Hurricane Ties
Opening Protection • None • Basic • Hurricane	Window Protection • None • Non-Engineered Shutters • Engineered Shutters
Roof Shape • Hip • Other	Roof Geometry • Hip • Gable End without Bracing
No Secondary Water Resistance	No Secondary Water Resistance
Secondary Water Resistance	Secondary Water Resistance

The AIR study made use of the same 31 points used to define locations in the public domain study. The analysis showed that loss relativities did not vary significantly by location. The resulting AIR wind loss mitigation relativities are therefore presented as the mean of the relativities across all locations, and take into account locations in each of the wind speed and terrain exposure combinations implemented in the Florida Building Code.

Appendix 10: Remapped ZIP Codes

Table 71. Remapped ZIP Codes

FCHLPM ZIP	Remapped ZIP
32004	32082
32006	32073
32007	32177
32026	32083
32030	32068
32035	32034
32041	32097
32042	32044
32050	32068
32056	32055
32067	32073
32072	32087
32079	32043
32085	32084
32099	32220
32105	32180
32111	34472
32115	32114
32116	32118
32120	32114
32121	32119
32123	32119
32125	32117
32126	32118
32133	32179
32135	32136
32138	32666
32142	32136
32147	32148
32149	32148
32157	32181
32158	32159
32160	32656
32163	34785
32170	32169
32173	32174
32175	32174
32178	32177
32182	32134
32183	32179
32185	32666
32192	32617
32198	32114
32201	32202
32203	32209
32215	32222
32228	32227
32229	32218
32231	32207
32232	32209
32235	32206
32236	32205
32238	32244
32239	32277
32240	32250
32241	32223
32245	32216
32247	32207
32255	32207
32260	32259
32267	32233
32290	32202
32302	32301
32313	32304
32314	32301
32315	32303
32316	32304
32318	32305
32323	32322
32326	32327
32329	32320
32330	32351
32335	32465
32337	32344
32341	32340
32345	32344
32353	32351
32357	32331
32360	32334
32361	32344
32362	32305
32395	32301
32402	32401
32406	32405
32410	32401
32411	32408
32412	32401
32417	32407
32422	32433
32432	32442
32434	32433
32447	32446
32452	32425
32454	32459
32457	32456
32461	32413
32463	32428
32509	32526
32512	32507
32513	32503
32516	32506
32520	32502
32521	32507
32522	32502
32523	32501
32524	32501
32530	32583
32537	32536
32538	32567
32540	32541
32549	32548
32559	32526
32560	32533
32562	32561
32572	32570
32588	32578
32591	32501
32592	32501
32602	32601
32604	32603

FCHLPM ZIP	Remapped ZIP
32610	32611
32612	32611
32613	32611
32614	32608
32616	32615
32627	32601
32633	32640
32634	32686
32635	32605
32639	34449
32644	32626
32654	32640
32655	32643
32658	32615
32662	32640
32663	32686
32664	32667
32681	32667
32683	34449
32692	32680
32697	32054
32704	32712
32706	32744
32710	32818
32715	32714
32716	32714
32718	32708
32719	32708
32721	32720
32722	32720
32723	32724
32727	32726
32728	32725
32733	32792
32739	32738
32745	32746
32747	32771
32752	32779
32753	32713
32756	32757
32762	32765
32768	32712
32772	32771
32774	32763
32775	32754
32777	32757
32781	32780
32782	32796
32783	32780
32790	32789
32791	32779
32793	32792
32794	32751
32795	32746
32799	32746

FCHLPM ZIP	Remapped ZIP
32802	32801
32834	32828
32853	32803
32854	32804
32855	32805
32856	32806
32857	32807
32858	32808
32859	32809
32860	32810
32861	32811
32862	32827
32867	32817
32868	32818
32869	32809
32872	32822
32877	32837
32878	32828
32887	32821
32890	32809
32891	32803
32893	32803
32896	32801
32897	32801
32899	32815
32902	32901
32906	32905
32910	32907
32911	32905
32912	32904
32919	32901
32923	32922
32924	32922
32932	32931
32936	32935
32941	32901
32954	32953
32956	32955
32957	32958
32959	32927
32961	32960
32964	32960
32965	32962
32969	32966
32970	32967
32971	32967
32978	32958
33001	33050
33002	33014
33008	33009
33011	33010
33017	33015
33022	33020
33041	33040
33045	33040

