Discussion Flood Standards as of December 1, 2015

Florida Commission on Hurricane Loss Projection Methodology

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I. INTRODUCTION

Discussion Flood Standards

Introduction

In 2014, the Florida Legislature passed CS/CS/CS/SB 542 that expanded the role for the Florida Commission on Hurricane Loss Projection Methodology (Commission). Section 627.715, Florida Statutes (F.S.), was created to allow for authorized insurers in Florida to write flood insurance and two other existing statutes were amended including s. 627.0628, F.S., which created the Commission and s. 627.062, F.S., which deals with rate filings. The new legislation tasked the Commission with adopting "actuarial methods, principles, standards, models, or output ranges for personal lines residential flood loss no later than July 1, 2017." The Legislature also passed SB 1262 expanding the definition of and the protection of trade secrets to include those used in designing and constructing a flood loss model.

Recognizing the vast amount of work involved, the Commission held a committee meeting of its Acceptability Process Committee on September 30, 2014. At this meeting, a preliminary time line was created, and the Chair of the Commission created the "Flood Standards Development Committee (Committee)." The overall and final objective of the Committee was to recommend "Discussion Flood Standards" to the Commission for adoption by November 2015. This document represents the culmination of the Committee's efforts and lays out a framework for further development and refinement of the flood standards.

Preparation and background

The Commission, consisting of 12 members, is administratively housed within the State Board of Administration of Florida (SBA) and is required to independently exercise its powers and duties. It is funded as a cost of administration of the Florida Hurricane Catastrophe Fund which provides for travel reimbursement, expenses, and staff support for the Commission.

In its role of providing staffing for the Commission, the SBA has historically contracted with certain experts to assist the Commission in the development of standards and the review of hurricane loss models. These experts are referred to as the "Professional Team" and have included an actuary, a statistician, a computer scientist, an engineer, and a meteorologist. The Professional Team includes both primary and backup members.

In preparation for the review of flood loss models, the SBA engaged in the process of putting together two teams: a hurricane loss model Professional Team with both primary and backup members and a flood loss model Professional Team with both primary and backup members. In total, 13 Professional Team members have been contracted with, and there is some overlap in members for hurricane loss modeling and for flood loss modeling. Two new areas of expertise were added to the Professional Team for flood loss model review – a hydrologist and a coastal engineer. The flood loss model Professional Team consists of a six member team: a statistician, a computer scientist, an actuary, a hydrologist, a meteorologist, and a coastal engineer. Primary and backup members have been designated as well.

During most of the past year, all members of the Professional Team have been engaged in the development of the Discussion Flood Standards and have participated with Commission members in monthly meetings. As staff to the Commission, the Professional Team has also met separately and helped review and draft the various versions of the Discussion Flood Standards which also include accompanying purpose statements, disclosures, on-site audit requirements, and forms.

All meeting materials of the Commission related to flood model standards development are available on the Commission's website at *www.sbafla.com/methodology* under the tab "Flood Standards Development." This includes agendas, documents, presentations, audio recordings, and meeting summaries. Various additional documents, studies, and references are also provided. In addition, drafts of the latest flood standards are posted to facilitate continued feedback and discussion. These drafts are expected to be updated periodically as input or feedback is provided to the Commission, noting the date of the change. Drafts of flood standards with revision dates after November 2015 will represent edits to the Discussion Flood Standards published in this document. There will be a "clean" and a "redline" version with notes or explanations accompanying any changes that cannot be clearly shown in a redline version.

What is addressed in this document

The purpose of this document is to publish the Discussion Flood Standards and definitions used specific to flood loss modeling, and to provide for various types of feedback leading up to the July 1, 2017, deadline for adopting flood standards. This document does not include an acceptability process for reviewing flood loss models. The process for reviewing flood loss models for acceptability is intended to be published with the Commission's 2017 Report of Activities (ROA) scheduled for publication in November 2017, which will be the next revision date for the hurricane standards. The ROA is expected to be one document that will address both hurricane loss modeling standards and flood loss modeling standards along with their respective acceptability review processes.

Process going forward

The process going forward will involve various types of feedback, the adoption of the initial flood standards by the July 1, 2017, statutory deadline, and the finalization of the acceptability process for flood loss model review at a later date. Since the deadline of July 1, 2017, deals with the adoption of flood standards and the Commission is required to adopt standards every odd-numbered year which applies to both hurricane loss modeling and flood loss modeling, there will be a need to coordinate, merge, and synchronize the 2017 Report of Activities (ROA) of the Commission such that there are no conflicts, ambiguities, or inconsistencies regarding what requirements relate to hurricane and what requirements relate to flood.

Once the initial flood standards are adopted by July 1, 2017, ongoing efforts will be made to revise the hurricane loss model standards and associated acceptability process by the Commission's November 1, 2017, deadline for adopting revisions to its previously adopted

standards. The Commission intends to merge the flood standards and a newly created acceptability process for flood loss model review into the existing ROA for hurricane loss modeling. It is anticipated that the 2017 ROA of the Commission will contain both hurricane standards and flood standards. These are anticipated to be located in separate sections of the ROA. It is anticipated that hurricane loss models and flood loss models will be reviewed separately and independently from one another. The model review process will be modified for flood versus hurricane as appropriate.

Various sections of the ROA will need to be common to both hurricane loss modeling and flood loss modeling. Most likely, the "Introduction," "Principles," "Commission Structure," "Findings of the Commission," "Working Definitions," "References," "Inquiries or Investigations," and "Appendix" can be common to both hurricane loss modeling and flood loss modeling (with relevant exceptions noted where necessary).

Sections of the ROA that will likely need to be different based on the type of model may include "Process for Determining the Acceptability of a Computer Simulation Model" (a major difference being that hurricane loss models and flood loss models will have separate timelines for model submission, on-site review, and Commission review), "On-Site Review" (differences in what the Professional Team will review), and "Standards, Disclosures, Audit, and Forms" (although common as to how the sections are structured, each will be specific to the peril being modeled). These are preliminary observations and may be useful in helping Commission members, modelers, regulators, insurers, and other interested parties to monitor and to provide input as the flood standards continue to be revised and evolve.

It is anticipated that the section entitled, "Process for Determining the Acceptability of a Flood Computer Simulation Model," will involve a specific and different timeline for flood loss model submission and review. It would not be practicable to merge on-site reviews for hurricane loss models and flood loss models since the modeling organizations will have different experts involved in developing the respective models and the Commission will have different Professional Team members involved in the review process. This also recognizes that modeling organizations may only submit a hurricane loss model or a flood loss model and not both.

Continuing Input and Feedback: The time frame between now and July 1, 2017

The time frame between now and July 1, 2017, will be used for input and feedback. It is expected that further refinement will be necessary as the Commission learns more about flood loss modeling and as the various flood loss models continue to be developed. Four types of feedback/input are anticipated.

1) **On-site Modeling Organization Feedback:** The Commission will entertain a limited number of on-site visits for modeling organization feedback purposes. The modeling organization shall send a letter to the Chair of the Commission requesting an on-site visit of the Professional Team for the purpose of providing feedback regarding the Discussion Flood

Standards and/or to further educate the Professional Team regarding the operations and nuances of its flood loss model in relation to the Discussion Flood Standards. The modeling organization shall suggest a date and time frame, including the length of time it feels is appropriate for the visit. These visits will not be characterized as on-site reviews and no submission or other information will need to be provided to the Commission other than the letter requesting the on-site feedback visit. The time period for a modeling organization to request an on-site feedback visit with the Professional Team shall be between December 2015 and March 2017. Thirty days' notice or longer is preferred since coordination with Professional Team members is necessary. All communications shall be addressed to the Chair of the Commission through SBA staff (Donna Sirmons).

The Professional Team will not provide suggestions on how to model flood nor how the flood loss model may need to be changed in order to meet the proposed Discussion Flood Standards. The Professional Team will discuss and react to suggestions for revising, modifying, deleting, or adding standards, disclosures, audit requirements, or forms. After each visit, the Professional Team will create a report for the purpose of making suggested revisions to the Discussion Flood Standards for the Commission's review. Depending on the nature of the feedback, the Chair of the Commission may assign a respective Committee or Committees to meet and engage in further discussions. It is anticipated that the work product of the various Committees will result in revisions to the Discussion Flood Standards in preparation for meeting the July 1, 2017, deadline for final adoption.

Commission members may attend on-site feedback visits, but due to the Florida "Sunshine Law," will not be able to participate in discussions between the Professional Team and the modeling organization. Commission members may only observe deliberations with the Professional Team and may meet separately with modeling organization personnel one on one in the absence of other Commission members or Professional Team members since participation with more than one Commission member would be considered a violation of the Sunshine Law. The same requirements specified in the Commission's 2015 ROA for Commission members attending an on-site visit will also apply to an on-site modeling organization feedback session related to flood loss modeling.

2) **Committee Meetings:**

a) Closed session modeling organization feedback dealing solely with proprietary information or trade secrets used in the design and construction of a flood loss model – such meetings shall be conducted as required for hurricane loss model closed session meetings and as specified in the Commission's 2015 ROA.

b) Open or public session modeling organization feedback that does not deal with proprietary information or trade secrets used in the design and construction of a flood loss model – such meetings shall be conducted as any other public meeting, meet all public meeting requirements, and as specified in the Commission's 2015 ROA.

3) **Commission Member or Professional Team Member Feedback/Input:** At times other than Commission meetings or Committee meetings, Commission members and Professional Team members should attempt to follow the same requirements for outside party input which is specified on the Commission's website at *www.sbafla.com/method/portals/methodology/FloodOutside/RequirementsOutsidePartyInput.pdf*

   There may be some instances where the ten business day time frame for providing input prior to a meeting may not be feasible for a Commission member or Professional Team member. In those instances, an attempt should be made to provide input as soon as practicable prior to an upcoming Commission or Committee meeting where the input is intended to be discussed. The format of including a Problem Statement, Explanation, and Amendatory/Suggested Language is beneficial for Commission member discussion and helps to avoid misunderstanding, thus focusing on the issue and saving time.

4) **Outside Party Feedback/Input:** Input from outside parties can be beneficial for the Commission's consideration. Requirements for outside party input to the flood standards development are provided on the Commission's website and should be closely followed in order for the Commission to properly consider the input for incorporating into the flood standards if deemed appropriate by the Commission. Specific requirements are available on the Commission's website at: *www.sbafla.com/method/portals/methodology/FloodOutside/RequirementsOutsidePartyInput.pdf*.

II. 2015 DISCUSSION FLOOD STANDARDS, DISCLOSURES, AND FORMS

GENERAL FLOOD STANDARDS

GF-1 Scope of the Flood Model and Its Implementation

A. The flood model shall project loss costs and probable maximum loss levels for primary damage to insured personal residential property from flood 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.

C. All software and data (1) located within the flood model, (2) used to validate the flood model, (3) used to project modeled loss costs and probable maximum loss levels, and (4) used to create forms required by the Commission in the Report of Activities shall fall within the scope of the Computer/Information Standards and shall be located in centralized, model-level file areas.

Purpose: This standard gives a high level view of the scope of the flood model to be reviewed, namely projecting flood loss costs and flood probable maximum loss levels for primary damage to insured personal residential property from flood events. The definition of flood as used in this standard is based on Section 627.715(1)(b), Florida Statutes. The scope of the flood model applies to all types of flooding determined to be scientifically feasible at a location (that is, where frequencies and severities of such events are available and can be projected) and is not limited to any specific subsets or types of flood peril.

Relevant Form: GF-1, General Flood Standards Expert Certification

Disclosures

1. Specify the flood model version identification. If the flood model submitted for review is implemented on more than one platform, specify each flood model platform. Specify which platform is the primary platform and verify how any other platforms produce the same flood 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 Platforms.

2. Provide a comprehensive summary of the flood model. This summary should include a technical description of the flood model, including each major component of the model used to project loss costs and probable maximum loss levels for insured primary damage to personal residential property from flood events causing damage in Florida. Describe the

theoretical basis of the flood model and include a description of the methodology, particularly the meteorology/hydrology components, the vulnerability components, and the insured flood loss components used in the flood model. The description should be complete and is not to reference unpublished work.

3. Provide a flowchart that illustrates interactions among major flood model components.

4. Provide a comprehensive list of complete references pertinent to the submission by flood standard grouping using professional citation standards.

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

6. Identify and describe the modeling organization specified, predetermined, and comprehensive exposure dataset used for projecting personal residential flood loss costs and flood probable maximum loss levels.

Audit

1. All primary technical papers that describe the underlying flood model theory and implementation (where applicable) should be available for review in hard copy or electronic form. Modeling organization specific publications cited must be available for review in hard copy or electronic form.

2. Compliance with the process prescribed in Standard GF-1.B in all stages of the flood modeling process will be reviewed.

3. Items specified in Standard GF-1.C will be reviewed as part of the Computer/Information Flood Standards.

4. Maps, databases, and data files relevant to the modeling organization's submission will be reviewed.

5. The following information related to changes in the flood model, since the initial submission for each subsequent revision of the submission, will be reviewed.

    A. Flood model changes:

        1. A summary description of changes that affect, or are believed to affect, the personal residential flood loss costs or flood probable maximum loss levels,

        2. A list of all other changes, and

        3. The rationale for each change.

B. Percentage difference in average annual zero deductible statewide flood loss costs based on a modeling organization specified, predetermined, and comprehensive exposure dataset for:

1. All changes combined, and

2. Each individual flood model component and subcomponent change.

C. Color-coded maps by rating area or zone reflecting the percentage difference in average annual zero deductible statewide flood loss costs based on the modeling organization specified, predetermined, and comprehensive exposure dataset for each flood model component change:

1. Between the initial submission and the revised submission, and

2. Between any intermediate revisions and the revised submission.

6. The modeling organization specified, predetermined, and comprehensive exposure dataset used for projecting personal residential flood loss costs and flood probable maximum loss levels will be reviewed.

GF-2 Qualifications of Modeling Organization Personnel and Consultants Engaged in Development of the Flood Model

A. Flood 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 flood loss projection methodologies.

B. The flood model and model submission documentation shall be reviewed by modeling organization personnel or consultants in the following professional disciplines with requisite experience: hydrology and hydraulics (advanced degree or licensed Professional Engineer(s) with experience in coastal and inland flooding), meteorology (advanced degree), statistics (advanced degree), structural engineering (licensed Professional Engineer(s) with experience in coastal and inland flooding), actuarial science (Associate or Fellow of Casualty Actuarial Society or Society of Actuaries), and computer/information science (advanced degree). These individuals shall certify Forms GF-1 through GF-6, Expert Certification forms, as applicable.

Purpose: This standard requires professional disciplines with requisite experience necessary to develop the flood model to be represented among modeling organization staff and consultants. Academic or professional designations are required but not necessarily sufficient for the personnel involved in flood model development, implementation, and preparation of material for review by the Commission.

Relevant Forms:
- GF-1, General Flood Standards Expert Certification
- GF-2A, Meteorological/Hydrological Flood Standards Meteorologist Expert Certification
- GF-2B, Meteorological/Hydrological Flood Standards Hydrologist Expert Certification
- GF-3, Statistical Flood Standards Expert Certification
- GF-4, Vulnerability Flood Standards Structural/Hydraulic/Coastal Engineer Expert Certification
- GF-5, Actuarial Flood Standards Expert Certification
- GF-6, Computer/Information Flood Standards Expert Certification

Disclosures

1. Organization Background

   A. Describe the ownership structure of the modeling organization engaged in the development of the flood model. Describe affiliations with other companies and the nature of the relationship, if any. Indicate if the organization has changed its name and explain the circumstances.

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

C. If the flood model is developed by an entity other than the modeling organization, describe the funding source for the development of the flood model.

D. Describe any services other than flood modeling provided by the modeling organization.

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

2. Professional Credentials

A. Provide in a tabular 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 flood model:
    1. Meteorology/Hydrology
    2. Statistics
    3. Vulnerability
    4. Actuarial Science
    5. Computer/Information Science

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

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 flood model:
    1. Meteorology/Hydrology
    2. Statistics
    3. Vulnerability
    4. Actuarial Science
    5. Computer/Information Science

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

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

4. Provide a list of rating agencies and insurance regulators that have reviewed the flood model. Include the dates and purpose of the reviews.

5. Provide a completed Form GF-1, General Flood Standards Expert Certification. Provide a link to the location of the form [insert hyperlink here].

6. Provide a completed Form GF-2A, Meteorological/Hydrological Flood Standards Meteorologist Expert Certification. Provide a link to the location of the form [insert hyperlink here].

7. Provide a completed Form GF-2B, Meteorological/Hydrological Flood Standards Hydrologist Expert Certification. Provide a link to the location of the form [insert hyperlink here].

8. Provide a completed Form GF-3, Statistical Flood Standards Expert Certification. Provide a link to the location of the form [insert hyperlink here].

9. Provide a completed Form GF-4, Vulnerability Flood Standards Structural/ Hydraulic/Coastal Engineer Expert Certification. Provide a link to the location of the form [insert hyperlink here].

10. Provide a completed Form GF-5, Actuarial Flood Standards Expert Certification. Provide a link to the location of the form [insert hyperlink here].

11. Provide a completed Form GF-6, Computer/Information Flood Standards Expert Certification. Provide a link to the location of the form [insert hyperlink here].

Audit

1. The professional vitae of personnel and consultants engaged in the development of the flood model and responsible for the current flood model and the submission will be reviewed. Background information on the professional credentials and the requisite experience of individuals providing testimonial letters in the submission will be reviewed.

2. Forms GF-1, General Flood Standards Expert Certification, GF-2A, Meteorological/Hydrological Flood Standards Meteorologist Expert Certification, GF-2B, Meteorological/Hydrological Flood Standards Hydrologist Expert Certification, GF-3, Statistical Flood Standards Expert Certification, GF-4, Vulnerability Flood Standards Structural/Hydraulic/Coastal Engineer Expert Certification, GF-5, Actuarial Flood Standards Expert Certification, GF-6, Computer/Information Flood Standards Expert Certification, and all independent peer reviews of the flood model under consideration will be reviewed. Signatories on the individual forms will be required to provide a description of their review process.

3. Incidents where modeling organization personnel or consultants have been found to have failed to abide by the standards of professional conduct adopted by their profession will be discussed.

4. For each individual listed under Disclosure 2.A, specific information as to any consulting activities and any relationship with an insurer, reinsurer, trade association, governmental entity, consumer group, or other advocacy group within the previous four years will be reviewed.

GF-3 Insured Exposure Location

A. ZIP Codes used in the model shall not differ from the United States Postal Service publication date by more than 36 months at the date of submission of the model. ZIP Code information shall originate from the United States Postal Service.

B. Address information purchased by the modeling organization shall be verified by the modeling organization for accuracy and timeliness. The address information data source shall be documented and updated.

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

D. Geocoding methodology shall be justified.

Purpose: Flood model outputs, including flood loss costs and flood probable maximum loss levels, are sensitive to insured exposure locations and topography. Accurate insured exposure locations are necessary for projecting flood loss costs and flood probable maximum loss levels. This standard requires that appropriate methods must be used in converting street addresses to geocode locations (latitude-longitude).

Relevant Form: GF-1, General Flood Standards Expert Certification

Disclosures

1. List the current ZIP Code and address databases used by the flood model and the flood model components to which they relate. Provide the effective dates corresponding to the ZIP Code and address databases.

2. Describe in detail how invalid ZIP Codes and addresses are handled.

3. Describe the method for subdividing the address databases to determine the insured exposure locations, and the treatment of any variations for populated versus unpopulated areas.

4. Describe the data, methods, and process used in the flood model to convert among street addresses and geocode locations (latitude-longitude).

5. Describe the use of geographic information systems (GIS) in the process of converting among street address and geocode locations, and the generation of insured exposure locations.

6. List and provide a brief description of each database used in the flood model for determining geocode location.

7. Describe the process for updating flood model geocode locations as ZIP Code and address databases are updated.

Audit

1. Geographic displays of the spatial distribution of insured exposures will be reviewed. The treatment of any variations for populated versus unpopulated areas will be reviewed.

2. Third party vendor information, if applicable, and a complete description of the process used to create, validate, and justify geographic grids will be reviewed.

3. The treatment of exposures over water or other uninhabitable terrain will be reviewed.

4. Examples of geocoding for complete and incomplete street addresses will be reviewed.

5. Flood model geocode location databases will be reviewed.

GF-4 Independence of Flood Model Components

The meteorology/hydrology, vulnerability, and actuarial components of the flood model shall each be theoretically sound without compensation for potential bias from other components.

Purpose: This standard requires that each of the primary components of the flood model be individually sound and operate independently. For example, the flood model should not allow adjustments to the vulnerability components to compensate for apparent deficiencies in other components (e.g., compensation which could inflate damage). A flood model would not meet this standard if an artificial calibration adjustment has been made to improve the match of historical and flood model results for a specific flood event. In addition to each component of the flood model meeting its respective standards, the interrelationship of the flood model components as a whole must be reasonable, logical, and scientifically justified.

Relevant Form: GF-1, General Flood Standards Expert Certification

Audit

1. The flood model components will be reviewed for adequately portraying flood phenomena and effects (damage, flood loss costs, and flood probable maximum loss levels). Attention will be paid to an assessment of (1) the theoretical soundness of each component, (2) the basis of the integration of each component into the flood model, and (3) consistency between the results of one component and another.

GF-5 Editorial Compliance

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 GF-7, Editorial Review Expert Certification that the submission has been personally reviewed and is editorially correct.

Purpose: This standard requires that the modeling organization engaged in the development of the flood model maintain a quality control process with regard to creating, maintaining, and reviewing all documentation associated with the flood model.

Person(s) with experience in reviewing technical documents for grammatical correctness, typographical accuracy, and accurate citations, charts, or graphs must have reviewed the submission and certify that the submission is in compliance with the acceptability process.

Relevant Forms:
- GF-1, General Flood Standards Expert Certification
- GF-2A, Meteorological/Hydrological Flood Standards Meteorologist Expert Certification
- GF-2B, Meteorological/Hydrological Flood Standards Hydrologist Expert Certification
- GF-3, Statistical Flood Standards Expert Certification
- GF-4, Vulnerability Flood Standards Structural/Hydraulic/Coastal Engineer Expert Certification
- GF-5, Actuarial Flood Standards Expert Certification
- GF-6, Computer/Information Flood Standards Expert Certification
- GF-7, Editorial Review Expert Certification

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.

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

3. Provide a completed Form GF-7, Editorial Review Expert Certification. Provide a link to the location of the form [insert hyperlink here].

Audit

1. An assessment that the person(s) who has reviewed the submission has experience in reviewing technical documentation and that such person(s) is familiar with the submission requirements as set forth in the Commission's *Report of Activities as of November 1, 2017* will be made.

2. Attestation that the submission has been reviewed for grammatical correctness, typographical accuracy, completeness, and no inclusion of extraneous data or materials will be assessed.

3. Confirmation that the submission has been reviewed by the signatories on Forms GF-1 through GF-6, Expert Certification forms, for accuracy and completeness will be assessed.

4. The modification history for submission documentation will be reviewed.

5. A flowchart defining the process for form creation will be reviewed.

6. Form GF-7, Editorial Review Expert Certification, will be reviewed.

Form GF-1: General Flood Standards Expert Certification

Purpose: This form identifies the signatory or signatories who have reviewed the current flood model submission for compliance with the General Flood Standards (GF1-GF5) in accordance with the stated provisions.

I hereby certify that I have reviewed the current submission of _____
(Name of Flood Model)
Version _____ for compliance with the 2017 Flood Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify that:

1) The model meets the General Flood Standards (GF1 – GF5);
2) The disclosures and forms related to the General Flood 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.

Name	Professional Credentials (Area of Expertise)
Signature (original submission)	Date
Signature (response to deficiencies, if any)	Date
Signature (revisions to submission, if any)	Date
Signature (final submission)	Date

An updated signature and form is required following any modification of the flood 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.

Include Form GF-1, General Flood Standards Expert Certification, in a submission appendix.

Form GF-2A: Meteorological/Hydrological Flood Standards Meteorologist Expert Certification

Purpose: This form identifies the signatory or signatories who have reviewed the current flood model submission for compliance with the Meteorological/Hydrological Flood Standards (MHF1-MHF7) in accordance with the stated provisions from the meteorologist perspective.

I hereby certify that I have reviewed the current submission of _____
(Name of Flood Model)
Version _____ for compliance with the 2017 Flood Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify that:

1) The model meets the Meteorological/Hydrological Flood Standards (MHF1 – MHF7);
2) The disclosures and forms related to the Meteorological/Hydrological Flood 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.

Name	Professional Credentials (Area of Expertise)
Signature (original submission)	Date
Signature (response to deficiencies, if any)	Date
Signature (revisions to submission, if any)	Date
Signature (final submission)	Date

An updated signature and form is required following any modification of the flood 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.

Include Form GF-2A, Meteorological/Hydrological Flood Standards Meteorologist Expert Certification, in a submission appendix.

Form GF-2B: Meteorological/Hydrological Flood Standards Hydrologist Expert Certification

Purpose: This form identifies the signatory or signatories who have reviewed the current flood model submission for compliance with the Meteorological/Hydrological Flood Standards (MHF1-MHF7) in accordance with the stated provisions from the hydrologist perspective.

I hereby certify that I have reviewed the current submission of _____
(Name of Flood Model)
Version _____ for compliance with the 2017 Flood Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify that:

1) The model meets the Meteorological/Hydrological Flood Standards (MHF1 – MHF7);
2) The disclosures and forms related to the Meteorological/Hydrological Flood 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.

Name	Professional Credentials (Area of Expertise)
Signature (original submission)	Date
Signature (response to deficiencies, if any)	Date
Signature (revisions to submission, if any)	Date
Signature (final submission)	Date

An updated signature and form is required following any modification of the flood 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.

Include Form GF-2B, Meteorological/Hydrological Flood Standards Hydrologist Expert Certification, in a submission appendix.

Form GF-3: Statistical Flood Standards Expert Certification

Purpose: This form identifies the signatory or signatories who have reviewed the current flood model submission for compliance with the Statistical Flood Standards (SF1-SF6) in accordance with the stated provisions.

I hereby certify that I have reviewed the current submission of _____
(Name of Flood Model)
Version _____ for compliance with the 2017 Flood Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify that:

1) The model meets the Statistical Flood Standards (SF1 – SF6);
2) The disclosures and forms related to the Statistical Flood 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.