FCHLPM ZIP	Remapped ZIP
33051	33050
33052	33050
33061	33060
33072	33069
33074	33064
33075	33067
33077	33071
33081	33021
33082	33028
33083	33023
33084	33024
33090	33030
33092	33032
33093	33063
33097	33073
33101	33128
33102	33126
33110	33150
33111	33131
33112	33122
33114	33134
33116	33176
33119	33139
33121	33131
33124	33181
33148	33131
33151	33127
33152	33122
33153	33138
33159	33139
33163	33180
33164	33162
33188	33174
33195	33125
33197	33157
33206	33126
33231	33131
33233	33133
33238	33150
33239	33139
33242	33142
33243	33143
33245	33145
33256	33156
33257	33157
33261	33161
33265	33175
33266	33166
33269	33169
33280	33162
33283	33183
33296	33156
33302	33304
33303	33301
33307	33334

FCHLPM ZIP	Remapped ZIP
33310	33311
33318	33322
33320	33321
33329	33324
33335	33334
33337	33324
33338	33324
33339	33306
33345	33351
33346	33316
33348	33308
33349	33304
33355	33325
33359	33319
33388	33324
33394	33301
33402	33480
33416	33406
33419	33404
33420	33410
33421	33411
33422	33417
33424	33426
33425	33426
33427	33486
33429	33432
33439	33438
33443	33441
33447	33444
33448	33446
33454	33467
33459	33440
33464	33460
33465	33462
33466	33461
33468	33458
33474	33436
33475	33455
33481	33431
33482	33484
33488	33433
33497	33428
33499	33487
33503	33598
33508	33511
33509	33511
33521	34785
33524	33540
33526	33525
33530	33567
33537	33523
33539	33542
33550	33584
33564	33566
33568	33569

FCHLPM ZIP	Remapped ZIP
33571	33573
33574	33525
33575	33570
33583	33584
33586	33570
33587	33527
33593	33523
33595	33594
33601	33602
33608	33621
33622	33607
33623	33607
33631	33607
33633	33607
33655	33602
33660	33619
33661	33619
33664	33607
33672	33602
33673	33603
33674	33604
33675	33605
33677	33607
33679	33629
33680	33610
33681	33611
33682	33612
33684	33634
33685	33615
33686	33616
33687	33617
33688	33618
33689	33619
33690	33609
33694	33624
33697	33612
33730	33713
33731	33701
33732	33702
33733	33713
33734	33704
33736	33706
33737	33707
33738	33708
33740	33706
33741	33706
33742	33702
33743	33710
33744	33708
33747	33711
33757	33755
33758	33765
33766	33763
33769	33765
33775	33772

FCHLPM ZIP	Remapped ZIP
33779	33770
33780	33781
33784	33713
33802	33803
33804	33805
33806	33803
33807	33813
33820	33830
33826	33825
33831	33830
33835	33860
33836	33837
33840	33803
33845	33844
33846	33812
33847	33830
33848	34758
33851	33844
33854	33898
33855	33898
33856	33898
33858	33837
33862	33852
33863	33860
33867	33898
33871	33870
33877	33859
33882	33880
33883	33880
33885	33881
33888	33884
33902	33901
33906	33907
33910	33990
33911	33901
33915	33990
33918	33903
33927	33953
33929	33928
33930	33935
33932	33931
33938	33948
33944	33471
33945	33922
33949	33950
33951	33950
33965	33967
33970	33936
33975	33935
33994	33905
34101	34102
34106	34102
34107	34102
34133	34135
34136	34135

FCHLPM ZIP	Remapped ZIP
34137	34114
34138	34141
34139	34141
34143	34142
34146	34145
34204	34203
34206	34205
34216	34217
34218	34217
34220	34221
34230	34236
34250	34221
34260	34243
34264	34203
34265	34266
34267	34266
34268	34266
34270	34243
34272	34275
34274	34275
34276	34236
34277	34231
34278	34234
34280	34209
34281	34207
34282	34207
34284	34285

FCHLPM ZIP	Remapped ZIP
34290	34287
34295	34223
34421	34420
34423	34429
34430	34432
34445	34442
34447	34448
34451	34450
34460	34461
34464	34465
34477	34471
34478	34471
34483	34472
34487	34448
34489	34488
34492	34491
34603	34601
34605	34601
34611	34606
34636	34601
34656	34653
34660	34683
34661	34601
34673	34668
34674	34667
34679	34667
34680	34653

FCHLPM ZIP	Remapped ZIP
34681	34683
34682	34683
34692	34690
34697	34698
34712	34711
34713	34714
34729	34715
34740	34787
34742	34741
34745	34741
34749	34748
34755	34715
34770	34769
34777	34787
34778	34787
34789	34788
34948	34950
34954	34983
34958	34957
34973	34972
34979	34950
34985	34952
34991	34990
34992	34997
34995	34994

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