Name	Professional Credentials (Area of Expertise)
Signature (original submission)	Date
Signature (response to deficiencies, if any)	Date
Signature (revisions to submission, if any)	Date
Signature (final submission)	Date

An updated signature and form is required following any modification of the flood 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.

Include Form GF-3, Statistical Flood Standards Expert Certification, in a submission appendix.

Form GF-4: Vulnerability Flood Standards Structural/Hydraulic/Coastal Engineer Expert Certification

Purpose: This form identifies the signatory or signatories who have reviewed the current flood model submission for compliance with the Vulnerability Flood Standards (VF1-VF4) in accordance with the stated provisions.

I hereby certify that I have reviewed the current submission of _____
(Name of Flood Model)
Version _____ for compliance with the 2017 Flood Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify that:

1) The model meets the Vulnerability Flood Standards (VF1 – VF4);
2) The disclosures and forms related to the Vulnerability Flood 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.

Name	Professional Credentials (Area of Expertise)
Signature (original submission)	Date
Signature (response to deficiencies, if any)	Date
Signature (revisions to submission, if any)	Date
Signature (final submission)	Date

An updated signature and form is required following any modification of the flood 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.

Include Form GF-4, Vulnerability Flood Standards Structural/Hydraulic/Coastal Engineer Expert Certification, in a submission appendix.

Form GF-5: Actuarial Flood Standards Expert Certification

Purpose: This form identifies the signatory or signatories who have reviewed the current flood model submission for compliance with the Actuarial Flood Standards (AF1-AF6) in accordance with the stated provisions.

I hereby certify that I have reviewed the current submission of _____
(Name of Flood Model)
Version _____ for compliance with the 2017 Flood Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify that:

1) The model meets the Actuarial Flood Standards (AF1 – AF6);
2) The disclosures and forms related to the Actuarial Flood 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.

Name	Professional Credentials (Area of Expertise)
Signature (original submission)	Date
Signature (response to deficiencies, if any)	Date
Signature (revisions to submission, if any)	Date
Signature (final submission)	Date

An updated signature and form is required following any modification of the flood 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.

Include Form GF-5, Actuarial Flood Standards Expert Certification, in a submission appendix.

Form GF-6: Computer/Information Flood Standards Expert Certification

Purpose: This form identifies the signatory or signatories who have reviewed the current flood model submission for compliance with the Computer/Information Flood Standards (CIF1-CIF7) in accordance with the stated provisions.

I hereby certify that I have reviewed the current submission of _____
(Name of Flood Model)
Version _____ for compliance with the 2017 Flood Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify that:

1) The model meets the Computer/Information Flood Standards (CIF1 – CIF7);
2) The disclosures and forms related to the Computer/Information Flood 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.

Name	Professional Credentials (Area of Expertise)
Signature (original submission)	Date
Signature (response to deficiencies, if any)	Date
Signature (revisions to submission, if any)	Date
Signature (final submission)	Date

An updated signature and form is required following any modification of the flood 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.

Include Form GF-6, Computer/Information Flood Standards Expert Certification, in a submission appendix.

Form GF-7: Editorial Review Expert Certification

Purpose: This form identifies the signatory or signatories who have reviewed the current flood model submission for compliance with the Commission's Notification Requirements and General Flood Standard GF-5, Editorial Compliance, in accordance with the stated provisions.

I hereby certify that I have reviewed the current submission of _____
(Name of Flood Model)
Version _____ 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, 2017*, and hereby certify that:

1) The model submission is in compliance with the Commission's Notification Requirements and General Flood Standard GF-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 flood model submission has been reviewed for grammatical correctness, typographical errors, completeness, the exclusion of extraneous data/ information and is otherwise acceptable for publication; and
5) In expressing my opinion I have not been influenced by any other party in order to bias or prejudice my opinion.

Name	Professional Credentials (Area of Expertise)
Signature (original submission)	Date
Signature (response to deficiencies, if any)	Date
Signature (revisions to submission, if any)	Date
Signature (final submission)	Date

An updated signature and form is required following any modification of the flood 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.

Include Form GF-7, Editorial Review Expert Certification, in a submission appendix.

METEOROLOGICAL/HYDROLOGICAL FLOOD STANDARDS

MHF-1 Flood Event Data Sources

A. The modeling of floods in Florida shall involve meteorological, hydrological, and other relevant data sources.

B. The model shall incorporate relevant data sources in order to account for meteorological and hydrological events and circumstances occurring either inside or outside of Florida that result in, or contribute to, flooding in Florida.

C. Flood model calibration and validation shall be scientifically justified based upon historical data consistent with peer reviewed or publically developed data sources.

D. Calibration and validation shall encompass relevant flood event data sources required to model flood, which shall include, but not be limited to, coastal and inland flooding, as well as any partitions or subsets.

E. Any trends, weighting, or partitioning shall be justified and consistent with currently accepted scientific literature and statistical techniques.

Purpose: This standard requires that the flood model include coastal and inland flooding as a minimum. Coastal flooding includes storm tide, and inland flooding includes riverine, lacustrine, and surface water flooding.

This standard requires that utilized data sources associated with each type of flooding be documented, and the stochastic flood event data sources be scientifically defensible. If other flood sub-perils are included, they are to be identified.

Relevant Forms:
- GF-2A, Meteorological/Hydrological Flood Standards Meteorologist Expert Certification
- GF-2B, Meteorological/Hydrological Flood Standards Hydrologist Expert Certification
- MHF-2, Coastal Flood Characteristics by Annual Exceedance Probability
- MHF-3, Inland Flood Characteristics by Annual Exceedance Probability
- AF-2, Total Flood Statewide Loss Costs
- SF-4, Average Annual Zero Deductible Statewide Flood Loss Costs – Historical versus Modeled

Disclosures

1. Specify relevant data sources, their release dates, and the time periods used to develop and implement flood frequencies for coastal and inland flooding into the flood model.

2. Where the flood model incorporates modification, partitioning, or adjustment of the historical data leading to differences between modeled climatological and historical data, justify each modification and describe how it is incorporated.

3. Describe any assumptions or calculations used in the flood model relating to future conditions (e.g., sea level rise, changes in precipitation patterns, changes in storm frequency or severity).

4. Provide citations to all data sources used to develop and support the land-use evaluation methodology, including publicly developed or peer reviewed information.

5. State whether the model includes flooding other than coastal and inland flooding. State whether the other flooding types are independent of the minimum required sub-perils of coastal and inland flooding.

6. Provide a completed Form MHF-2, Coastal Flood Characteristics by Annual Exceedance Probability, for coastal flooding, which includes data for flood extent and flood depth corresponding to modeled 0.1, 0.02, 0.01, and 0.002 annual exceedance probabilities. Provide a link to the location of the form [insert hyperlink here].

7. Provide a completed Form MHF-3, Inland Flood Characteristics by Annual Exceedance Probability, for inland flooding which includes data for flood extent and flood depth corresponding to modeled 0.1, 0.02, 0.01, and 0.002 annual exceedance probabilities. Provide a link to the location of the form [insert hyperlink here].

Audit

1. The modeling organization’s data sources will be reviewed.

2. Justification for any modification, partitioning, or adjustment to historical data and the impact on flood model parameters and characteristics will be reviewed.

3. Modeled frequencies will be compared with the observed spatial distribution of flood frequencies across Florida using methods documented in currently accepted scientific literature. The goodness-of-fit of modeled to historical statewide and regional coastal and inland flood frequencies as provided in Form MHF-2, Coastal Flood Characteristics by Annual Exceedance Probability, and Form MHF-3, Inland Flood Characteristics by Annual Exceedance Probability, will be reviewed.

4. Historical data used as the basis for the model’s flood extent/flow and elevation or depth will be reviewed. The appropriateness of the model’s stochastic flood extent/flow and elevation or depth with reference to the historical flood databases will be reviewed.

MHF-2 Flood Parameters (Inputs)

A. The flood model shall be developed with consideration given to flood parameters that are scientifically appropriate for modeling coastal and inland flooding. The modeling organization shall justify the use of all flood parameters based on information documented in currently accepted scientific literature.

B. Any differences in the treatment of flood parameters between historical and stochastic events shall be justified.

C. The land use and land cover (LULC) database shall be consistent with the National Land Cover Database (NLCD) 2006 or later. Use of alternate datasets shall be justified.

D. Treatment of soil effects on inland flooding shall be consistent with current scientific and technical literature.

E. The grid cell size used in the flood model shall be scientifically justified.

Purpose: This standard requires that the modeling organization use only scientifically sound information for determining coastal and inland flooding parameters. Flood parameters are inputs to the flood model and are needed by the model to define or determine the nature, severity, and physical characteristics associated with coastal and inland flooding.

This standard requires that the flood model be implemented consistently with contemporary soil categories and LULC distributions.

Note: The NLCD products are created by the Multi-Resolution Land Characteristics (MRLC) Consortium, a partnership of Federal agencies led by the U.S. Geological Survey (USGS), and are updated every five years.

This standard requires that any differences in the treatment of flood parameters between historical and stochastic flood events be justified.

Relevant Forms: GF-2A, Meteorological/Hydrological Flood Standards Meteorologist Expert Certification
GF-2B, Meteorological/Hydrological Flood Standards Hydrologist Expert Certification
SF-1, Distributions of Stochastic Flood Parameters (Coastal, Inland)

Disclosures

1. For coastal and inland flood model components, identify and justify the various flood parameters used in model.

2. For coastal and inland flood model components, describe the dependencies among model parameters and specify any assumed mathematical dependencies among these parameters.

3. For coastal and inland flood model components, describe the dependencies that exist among and between each of the model components.

4. Identify whether physical flood parameters are modeled as random variables, functions, or fixed values for the stochastic flood event generation. Provide rationale for the choice of parameter representations.

5. Describe if and how any physical flood parameters are treated differently in the historical and stochastic flood event sets and provide rationale.

6. For coastal flood analyses, describe how the coastline is segmented (or partitioned) in determining the parameters for flood frequency used in the flood model.

7. For coastal flooding, describe how astronomical tides are incorporated and combined with storm surge to obtain storm tide.

8. For inland flood analyses associated with riverine and lacustrine flooding, describe how the rivers, lakes, and associated floodplains are segmented (or partitioned) in determining the parameters for flood frequency used in the flood model.

9. For inland flood analyses associated with surface water flooding, describe how the affected area is segmented (or partitioned) in determining the parameters for flood frequency used in the flood model.

10. Describe how any flood parameters change or evolve during an individual flood life cycle (e.g., the functional representation of Manning's roughness varying with flood depth).

11. Describe any assumptions or calculations used in the flood model relating to antecedent conditions (e.g., groundwater levels, lake levels, river discharges, tides, soil moisture).

12. For coastal modeling, describe any assumptions or calculations for wave setup (wave radiation stress) and their impact on storm tide stillwater elevations.

13. Provide the grid resolution or other area partitioning used to model the flood extent and depth and how the hydrological characteristics are determined on these scales.

14. Provide the source, resolution, and accuracy of the topography and bathymetry throughout the flood model domain. Provide the grid cell size(s) used in the flood model.

15. Describe in detail the methods by which ground elevation data at the insured exposure location (e.g., building) is associated with ZIP Code and address databases referenced in Standard GF-3, Insured Exposure Location, and how this associated data is used in the flood model.

16. Describe any assumptions or calculations used in the flood model relating to flood-induced erosion or topographic changes.

17. Describe the methods used to account for soil infiltration and percolation rates and soil moisture condition in the flood model, as applicable. Provide citations to all data sources used to develop and support the soil infiltration and percolation rate or soil moisture condition methodology, including publicly developed or peer reviewed information.

18. Provide the collection and publication dates of the soil and LULC data used in the flood model, and justify the data's applicability and timeliness for Florida.

19. Describe the methodology used to convert LULC information into a spatial distribution of hydrological parameters, including roughness coefficients, throughout the flood model domain.

20. For each parameter used in the flood model, provide the horizontal and vertical projection and datum references, if applicable. If any horizontal or vertical datum conversions are required, provide conversion factors and describe the conversion methodology utilized.

Audit

1. All flood parameters used in the flood model will be reviewed.

2. Graphical depictions of flood parameters as used in the flood model will be reviewed. Descriptions and justification of the following will be reviewed:
    a. The dataset basis for any fitted distributions, the methods used, and any smoothing techniques employed,
    b. The modeled dependencies among correlated parameters in the flood model and how they are represented,
    c. The dependencies between the coastal and inland flooding analyses.

3. Scientific literature cited in Standard GF-1, Scope of the Flood Model and Its Implementation, may be reviewed to determine applicability.

4. The initial conditions for each flood event and how the flood event is initialized in an individual event calculation will be reviewed.

5. Any modeling organization specific research performed to develop the soil infiltration and percolation rates or soil moisture conditions used in the flood model will be reviewed, if applicable. The databases used will be reviewed in the context of the cited scientific literature.

6. Any modeling organization specific methodology used to incorporate LULC information into the food model will be reviewed. The databases used will be reviewed in the context of the cited scientific literature.

MHF-3 Wind and Pressure Fields for Storm Surge

A. Modeling of wind and pressure fields shall be employed to drive storm surge models due to tropical cyclones.

B. Modeling of wind and pressure fields shall be employed to drive storm surge models due to non-tropical cyclones, unless non-tropical storm surge effects are otherwise incorporated into the flood model results. Exclusion of non-tropical cyclone storm surge effects shall be scientifically justified.

C. The wind and pressure fields shall be based on contemporary scientific literature or developed using scientifically defensible methods.

D. Wind and pressure fields that drive coastal flood models shall be modeled for a time period that extends from at least before the storm's passage over the continental shelf waters of Florida and adjacent states to at least the time the storm no longer affects coastal flooding in Florida.

E. The features of modeled wind and pressure fields shall be consistent with those of historical storms affecting Florida.

Purpose: Wind is the dominant feature of tropical cyclones that drives storm surge and storm surge is frequently the dominant component of the associated flooding. The representation of the windfield and related pressure field is, therefore, crucial to storm surge modeling, as is the propagation of these fields along storm tracks, which determines their duration over ocean waters relevant for surges affecting Florida. This standard requires that the wind and pressure fields used to drive storm surge as part of the flood model are scientifically sound and have been evaluated using comparison to historical storms affecting Florida. Non-tropical cyclones need not be explicitly modeled with wind and pressure fields. However, the standard requires that either their effects be incorporated in the flood model results or their exclusion be justified.

Relevant Forms: GF-2A, Meteorological/Hydrological Flood Standards Meteorologist Expert Certification
GF-2B, Meteorological/Hydrological Flood Standards Hydrologist Expert Certification
AF-2, Total Flood Statewide Loss Costs

Disclosures

1. Describe the modeling of the wind and pressure fields for tropical cyclones. State and justify the choice of the parametric forms and the parameter values.

2. Describe the modeling of the wind and pressure fields for non-tropical cyclones, if implemented.

3. Provide the historical data used to estimate parameters and to develop stochastic storm sets.

4. Provide a rotational (*y*-axis) versus radial (*x*-axis) plot of the average or default wind and pressure fields for tropical cyclones. Provide such plots for non-tropical cyclones, if non-tropical cyclones are modeled explicitly.

5. Describe how the parametric windfields are translated to surface windfields used for storm surge development (e.g., numerically via planetary boundary layer models or parametrically via empirical surface wind reduction factors and inflow angles). Discuss the associated uncertainties.

6. Describe how storm translation is accounted for when computing surface windfields.

7. Describe and justify the averaging of observational windspeeds for use in the storm surge model.

Audit

1. All external data sources that affect the modeled wind and pressure fields associated with storm surge will be identified and their appropriateness reviewed.

2. Calibration and evaluation of wind and pressure fields will be reviewed. Accepted scientific comparisons of simulated wind and pressure fields to historical storms will be reviewed.

3. The sensitivity of flood extent and depth results to changes in the representation of wind and pressure fields will be reviewed.

4. The over-land evolution of simulated wind and pressure fields and its impact on the simulated flooding will be reviewed.

5. The derivation of surface water wind stress from surface windspeed will be reviewed. If a sea-surface drag coefficient is employed, how it is related to the surface windspeed will be reviewed. A comparison of the sea-surface drag coefficient to coefficients from the scientific literature will be reviewed.

6. The treatment of uncertainty in the factors used to convert from a reference windfield to a geographic distribution of surface winds and the impact of the resulting winds upon the storm surge will be reviewed and compared with currently accepted scientific literature.

MHF-4 Flood Characteristics (Outputs)

A. Flood extent and depth generated by the flood model shall be consistent with observed historical floods affecting Florida.

B. Methods for deriving flood extent and depth shall be scientifically defensible and technically sound.

C. Methods for deriving wave conditions in coastal flooding shall be scientifically defensible and technically sound.

D. Modeled flood characteristics shall be sufficient for the calculation of flood damage.

Purpose: This standard requires that the modeling organization use scientifically sound information for determining inland and coastal flooding characteristics.

This standard requires that the resulting surface flood extent, depth, and other characteristics be representative of historical floods in Florida.

This standard requires that comparison of flood characteristics produced by the stochastic flood events and historical flood events be documented and variations justified.

Relevant Forms:
- GF-2A, Meteorological/Hydrological Flood Standards Meteorologist Expert Certification
- GF-2B, Meteorological/Hydrological Flood Standards Hydrologist Expert Certification
- MHF-1, Historical Event Flood Extent and Elevation or Depth Validation Maps
- MHF-2, Coastal Flood Characteristics by Annual Exceedance Probability
- MHF-3, Inland Flood Characteristics by Annual Exceedance Probability
- AF-2, Total Flood Statewide Loss Costs

Disclosures

1. Provide comparisons of the modeled and historical flood extents and elevations or depths for the following storm events: Hurricane Andrew (1992), Hurricane Ivan (2004), Hurricane Jeanne (2004), Hurricane Wilma (2005), Tropical Storm Fay (2008), Unnamed storm in East Florida (May 2009), Unnamed storm on Panhandle (July 2013), and one additional Florida storm of the modeling organization's choosing. For whichever storms data are not available, the modeling organization may substitute an alternate historical storm of their choosing. Describe and justify the appropriateness of the databases used in the flood extent and elevation or depth validations.

2. Demonstrate that the coastal flood and inland flood model components each incorporate flood parameters necessary for simulating flood damage. Demonstrate that each of these flood model components accommodate the varied geographic, geologic, hydrologic, hydraulic, and LULC conditions in Florida. Provide justification for validation using any historical events not specified in Disclosure 1.

3. For each of the coastal storm events in Disclosure 1, provide a comparison of the Envelope of High Water (EOHW) to NOAA's Sea, Lake, and Overland Surges from Hurricanes (SLOSH), if such data are available.

4. For each of the storm events in Disclosure 1 resulting in inland flooding, provide a comparison of the modeled flood peak flow with recorded flow data from selected United States Geological Survey (USGS) or Florida Water Management District (FWMD) gaging stations. Provide the rationale for gaging station selections.

5. Provide a map comparing simulated water elevations or depths to observed water elevations or depths for each storm event in Disclosure 1.

6. For coastal flooding, describe how the flood model accounts for wave generation and decay, wave breaking, wave runup, and other wave effects.

7. Identify all hydrological variables that affect the flood extent, depth, and other flood characteristics.

8. For inland and coastal modeling, state if and describe how the flood model accounts for flood velocity, flood duration, flood-induced erosion, floodborne debris, salinity (saltwater versus freshwater flooding), contaminated floodwaters, and the likelihood of mold following flooding.

9. Describe the effect of any assumptions or calculations relating to antecedent conditions on the flood characteristics.

10. Disclose if and how the coincidence and interaction of inland and coastal flooding is modeled. If it is not, then provide justification.

11. Describe and provide visual depictions of how the characteristics of each flood model component are utilized in or interface with the other components.

12. Demonstrate the consistency of the modeled flood extent and elevation or depth with observed floods affecting Florida. Describe and justify the appropriateness of the databases used in the flood extent and elevation or depth validations.

13. Describe any variations in the treatment of the flood model flood extent and elevation or depth for stochastic versus historical floods and justify this variation.

14. Provide a completed Form MHF-1, Historical Event Flood Extent and Elevation or Depth Validation Maps. Explain any differences between modeled flood extent and elevation or depth and historical flood extent and elevation or depth. Provide a link to the location of the form [insert hyperlink here].

Audit

1. The method and supporting material for determining flood extent and elevation or depth for coastal and inland flooding will be reviewed.

2. Any modeling organization specific research performed to calculate the flood extent and depth and wave conditions will be reviewed along with the associated databases.

3. Any modeling organization specific research performed to derive the hydrological characteristics associated with the topography, soil conditions, and LULC distributions for the flood extent and depth will be reviewed.

4. The flood parameters used in calculating the flood loss costs for the historical flood events given in Disclosure 1 will be reviewed. Calculations based on flood model results for coastal and inland flooding, specification of flood parameters (including temporal and/or spatial variation where applicable) used in the flood model for all storm events, and the resulting temporal and spatial distributions of any flood characteristics contributing to flood damage will be reviewed. These will be reviewed with Form AF-2, Total Flood Statewide Loss Costs.

5. Time-based contour animations (capable of being paused) to demonstrate scientifically reasonable temporal evolution of flood characteristics will be reviewed. (Trade Secret item to be provided during the closed meeting portion of the Commission meeting to review the flood model for acceptability.)

6. Comparisons of the flood peak flow calculated in the flood model with records from USGS or FWMD gaging stations will be reviewed.

7. Calculation of relevant characteristics in the flood model, such as flood extent, depth, and waves, will be reviewed. The methods by which each flood model component utilizes the characteristics of or interfaces with other flood model components, if applicable, will be reviewed.

8. The modeled coincidence and interaction of inland and coastal flooding will be reviewed. If it is not modeled, justification will be reviewed.

9. Form MHF-1, Historical Event Flood Extent and Elevation or Depth Validation Maps, will be reviewed.

10. The comparison of the calculated characteristics with historical flood events will be reviewed. The selected locations and corresponding storm events will be reviewed to verify sufficient representation of the varied geographic areas. If a single storm is used for both coastal and inland flooding validation, then its appropriateness will be reviewed.

11. The comparison of the EOHW to NOAA’s SLOSH, if such data are available, will be reviewed.

MHF-5 Flood Probability Distributions

A. Flood probability, its geographic variation, and the associated flood extent and elevation or depth shall be scientifically defensible and shall be consistent with flooding observed for Florida.

B. Flood probability distributions for storm tide affected areas shall include tropical, and if modeled, non-tropical events.

C. Probability distributions for coastal wave conditions, if modeled, shall arise from the same events as with storm tide modeling.

D. Any additional probability distributions of flood parameters and modeled characteristics shall be consistent with historical floods for Florida resulting from coastal and inland flooding.

Purpose: This standard requires that the probability of occurrence of floods and associated flood extent and elevation or depth reasonably reflect the historical record with respect to geographical locations. This standard addresses consideration of rainfall events in adjacent states that could result in flooding in Florida (e.g., rainfall in the Chattahoochee River watershed in North Georgia contributes to Apalachicola River flooding).

This standard requires that the probability of occurrence of flood extent and elevation or depth be determined by combining storm tide from tropical and non-tropical events unless justification is provided for the exclusion of non-tropical events. Such combination can be through explicit modeling of both types of events, or by statistically combining non-tropical flood frequency information with explicitly modeled tropical event flood frequency.

This standard requires that the probability distributions of flood parameters not treated as constants and modeled characteristics be consistent with those documented in official meteorological and hydrological databases. Consistent means that spatial distributions of modeled flood probabilities accurately depict coastal and inland flooding in Florida.

Relevant Forms:
- GF-2A, Meteorological/Hydrological Flood Standards Meteorologist Expert Certification
- GF-2B, Meteorological/Hydrological Flood Standards Hydrologist Expert Certification
- MHF-2, Coastal Flood Characteristics by Annual Exceedance Probability
- MHF-3, Inland Flood Characteristics by Annual Exceedance Probability
- AF-2, Total Flood Statewide Loss Costs
- SF-1, Distributions of Stochastic Flood Parameters (Coastal, Inland)

Disclosures

1. List assumptions used in creating the database(s) containing flood parameters and characteristics.

2. Describe how non-tropical and tropical event coastal storm tide flood probability distributions are combined, if applicable. Provide an example demonstrating the process.

3. Provide the rationale for each of the probability distributions used for relevant flood parameters and characteristics.

4. Demonstrate that simulated flood extent and elevation or depth frequencies are consistent with historical frequencies.

Audit

1. The consistency in accounting for similar flood parameters and characteristics across Florida and segments in adjacent states will be reviewed.

2. The method and supporting material for generating stochastic coastal and inland flood events will be reviewed.

3. Any modeling organization specific research performed to develop the functions used for simulating flood model characteristics and to develop flood databases will be reviewed.

4. Form SF-1, Distributions of Stochastic Flood Parameters (Coastal, Inland), will be reviewed for the probability distributions and data sources.

5. Comparisons of modeled flood probabilities and characteristics for coastal and inland flooding against the available historical record will be reviewed. Modeled probabilities from any subset, trend, or fitted function will be reviewed, compared, and justified against this historical record. In the case of partitioning, modeled probabilities from the partition and its complement will be reviewed and compared with the complete historical record.

MHF-6 Modeling of Major Flood Control Measures

A. The flood model's treatment of major flood control measures and spatial variation in performance shall be consistent with historical records and with current state-of-the-science.

B. The modeling organization shall have a documented procedure for reviewing available flood control data and shall update the flood model control databases as necessary.

C. Treatment of the potential failure of major flood control measures shall be based upon currently accepted scientific literature, empirical studies, or engineering analyses.

Purpose: This standard requires that major flood control measures are accounted for and updated as necessary. It also requires that any treatment of the potential failure of major flood control measures properly reflects the scientific and engineering basis.

Flood control measures are those measures undertaken outside the building footprint and on a larger scale, to reduce the presence, depth or energy of flow or waves that affect personal residential structures. Major flood control measures may include, but not be limited to location, dimensions, and strength of dams, levees, and floodwalls.

Relevant Forms: GF-2A, Meteorological/Hydrological Flood Standards Meteorologist Expert Certification
GF-2B, Meteorological/Hydrological Flood Standards Hydrologist Expert Certification

Disclosures

1. List the flood control measures incorporated in the flood model and the sources of all data employed.

2. Describe the methodology to account for flood control measures in the flood model and indicate if these measures can be set (either to on or off) in the flood model.

3. Describe if and how flood control measures that require human intervention are incorporated into the flood model.

4. Provide an example of the flood extent and depth showing the potential impact of major flood control measure failure.

5. Describe and justify the methodology used to account for the potential failure or alteration of major flood control measures in the flood model and if the level of failure can be adjusted in the flood model.

Audit

1. Treatment of major flood control measures incorporated in the flood model will be reviewed.

2. The documented procedure addressing the updating of major flood control measures as necessary will be reviewed.

3. The methodology and justification used to account for the potential failure or alteration of major flood control measures in the flood model will be reviewed.

4. Examples of flood extent and depth showing the potential impact of major flood control measure failure will be reviewed.

5. If the flood model incorporates flood control measures that require human intervention, the methodology used in the flood model will be reviewed.

MHF-7 Logical Relationships Among Flood Parameters and Characteristics

A. Water surface elevation shall increase with increasing terrain roughness, all other factors held constant, if applicable.

B. Rate of discharge shall increase with increase in steepness in the topography, all other factors held constant.

C. Inland flood extent and depth associated with riverine and lacustrine flooding shall increase with increasing discharge, all other factors held constant.

D. The coincidence of storm tide and inland flooding shall not decrease the flood extent and depth, all other factors held constant.

E. Storm surge shall increase with greater over-water storm size, as measured by the area enclosed by threshold windspeed or pressure contours, all other factors held constant.

F. Storm surge shall increase with shallower bathymetry, all other factors held constant.

G. Maximum storm surge height shall increase with increasing onshore windspeeds, all other factors held constant.

H. Heights of locally generated coastal waves shall increase with increasing windspeed, subject to depth, fetch, and wind duration limits, all other factors held constant, if applicable.

Purpose: This standard requires that the relationships among the parameters and characteristics of the flood model are logically consistent.

Relevant Forms: GF-2A, Meteorological/Hydrological Flood Standards Meteorologist Expert Certification
GF-2B, Meteorological/Hydrological Flood Standards Hydrologist Expert Certification

Disclosures

1. Provide a sample graph of water surface elevation and discharge versus time associated with inland flooding for modeling organization defined locations within each region in Florida defined in *Figure 1*: Panhandle, North Florida, East Florida, Southeast Florida, and Southwest Florida. Discuss how the flood characteristics exhibit logical relationships.

2. Provide sample plots and tabulations of storm tide elevations and associated wave conditions, if applicable, at Atlantic Ocean, Gulf of Mexico, and bay/estuarine locations around the Florida coastline. The number of examples should be sufficient to demonstrate logical relationships with geographic, oceanographic, hydraulic, and meteorological conditions.

3. Describe the analysis performed in order to demonstrate the logical relationships in this standard.

Audit

1. The analysis performed to demonstrate the logical relationships will be reviewed.

2. Methods (including any software) used in verifying the logical relationships will be reviewed.

Form MHF-1: Historical Event Flood Extent and Elevation or Depth Validation Maps

Purpose: This form illustrates the flood model's ability to simulate historical flood events.

A. Provide color-coded contour maps with appropriate base map data illustrating modeled flood extents and depths for the following historical Florida flood events:

Hurricane Andrew (1992)
Hurricane Ivan (2004)
Hurricane Jeanne (2004)
Hurricane Wilma (2005)
Tropical Storm Fay (2008)
Unnamed Storm in East Florida (May 2009)
Unnamed Storm on Panhandle (July 2013)
Storm chosen by modeling organization

If data are not available, the modeling organization may substitute a historical storm of their choosing.

B. Provide corresponding color-coded contour maps with modeled flood elevations or depths for each of the historical events, contoured at no more than one foot intervals. Explain the procedures for converting flood elevation contours to depth contours.

Elevation datum shall be North American Vertical Datum of 1988 (NAVD88).

Plot the locations and values associated with validation points (maximum flood elevations or depths from observations such as gage data, water marks, etc.) on each contour map for the historical events.

Provide sources of the validation data.

Provide the resolution of the model elevation or depth grid used on each contour map.

Demonstrate the consistency of the modeled flood extent and elevation or depth with observed flood extent and elevation or depth for each historical event.

C. Explain any differences between the modeled flood extent and elevation or depth and the historical floods observations. Include an explanation if the differences are impacted by flood control measures.

D. Include Form MHF-1, Historical Event Flood Extent and Elevation or Depth Validation Maps, in a submission appendix.

Form MHF-2: Coastal Flood Characteristics by Annual Exceedance Probability

Purpose: This form illustrates the simulations of key coastal flood characteristics at a range of locations and annual exceedance probabilities.

Define one study area subject to coastal flooding within each of five Florida geographic regions (see *Figure 1*): Panhandle, North Florida, East Florida, Southeast Florida, and Southwest Florida. The extent of each study area shall be determined by the modeling organization and shall be large enough to encompass at least one county. The modeling organization shall create the underlying grid for this form.

Provide, for each study area, 1) summary maps, and 2) graphs or tables, based on the underlying gridded data, for the following:

A. Flood extent and flood depth corresponding to modeled 0.1, 0.02, 0.01, and 0.002 annual exceedance probabilities. Flood extent and flood depth shall incorporate 1) wave effects, if modeled, and 2) the effects of erosion, if modeled.

B. If applicable, wave conditions associated with flood extents and flood depths in A. above.

C. If the vulnerability model requires explicit representation of flood-induced erosion effects, the depth of erosion (original ground elevation minus eroded ground elevation) corresponding to modeled 0.1, 0.02, 0.01, and 0.002 annual exceedance probabilities.

D. If the vulnerability model requires explicit representation of flow velocity effects, the flow velocity corresponding to modeled 0.1, 0.02, 0.01, and 0.002 annual exceedance probabilities.

E. If the vulnerability model requires explicit representation of flood inundation duration effects, the duration of flood inundation corresponding to modeled 0.1, 0.02, 0.01, and 0.002 annual exceedance probabilities.

F. Include Form MHF-2, Coastal Flood Characteristics by Annual Exceedance Probability, in a submission appendix.

Form MHF-3: Inland Flood Characteristics by Annual Exceedance Probability

Purpose: This form illustrates the simulations of key inland flood characteristics at a range of locations and annual exceedance probabilities.

Define one study area subject to inland flooding within each of five Florida geographic regions (see *Figure 1*): Panhandle, North Florida, East Florida, Southeast Florida, and Southwest Florida. The extent of each study area shall be determined by the modeling organization and shall be large enough to encompass at least one county. The modeling organization shall create the underlying grid for this form.

Provide, for each study area, 1) summary maps, and 2) graphs or tables, based on the underlying gridded data, for the following:

A. Flood extent and flood depth corresponding to modeled 0.1, 0.02, 0.01, and 0.002 annual exceedance probabilities. Flood extent and flood depth shall incorporate the effects of erosion, if modeled. For locations subject to both inland and coastal flooding, this information should reflect only inland flooding.

B. If the vulnerability model requires explicit representation of flood-induced erosion effects, the depth of erosion (original ground elevation minus eroded ground elevation) corresponding to modeled 0.1, 0.02, 0.01, and 0.002 annual exceedance probabilities.

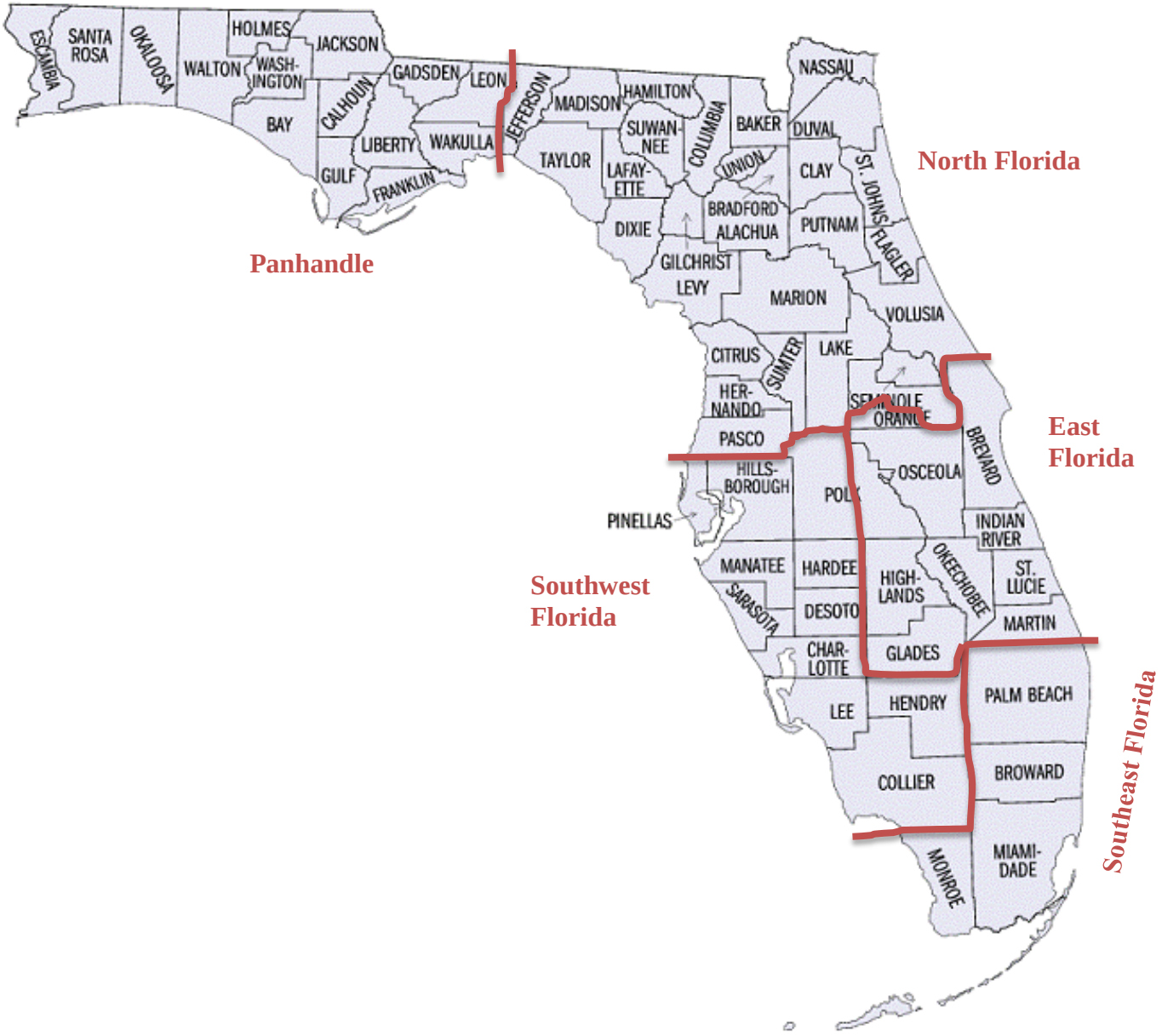
C. If the vulnerability model requires explicit representation of flow velocity effects, the flow velocity corresponding to modeled 0.1, 0.02, 0.01, and 0.002 annual exceedance probabilities.

D. If the vulnerability model requires explicit representation of flood inundation duration effects, the duration of flood inundation corresponding to modeled 0.1, 0.02, 0.01, and 0.002 annual exceedance probabilities.

E. Include Form MHF-3, Inland Flood Characteristics by Annual Exceedance Probability, in a submission appendix.

Figure 1

State of Florida
By Region



STATISTICAL FLOOD STANDARDS

SF-1 Modeled Results and Goodness-of-Fit

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

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

Purpose: Many aspects of flood model development and implementation involve fitting a probability distribution to historical data for use in generating stochastic floods. Such fitted models must be checked to ensure that the distributions are reasonable. The chi-square goodness-of-fit test may not be sufficiently rigorous for demonstrating the reasonableness of models of historical data.

This standard explicitly requires the modeling organization to have the results of data fitting with probability distributions available for the flood model assessments. Also, this standard requires the production of graphical and numerical statistical summaries by the modeling organization in advance of an on-site review (which could have the desirable effect in a self-audit of identifying potential problem areas).

Relevant Forms:
- GF-3, Statistical Flood Standards Expert Certification
- MHF-1, Historical Event Flood Extent and Elevation or Depth Validation Maps
- SF-1, Distributions of Stochastic Flood Parameters (Coastal, Inland)
- SF-2, Examples of Flood Loss Exceedance Estimates (Coastal and Inland Combined)
- SF-3, Validation Comparisons
- SF-4, Average Annual Zero Deductible Statewide Flood Loss Costs – Historical versus Modeled

Disclosures

1. Provide a completed Form SF-1, Distributions of Stochastic Flood Parameters (Coastal, Inland). Identify the form of the probability distributions used for each function or variable, if applicable. Identify statistical techniques used for estimation and the specific goodness-of-fit tests applied along with the corresponding *p*-values. Describe whether the fitted distributions provide a reasonable agreement with the historical data. Provide a link to the location of the form [insert hyperlink here].

2. Describe the nature and results of the tests performed to validate the flood extent/flow and elevations or depths generated, and in the case of coastal flooding, to validate wave conditions, if applicable.

3. Provide the date of loss of the insurance claims data used for validation and verification of the flood model.

4. Provide an assessment of uncertainty in flood probable maximum loss levels and in flood loss costs for output ranges using confidence intervals or other accepted scientific characterizations of uncertainty.

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

6. Provide graphical comparisons of modeled and historical data and goodness-of-fit tests. Examples to include are flood frequencies, flood extent and elevations or depths, and damage.

7. Provide a completed Form SF-2, Examples of Flood Loss Exceedance Estimates (Coastal and Inland Combined). Provide a link to the location of the form [insert hyperlink here].

Audit

1. Forms SF-1, Distributions of Stochastic Flood Parameters (Coastal, Inland), and SF-2, Examples of Flood Loss Exceedance Estimates (Coastal and Inland Combined), will be reviewed. Justification for the distributions selected, including for example, citations to published literature or analyses of specific historical data, will be reviewed.

2. The modeling organization's characterization of uncertainty for flood extent and depth, damage estimates, annual flood loss, flood probable maximum loss levels, and flood loss costs will be reviewed.

SF-2 Sensitivity Analysis for Flood Model Output

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 shall have taken appropriate action.

Purpose: Sensitivity analysis goes beyond mere quantification of the magnitude of the output (e.g., flood extent and depth, flood loss cost) by identifying and quantifying the input variables that impact the magnitude of the output when the input variables are varied simultaneously. The simultaneous variation of all input variables enables the modeling organization to detect interactions and to properly account for correlations among the input variables. Neither of these goals can be achieved by using one-factor-at-a-time variation; hence, such an approach to sensitivity analysis does not lead to an understanding of how the input variables jointly affect the flood model output. The simultaneous variation of the input variables is an important diagnostic tool and provides needed assurance of the robustness and viability of the flood model output.

Relevant Form: GF-3, Statistical Flood Standards Expert Certification

Disclosures

1. Identify the most sensitive aspects of the flood model and the basis for making this determination.

2. Identify other input variables that impact the magnitude of the output when the input variables are varied simultaneously. Describe the degree to which these sensitivities affect output results and illustrate with an example.

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

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

Audit

1. The modeling organization's sensitivity analysis for the flood model will be reviewed in detail. Statistical techniques used to perform sensitivity analysis will be reviewed. The results of the sensitivity analysis displayed in graphical format (e.g., contour plots with temporal animation) will be reviewed.

SF-3 Uncertainty Analysis for Flood Model Output

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

Purpose: Modeling organizations have traditionally quantified the magnitude of the uncertainty in the output (e.g., flood extent and depth, flood loss cost) through a variance calculation or by use of confidence intervals. While these statistics provide useful information, uncertainty analysis goes beyond a mere quantification of these statistics by quantifying the expected percentage reduction in the variance of the output that is attributable to each of the input variables. Identification of those variables that contribute to the uncertainty is the first step that can lead to a reduction in the uncertainty in the output. It is important to note that the key input variables identified in an uncertainty analysis are not necessarily the same as those in a sensitivity analysis nor are they necessarily in the same relative order. As with sensitivity analysis, uncertainty analysis is an important diagnostic tool and provides needed assurance of the robustness and viability of the flood model output.

Relevant Form: GF-3, Statistical Flood Standards Expert Certification

Disclosures

1. Identify the major contributors to the uncertainty in flood 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.

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

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

Audit

1. The modeling organization's uncertainty analysis for the flood model will be reviewed in detail. Statistical techniques used to perform uncertainty analysis will be reviewed. The results of the uncertainty analysis displayed in graphical format (e.g., contour plots with temporal animation) will be reviewed.

SF-4 Flood Model Loss Cost Convergence by Geographic Zone

At a modeling organization determined level of aggregation utilizing a minimum of 30 geographic zones encompassing the entire state, the contribution to the error in flood loss cost estimates attributable to the sampling process shall be negligible for each of the modeled coastal and inland flooding components.

Purpose: The intent of this standard is to ensure that sufficient runs of the simulation have been made or a suitable sampling design invoked so that the contribution to the error of the flood loss cost estimates due to its probabilistic nature is negligible considering the computational effort involved. To be negligible, the standard error of flood loss cost estimator within each identified geographic zone is suggested to be less than 5% of the flood loss cost estimate unless otherwise justified.

Relevant Form: GF-3, Statistical Flood Standards Expert Certification

Disclosure

1. Describe the sampling plan used to obtain the average annual flood loss costs and output ranges for each of coastal and inland flooding. For a direct Monte Carlo simulation, indicate steps taken to determine sample size. For an importance sampling design or other sampling scheme, describe the underpinnings of the design and how it achieves the required performance.

Audit

1. An exhibit of the standard error by geographic zone will be reviewed.

SF-5 Replication of Known Flood Losses

The flood model shall estimate incurred flood losses in an unbiased manner on a sufficient body of past flood events, including the most current data available to the modeling organization. This standard applies to personal residential exposures. Personal residential loss experience may be used to replicate personal residential structure-only and personal residential contents-only flood losses. The replications shall be produced on an objective body of flood loss data by county or an appropriate level of geographic detail.

Purpose: This standard applies to severity or the combined effects of flood extent and depths, personal residential flood vulnerability functions, and insurance flood loss limitations. To the extent possible, each of the three functions of flood extent and depth, personal residential flood vulnerability, and flood insurance are required to be separately tested and verified.

Given a past flood event and a book of insured properties at the time of the flood event, the flood model is required to be able to provide expected flood losses.

Relevant Forms: GF-3, Statistical Flood Standards Expert Certification
SF-3, Validation Comparisons

Disclosures

1. Describe the nature and results of the analyses performed to validate the flood loss projections generated for personal residential losses. Include analyses for the events indicated in Standard MHF-4, Flood Characteristics (Outputs), Disclosure 1.

2. Provide a completed Form SF-3, Validation Comparisons. Provide a link to the location of the form [insert hyperlink here].

Audit

1. The following information for each flood event will be reviewed:
    a. The validity of the flood model assessed by comparing projected flood losses produced by the flood model to actual observed flood losses incurred by insurers at both the state and county level,
    b. The version of the flood model used to calculate modeled flood losses for each flood event provided,
    c. A general description of the data and its sources,
    d. A disclosure of any material mismatch of exposure and flood loss data problems, or other material consideration,
    e. The date of the exposures used for modeling and the date of the flood event,

f. An explanation of differences in the actual and modeled flood parameters,
g. A listing of the departures, if any, in the flood extent and elevations or depths (and in the case of coastal flooding, wave conditions) applied to a particular flood event for the purpose of validation and the flood extent and elevations or depths (and wave conditions) used in the flood model under consideration,
h. The type of coverage applied in each flood event to address:
    (1) Personal residential structures
    (2) Manufactured homes
    (3) Condominiums
    (4) Contents
    (5) Time element,
i. The treatment of demand surge or loss adjustment expenses in the actual flood losses or the modeled flood losses,
j. The treatment of wind losses in the actual flood losses or the modeled flood losses.

2. The following documentation will be reviewed:
    a. Publicly available documentation referenced in the submission in hard copy or electronic form,
    b. The data sources excluded from validation and the reasons for excluding the data from review by the Commission (if any),
    c. An analysis that identifies and explains anomalies observed in the validation data,
    d. User input data for each insurer and flood event detailing specific assumptions made with regard to exposed personal residential property.

3. The confidence intervals used to gauge the comparison between historical and modeled flood losses will be reviewed.

4. Form SF-3, Validation Comparisons, will be reviewed.

5. The results for more than one flood event will be reviewed to the extent data are available.

SF-6 Comparison of Projected Flood Loss Costs

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

Purpose: This standard requires various demonstrations that the differences between historical and modeled annual average statewide flood loss costs are plausible from a statistical perspective.

Relevant Forms: GF-3, Statistical Flood Standards Expert Certification
SF-4, Average Annual Zero Deductible Statewide Flood Loss Costs – Historical versus Modeled

Disclosures

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

2. Identify and justify differences, if any, in how the flood model produces flood loss costs for specific historical events versus flood loss costs for events in the stochastic flood event data sources.

3. Provide a completed Form SF-4, Average Annual Zero Deductible Statewide Flood Loss Costs – Historical versus Modeled. Provide a link to the location of the form [insert hyperlink here].

Audit

1. Justification for the following will be reviewed:
    a. Meteorological/Hydrological parameters,
    b. The departures, if any, from the flood extent and depths, coastal wave conditions, personal residential flood vulnerability functions, or flood insurance functions applied to the actual flood events for the purposes of this test and those used in the flood model under consideration,
    c. Exposure assumptions.

Form SF-1: Distributions of Stochastic Flood Parameters (Coastal, Inland)

Purpose: This form identifies the probability distributions used in the coastal and inland flooding model and provides their justification.

Provide the probability distribution functional form used for each stochastic flood parameter in the flood model (one each for coastal and inland flooding). Provide a summary of the justification for each functional form selected for each general classification. Specify the relevant classification (coastal or inland) for each distribution.

Include Form SF-1, Distributions of Stochastic Flood Parameters (Coastal, Inland), in a submission appendix.

Stochastic Flood Parameter (Function or Variable)/ (Coastal or Inland)										
Functional Form of Distribution										
Data Source										
Year Range Used										
Justification for Functional Form										

Form SF-2: Examples of Flood Loss Exceedance Estimates (Coastal and Inland Combined)

Purpose: This form illustrates the modeling organization's ability of obtaining flood loss exceedance estimates for coastal and inland losses combined.

Provide estimates of the aggregate personal residential insured flood losses for various probability levels using a modeling organization specified, predetermined, and comprehensive exposure dataset justified by the modeling organization. Provide the total average annual flood loss for the loss exceedance distribution. If the modeling methodology does not allow the flood model to produce a viable answer, state so and why.

Include Form SF-2, Examples of Flood Loss Exceedance Estimates (Coastal and Inland Combined), in a submission appendix.

Part A

Return Period (years)	Annual Probability of Exceedance	Estimated Flood Loss Modeling Organization Exposure Dataset
Top Event	N/A	_____
10,000	0.0001	_____
5,000	0.0002	_____
2,000	0.0005	_____
1,000	0.0010	_____
500	0.0020	_____
250	0.0040	_____
100	0.0100	_____
50	0.0200	_____
20	0.0500	_____
10	0.1000	_____
5	0.2000	_____

Part B

Mean (Total Average Annual Flood Loss)	_____
Median	_____
Standard Deviation	_____
Interquartile Range	_____
Sample Size	_____

Form SF-3: Validation Comparisons

Purpose: This form illustrates the differences between actual and modeled flood losses for a set of five comparisons of the modeling organization's choosing.

A. Provide five validation comparisons of actual personal residential exposures and flood loss to modeled exposures and flood loss. Provide these comparisons by line of insurance, construction type, policy coverage, county or other level of similar detail in addition to total flood losses. Include flood 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 flood. This would include exposures for policies that did not have a flood loss. If this is not available, use exposures for only those policies that had a flood loss. Specify which was used. Also, specify the name of the flood event compared.

B. Provide a scatter plot of modeled versus historical flood losses for each of the required flood validation comparisons. (Plot the historical flood losses on the *x*-axis and the modeled flood losses on the *y*-axis.)

C. Include Form SF-3, Validation Comparisons, in a submission appendix.

Rather than using a specific published flood extent and depth directly, the flood elevation and wave action underlying the modeled flood loss cost calculations must be produced by the flood model being evaluated and should be the same flood parameters as used in completing Form AF-2, Total Flood Statewide Loss Costs.

Example Formats for Personal Residential Flood Loss:

Flood Event Description (name, location, and date of event) = _____
Exposure (Specify total exposure or flood loss only) = _____
Type (Specify Coastal, Inland, or Combination Coastal/Inland) = _____

Construction	Company Actual Flood Loss / Exposure	Modeled Flood Loss / Exposure	Difference
Wood Frame			
Masonry			
Other (specify)			
Total			

Flood Event Description (name, location, and date of event) = _____
Exposure (Specify total exposure or flood loss only) = _____
Type (Specify Coastal, Inland, or Combination Coastal/Inland) = _____

Coverage	Company Actual Flood Loss / Exposure	Modeled Flood Loss / Exposure	Difference
A			
B			
Time Element			
Total			

Form SF-4: Average Annual Zero Deductible Statewide Flood Loss Costs – Historical versus Modeled

Purpose: This form provides an illustration of flood loss costs for a specific set of floods on an exposure determined by the modeling organization.

A. Provide the average annual zero deductible statewide personal residential flood loss costs produced using the list of floods in Standard MHF-4, Flood Characteristics (Outputs), Disclosure 1, based on a modeling organization specified, predetermined, and comprehensive exposure dataset justified by the modeling organization as relevant for the purpose of comparing the modeled estimate of average annual zero deductible statewide personal residential flood loss costs.

Average Annual Zero Deductible Statewide Personal Residential Flood Loss Costs

Time Period	Historical Floods	Produced by Flood Model
Current Submission		

B. Provide a comparison with the statewide personal residential flood loss costs produced by the flood model on an average industry basis.

C. Provide a 95% confidence interval on the difference between the means of the historical and modeled personal residential flood losses and identify its basis.

D. If the data are partitioned or modified, provide the average annual zero deductible statewide personal residential flood loss costs for the applicable partition (and its complement) or modification, as well as the modeled average annual zero deductible statewide personal residential flood loss costs in additional copies of Form SF-4, Average Annual Zero Deductible Statewide Flood Loss Costs – Historical versus Modeled.

E. Include Form SF-4, Average Annual Zero Deductible Statewide Flood Loss Costs – Historical versus Modeled, in a submission appendix.

VULNERABILITY FLOOD STANDARDS

VF-1 Derivation of Personal Residential Structure Flood Vulnerability Functions

A. Development of the personal residential structure flood vulnerability functions shall be based on a combination of the following: (1) rational structural analysis, (2) post-event site investigations, (3) technical literature, (4) expert opinion, (5) laboratory or field testing, and (6) insurance claims data. Personal residential structure flood vulnerability functions shall be supported by historical and other relevant data.

B. The derivation of personal residential structure flood vulnerability functions and their associated uncertainties shall be theoretically sound and consistent with fundamental engineering principles.

C. Residential building stock classification shall be representative of Florida construction for personal residential structures.

D. The following flood characteristics shall be used in the derivation of personal residential structure flood vulnerability functions: depth above ground and wave action in coastal areas.

E. The following primary building characteristics shall be used or accounted for in the derivation of personal residential structure vulnerability functions: lowest floor elevation relative to ground, foundation type, construction materials, and year of construction.

F. Flood vulnerability functions shall be separately derived for personal residential building structures, manufactured homes, and appurtenant structures.

Purpose: Personal residential structure flood vulnerability functions are to account for both flood and building characteristics. This standard requires the development of personal residential flood vulnerability functions to be supported by historical or other relevant data.

The data and methods used to develop personal residential flood vulnerability functions, and their associated uncertainties, affect the modeled flood loss costs and flood probable maximum loss levels. Their development and documentation are essential parts of the flood model.

The adoption and enforcement of building codes and floodplain management regulations affect the flood vulnerability functions.

This standard allows insurance claims data used in personal residential flood vulnerability function development to include appropriate insurer or modeling organization adjustments that do not diminish the usefulness of the data.

Relevant Forms:
- GF-4, Vulnerability Flood Standards Structural/Hydraulic/Coastal Engineer Expert Certification
- VF-1, Hypothetical Coastal Flood Event with Damaging Waves
- VF-2, Hypothetical Inland Flood Event
- AF-1, Zero Deductible Personal Residential Flood Loss Costs
- AF-5, Logical Relationship to Flood Risk (Trade Secret item)

Disclosures

1. Provide a flowchart documenting the process by which the personal residential structure flood vulnerability functions are derived and implemented.

2. Describe the assumptions, data (including insurance claims data), methods, and processes used for the development of the personal residential structure flood vulnerability functions.

3. As applicable, describe the nature and extent of actual insurance claims data used to develop the personal residential structure flood 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 and manufactured homes.

4. Summarize post-event site investigations, including the source, and provide a brief description of the resulting use of these data in the development or validation of personal residential structure flood vulnerability functions.

5. Describe how the personal residential structure flood vulnerability functions incorporate depth of flooding (above ground and above lowest floor) and wave action (in coastal areas).

6. State if the following flood characteristics are considered in the development of the personal residential structure flood vulnerability functions, and if so, how; if not, explain why: flood duration, flood velocity, flood-induced erosion, flood-borne debris, salinity (saltwater versus freshwater flooding), contaminated floodwaters, and likelihood of mold following flooding.

7. Describe how the personal residential structure flood vulnerability functions incorporate the following primary building characteristics: lowest floor elevation relative to ground, foundation type, primary construction materials, and year of construction.

8. State if the following building characteristics are considered in the development of the personal residential structure flood vulnerability functions, and if so, how; if not, explain why: number of stories, use of each story (e.g., habitable space, parking, storage, other), presence of basement, replacement value of building, structure value by story, square footage of living area, and other construction characteristics, as applicable.

9. Describe the process by which local construction practices, building code, and floodplain management regulation adoption and enforcement are considered in the development of personal residential structure flood vulnerability functions.

10. Provide the total number of personal residential structure flood vulnerability functions available for use in the flood model. Describe which structure flood vulnerability functions are used for personal residential structures, manufactured homes, condo unit owners and apartment renters.

11. Describe the relationship between personal residential structure and appurtenant structure flood vulnerability functions and their consistency with insurance claims data as applicable.

12. Describe the assumptions, data (including insurance claims data), methods, and processes used to develop personal residential structure flood vulnerability functions for unknown personal residential construction types or for when some building characteristics are unknown.

13. Describe similarities and differences in how the personal residential structure vulnerability functions are developed and applied for coastal and inland flooding.

14. Describe how personal residential structure vulnerability functions are selected when input data are missing, incomplete, or conflicting.

15. Provide a completed Form VF-1, Hypothetical Coastal Flood Event with Damaging Waves. Provide a link to the location of the form [insert hyperlink here].

16. Provide a completed Form VF-2, Hypothetical Inland Flood Event. Provide a link to the location of the form [insert hyperlink here].

Audit

1. All personal residential structure flood vulnerability functions will be reviewed.

2. Validation of the personal residential structure flood vulnerability functions and associated uncertainties will be reviewed.

3. Historical data in the original form will be reviewed with explanations for any changes made and descriptions of how missing or incorrect data were handled. For historical data used to develop personal residential structure flood vulnerability functions, the goodness-of-fit of the data will be reviewed. Complete reports detailing flooding conditions and damage suffered for any laboratory or field testing data used will be reviewed. A variety of different personal residential structure construction classes will be selected from the complete rational structural analyses and calculations to be reviewed. Laboratory or field tests and original post-event site investigation reports will be reviewed. Other technical literature and expert opinion summaries will be reviewed.

4. All papers, reports, and studies used in the continual development of the personal residential structure flood vulnerability functions must be available for review in hard copy or electronic form.

5. Multiple samples of personal residential structure flood vulnerability functions for personal residential structures, manufactured homes, and appurtenant structures will be reviewed. The magnitude of logical changes among these items for given flood events and validation materials will be reviewed.

6. Justification for the personal residential structures construction classes and characteristics used will be reviewed.

7. Documentation and justification for all modifications to the personal residential structure flood vulnerability functions due to building codes, floodplain management regulations, and their enforcement will be reviewed. If year of construction and/or geographical location of personal residential structure is used as a surrogate for building code, floodplain management regulation, and their enforcement, complete supporting information for the number of year of construction groups used as well as the year(s) and/or geographical region(s) of construction that separates particular group(s) will be reviewed.

8. The effects on personal residential structure flood vulnerability from local and regional construction characteristics, building codes, and floodplain management regulations will be reviewed.

9. How the claim practices of insurance companies are accounted for when claims data for those insurance companies are used to develop or to verify personal residential structure flood vulnerability functions will be reviewed. Examples include the level of damage the insurer considers a loss to be a total loss, claim practices of insurers with respect to concurrent causation, or the impact of public adjusting.

10. The percentage of damage at or above which the flood model assumes a total structure loss will be reviewed.

11. Documentation and justification for the method of derivation and data on which the personal residential structure flood vulnerability functions are based will be reviewed.

12. Incorporation of water intrusion in personal residential structure flood vulnerability functions will be reviewed.

13. Form VF-1, Hypothetical Coastal Flood Event with Damaging Waves, will be reviewed.

14. Form VF-2, Hypothetical Inland Flood Event, will be reviewed.

VF-2 Derivation of Personal Residential Contents Flood Vulnerability Functions

A. Development of the personal residential contents flood vulnerability functions shall be based on some combination of the following: (1) post-event site investigations, (2) technical literature, (3) expert opinion, (4) laboratory or field testing, and (5) insurance claims data. Contents flood vulnerability functions shall be supported by historical and other relevant data.

B. The derivation of personal residential contents vulnerability functions and their associated uncertainties shall consider the extent of personal residential structure damage.

C. Contents flood vulnerability functions shall be derived separately for personal residential building structures and manufactured homes.

Purpose: Personal residential contents flood vulnerability functions are to account for flood, contents, and building characteristics. This standard requires the development of personal residential contents flood vulnerability functions to be supported by historical or other relevant data.

The development of personal residential contents flood vulnerability functions is to be documented with respect to the methods and sources, including any use of insurance claims data, post-event site investigations, expert opinion, technical literature, testing data, and other relevant data.

This standard allows insurance claims data used in contents flood vulnerability function development to include appropriate insurer or modeling organization adjustments that do not diminish the usefulness of the data.

A reasonable representation of contents flood vulnerability is necessary in order to address policies that cover contents losses.

Relevant Forms: GF-4, Vulnerability Flood Standards Structural/Hydraulic/Coastal Engineer Expert Certification
AF-5, Logical Relationship to Flood Risk (Trade Secret item)

Disclosures

1. Provide a flowchart documenting the process by which the personal residential contents flood vulnerability functions are derived and implemented.

2. Describe the relationship between personal residential contents and personal residential structure flood vulnerability functions.

3. As applicable, describe the nature and extent of actual insurance claims data used to develop the personal residential contents flood 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 structure and manufactured homes.

4. Describe any assumptions, data (including insurance claims data), methods, and processes used to develop and validate the personal residential contents flood vulnerability functions.

5. Provide the total number of personal residential contents flood vulnerability functions available for use in the flood model. Describe whether different contents flood vulnerability functions are used for personal residential structures, manufactured homes, unit location for condo owners and apartment renters, and various building classes.

6. Describe any relationships between flood characteristics and personal residential contents flood vulnerability functions.

7. State the minimum threshold, if any, at which personal residential contents flood damage is calculated (e.g., personal residential contents damage is estimated for personal residential structure damage greater than *x* percent, or flood depth greater than *y* inches). Provide documentation of assumptions and available validation data to verify the approach used.

8. Describe similarities and differences in how personal residential contents flood vulnerability functions are developed and applied for coastal and inland flooding.

9. Describe the assumptions, data (including insurance claims data), methods, and processes used to develop personal residential contents flood vulnerability functions for unknown personal residential construction types and for when some primary building characteristics are unknown.

Audit

1. All personal residential contents flood vulnerability functions will be reviewed.

2. Validation of the personal residential contents flood vulnerability functions and associated uncertainties will be reviewed.

3. Documentation and justification of the following aspects or assumptions related to personal residential contents flood vulnerability functions will be reviewed:
    a. The method of derivation and data;
    b. Variability of personal residential contents flood damage by personal residential structure classification and characteristics;
    c. Variability of personal residential contents flood damage by flood characteristics;
    d. Personal residential contents flood damage for various occupancies.

4. Historical data in the original form will be reviewed with explanations for any changes made and descriptions of how missing or incorrect data were handled. For historical data used to develop personal residential contents flood vulnerability functions, the goodness-of-fit of the

data will be reviewed. Complete reports detailing flood conditions and damage suffered for any test data used will be reviewed. Original post-event site investigation reports will be reviewed. Other technical literature and expert opinion summaries will be reviewed.

5. All papers, reports, and studies used in the continual development of the personal residential contents flood vulnerability functions must be available for review in hard copy or electronic form.

VF-3 Derivation of Personal Residential Time Element Flood Vulnerability Functions

A. Development of the personal residential time element flood vulnerability functions shall be based on some combination of the following: (1) post-event site investigations, (2) technical literature, (3) expert opinion, (4) laboratory or field testing, and (5) insurance claims data. Time element vulnerability functions shall be supported by historical and other relevant data.

B. The derivation of personal residential time element flood vulnerability functions and their associated uncertainties shall consider the extent of personal residential structure and/or contents damage and the estimated time required to repair or replace the structure.

C. Personal residential time element flood vulnerability functions shall be derived separately for personal residential building structures and manufactured homes.

Purpose: Personal residential time element flood vulnerability functions are to account for flood, contents and building characteristics, as well as external factors that affect the ability to repair or replace a structure. This standard requires the development of personal residential time element flood vulnerability functions to be supported by historical or other relevant data.

The development of personal residential time element flood vulnerability functions is to be documented with respect to the methods and sources, including any use of insurance claims data, post-event site investigations, expert opinion, technical literature, testing data, and other relevant data.

This standard allows insurance claims data used in personal residential time element flood vulnerability function development to include appropriate insurer or modeling organization adjustments that do not diminish the usefulness of the data.

A reasonable representation of personal residential time element flood vulnerability is necessary in order to address policies that cover personal residential time element losses.

Policies can provide varying types of personal residential time element coverage and insurance policies may pay for personal residential time element claims irrespective of flood damage to the insured property.

Relevant Forms: GF-4, Vulnerability Flood Standards Structural/Hydraulic/Coastal Engineer Expert Certification
AF-5, Logical Relationship to Risk (Trade Secret item)

Disclosures

1. Provide a flowchart documenting the process by which the personal residential time element flood vulnerability functions are derived and implemented.

2. Describe the assumptions, data (including insurance claims data), methods, and processes used to develop and validate personal residential time element flood vulnerability functions.

3. As applicable, describe the nature and extent of actual insurance claims data used to develop the personal residential time element flood 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 structure and manufactured homes.

4. Provide the total number of personal residential time element flood vulnerability functions available for use in the flood model. Describe whether different time element flood vulnerability functions are used for personal residential structures, manufactured homes, unit location for condo owners and apartment renters, and various building classes.

5. Describe similarities and differences in how personal residential time element flood vulnerability functions are developed and applied for coastal and inland flooding.

6. Describe whether and how personal residential structure classification and characteristics, and flood characteristics, are incorporated into the personal residential time element flood vulnerability functions.

7. Describe whether and how personal residential time element flood vulnerability functions take into consideration the damage to local and regional infrastructure, or personal residential time element vulnerability resulting from a governmental mandate associated with flood events (e.g., evacuation and re-entry mandates).

8. Describe the assumptions, data (including insurance claims data), methods, and processes used to develop personal residential time element flood vulnerability functions for unknown personal residential construction types and for when some primary building characteristics are unknown.

Audit

1. All personal residential time element flood vulnerability functions will be reviewed.

2. Validation of the personal residential time element flood vulnerability functions and associated uncertainties will be reviewed.

3. Documentation and justification of the following aspects or assumptions related to personal residential time element flood vulnerability functions will be reviewed:
    a. The method of derivation and underlying data;
    b. Variability of personal residential time element flood vulnerability by personal residential structure classification and characteristics;
    c. Variability of personal residential time element flood vulnerability by flood characteristics;
    d. Personal residential time element flood vulnerability for various occupancies;
    e. The methods used to estimate the time required to repair or replace the property due to flooding.

4. Historical data in the original form will be reviewed with explanations for any changes made and descriptions of how missing or incorrect data were handled. For historical data used to develop personal residential time element flood vulnerability functions, the goodness-of-fit of the data will be reviewed. Complete reports detailing flooding conditions and damage suffered for any test data used will be reviewed. Original post-event site investigation reports will be reviewed. Other technical literature and expert opinion summaries will be reviewed.

5. The methodology and validation for determining the extent of infrastructure flood damage and governmental mandate and their effect on personal residential time element vulnerability will be reviewed.

VF-4 Flood Mitigation Measures

A. Modeling of flood mitigation measures to improve flood resistance of personal residential structures, the corresponding effects on flood vulnerability, and their associated uncertainties shall be theoretically sound and consistent with fundamental engineering principles. These measures shall include design, construction, and retrofit techniques that enhance the flood resistance or flood protection of personal residential structures. The modeling organization shall justify all flood mitigation measures considered by the flood model.

B. Application of flood mitigation measures that enhance the performance of personal residential structures and their contents shall be justified as to the impact on reducing flood damage whether done individually or in combination.

Purpose: This standard requires that flood mitigation measures intended to eliminate or reduce flood damage are accounted for in the flood model as they impact personal residential exposures.

Flood mitigation measures are those measures undertaken at an individual building level, usually within the building footprint, and may include, but not be limited to such things as:

- Strengthening foundation
- Strengthening foundation to building connection
- Wet and/or dry floodproofing
- Use of flood damage resistant materials
- Permanent elevation or protection of equipment and utilities
- Flood barriers
- Pumps.

It is necessary to account for the total impact that the use of multiple flood mitigation measures will have on flood damage. When multiple measures are used, the combined effect on flood damage must be estimated, and this may not be the sum of the effects of the individual measures.

This standard requires sensitivity of flood damage to effectiveness of building mitigation measures to be considered and flood loss uncertainties to be estimated.

Relevant Forms: GF-4, Vulnerability Flood Standards Structural/Hydraulic/Coastal Engineer Expert Certification
VF-3, Flood Mitigation Measures, Range of Changes in Flood Damage
VF-4, Coastal Flood Mitigation Measures, Mean Coastal Flood Damage Ratios and Coastal Flood Loss Costs (Trade Secret item)

VF-5, Inland Flood Mitigation Measures, Inland Mean Flood Damage Ratios and Inland Flood Loss Costs (Trade Secret item)
AF-5, Logical Relationship to Flood Risk (Trade Secret item)

Disclosures

1. Provide a completed Form VF-3, Flood Mitigation Measures, Range of Changes in Flood Damage. Provide a link to the location of the form [insert hyperlink here].

2. Provide a description of all flood mitigation measures used by the flood model, whether or not they are listed in Form VF-3, Flood Mitigation Measures, Range of Changes in Flood Damage.

3. Describe how personal residential time element losses are affected by performance of flood mitigation measures. Identify any assumptions.

4. Describe how personal residential structure and contents damage and their associated uncertainties are affected by flood mitigation measures. Identify any assumptions.

5. Describe how the effects of multiple flood mitigation measures are combined in the flood model and the process used to ensure that multiple flood mitigation measures are correctly combined.

6. Describe how flood mitigation measures affect the uncertainty of the vulnerability. Identify any assumptions.

Audit

1. Flood mitigation measures used by the flood model will be reviewed for theoretical soundness and reasonability.

2. Form VF-3, Flood Mitigation Measures, Range of Changes in Flood Damage, Form VF-4, Coastal Flood Mitigation Measures, Mean Coastal Flood Damage Ratios and Coastal Flood Loss Costs (Trade Secret item), and Form VF-5, Inland Flood Mitigation Measures, Mean Inland Flood Damage Ratios and Inland Flood Loss Costs (Trade Secret item), will be reviewed.

3. Implementation of flood mitigation measures will be reviewed as well as the effect of individual flood mitigation measures on flood damage. Any variation in the change over the range of flood depths above ground for individual flood mitigation measures will be reviewed. Historical data, technical literature, or expert opinion used to support the assumptions and implementation of flood mitigation measures will be reviewed. How flood mitigation measures affect the uncertainty of the vulnerability will be reviewed.

4. Implementation of multiple flood mitigation measures will be reviewed. The combined effects of these flood mitigation measures on flood damage will be reviewed. Any variation in the change over the range of flood depths above ground for multiple flood mitigation measures will be reviewed.

Form VF-1: Hypothetical Coastal Flood Event with Damaging Waves

Purpose: This form provides an illustration of the aggregate damage/exposure ratios by flood depth and by construction type for a specific set of reference structures subject to coastal flooding with damaging waves.

A. Sample personal residential exposure data for 8 reference structures as defined below and 51 flood depths (0-25 feet at half foot increments) are provided in the file named "*VFEventFormsInput15.xlsx*."

Model the sample personal residential exposure data provided in the file versus the flood depths and provide the damage ratios summarized by flood depth and construction type.

For completing Part A, Estimated Damage for each individual flood depth is the sum of ground up loss to all structures in the flood depth range, excluding demand surge. For completing Part B, Estimated Damage is the sum of the ground up loss to all structures of a specific construction type (wood frame, masonry, or manufactured home) in all of the flood depth ranges, excluding demand surge.

Personal residential contents, appurtenant structures, or time element coverages are not included.

Reference Structures

Wood Frame	Masonry	Manufactured Home
#1 One story Crawlspace foundation Top of foundation wall 3 feet above grade	#4 One story Slab foundation Top of slab 1 foot above grade Unreinforced masonry exterior walls	#7 Manufactured post 1994 Dry stack concrete foundation Pier height 3 feet above grade Tie downs Single unit
#2 Two story Slab foundation Top of slab 1 foot above grade 5/8" diameter anchors at 48" centers for wall/slab connections	#5 Two story Slab foundation Top of slab 1 foot above grade Reinforced masonry exterior walls	#8 Manufactured post 1994 Reinforced masonry pier foundation Pier height 6 feet above grade Tie downs Single unit
#3 Two story Unbraced timber pile foundation Top of pile 8 feet above grade Wood floor system bolted to piles	#6 Two story Concrete pile foundation Concrete slab Top of pile 8 feet above grade Reinforced masonry exterior walls	

B. Confirm that the structures used in completing the form are identical to those in the above table for the reference structures.

C. If additional assumptions are necessary to complete this form, provide the rationale for the assumptions as well as a description of how they are included.

D. Provide a plot of the Form VF-1, Part A data.

E. Include Form VF-1, Hypothetical Coastal Flood Event with Damaging Waves, in a submission appendix.

Form VF-1: Hypothetical Coastal Flood Event with Damaging Waves

Part A

Flood depth (feet) above ground level	Estimated Damage/ Subject Exposure	Flood depth (feet) above ground level	Estimated Damage/ Subject Exposure
0		13	
0.5		13.5	
1		14	
1.5		14.5	
2		15	
2.5		15.5	
3		16	
3.5		16.5	
4		17	
4.5		17.5	
5		18	
5.5		18.5	
6		19	
6.5		19.5	
7		20	
7.5		20.5	
8		21	
8.5		21.5	
9		22	
9.5		22.5	
10		23	
10.5		23.5	
11		24	
11.5		24.5	
12		25	
12.5			

Part B

Construction Type	Estimated Damage/ Subject Exposure
Wood Frame	
Masonry	
Manufactured Home	

Form VF-2: Hypothetical Inland Flood Event

Purpose: This form provides an illustration of the aggregate damage/exposure ratios by flood depth and by construction type for a specific set of reference structures subject to inland (inundation) flooding.

A. Sample personal residential exposure data for 8 reference structures as defined below and 51 flood depths (0-25 feet at half foot increments) are provided in the file named "*VFEventFormsInput15.xlsx*."

Model the sample personal residential exposure data provided in the file versus the flood depths and provide the damage ratios summarized by flood depth and construction type.

For completing Part A, Estimated Damage for each individual flood depth is the sum of ground up loss to all structures in the flood depth range, excluding demand surge. For completing Part B, Estimated Damage is the sum of the ground up loss to all structures of a specific construction type (wood frame, masonry, or manufactured home) in all of the flood depth ranges, excluding demand surge.

Personal residential contents, appurtenant structures, or time element coverages are not included.

Reference Structures

Wood Frame	Masonry	Manufactured Home
#1 One story Crawlspace foundation Top of foundation wall 3 feet above grade	#4 One story Slab foundation Top of slab 1 foot above grade Unreinforced masonry exterior walls	#7 Manufactured post 1994 Dry stack concrete foundation Pier height 3 feet above grade Tie downs Single unit
#2 Two story Slab foundation Top of slab 1 foot above grade 5/8" diameter anchors at 48" centers for wall/slab connections	#5 Two story Slab foundation Top of slab 1 foot above grade Reinforced masonry exterior walls	#8 Manufactured post 1994 Reinforced masonry pier foundation Pier height 6 feet above grade Tie downs Single unit
#3 Two story Unbraced timber pile foundation Top of pile 8 feet above grade Wood floor system bolted to piles	#6 Two story Concrete pile foundation Concrete slab Top of pile 8 feet above grade Reinforced masonry exterior walls	

B. Confirm that the structures used in completing the form are identical to those in the above table for the reference structures.

C. If additional assumptions are necessary to complete this form, provide the rationale for the assumptions as well as a description of how they are included.

D. Provide a plot of the Form VF-2, Part A data.

E. Include Form VF-2, Hypothetical Inland Flood Event, in a submission appendix.

Form VF-2: Hypothetical Inland Flood Event

Part A

Flood depth (feet) above ground level	Estimated Damage/ Subject Exposure	Flood depth (feet) above ground level	Estimated Damage/ Subject Exposure
0		13	
0.5		13.5	
1		14	
1.5		14.5	
2		15	
2.5		15.5	
3		16	
3.5		16.5	
4		17	
4.5		17.5	
5		18	
5.5		18.5	
6		19	
6.5		19.5	
7		20	
7.5		20.5	
8		21	
8.5		21.5	
9		22	
9.5		22.5	
10		23	
10.5		23.5	
11		24	
11.5		24.5	
12		25	
12.5			

Part B

Construction Type	Estimated Damage/ Subject Exposure
Wood Frame	
Masonry	
Manufactured Home	

Form VF-3: Flood Mitigation Measures Range of Changes in Flood Damage

Purpose: This form illustrates the changes in flood damage rates for two specific reference structures subject to individual flood mitigation measures and to combinations of flood mitigation measures.

A. Provide the change in the personal residential reference building damage rate (not loss cost) for each individual flood mitigation measure listed in Form VF-3, Flood Mitigation Measures, Range of Changes in Flood Damage, as well as for the combination of the flood mitigation measures.

B. If additional assumptions are necessary to complete this form, provide the rationale for the assumptions as well as a detailed description of how they are included.

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. Also include Form VF-3, Flood Mitigation Measures, Range of Changes in Flood Damage, in a submission appendix.

Reference Structures

Wood Frame	Masonry
Two story Unbraced timber pile foundation Top of pile 8 feet above grade Wood floor system bolted to piles	One story Slab foundation Top of slab 1 foot above grade Unreinforced masonry exterior walls

Place the reference structures at the following locations, with latitude and longitude referenced to the World Geodetic System of 1984 (WGS84) datum, and provide the aggregated results.

Gulf of Mexico	St. Johns River
Latitude: 27.9957517	Latitude: 29.376888
Longitude: -82.8277373	Longitude: -81.619022

D. Provide the ground elevation used from the model elevation database for both reference points.

Form VF-3: Flood Mitigation Measures
Range of Changes in Flood Damage

INDIVIDUAL MITIGATION MEASURES		PERCENTAGE CHANGES IN DAMAGE ((REFERENCE DAMAGE RATE - MITIGATED DAMAGE RATE) / REFERENCE DAMAGE RATE) * 100									
		WOOD FRAME STRUCTURE					MASONRY STRUCTURE				
		FLOOD DEPTH (FT) ABOVE GROUND					FLOOD DEPTH (FT) ABOVE GROUND				
		7	9	11	13	15	1	3	5	7	9
	REFERENCE STRUCTURE	—	—	—	—	—	—	—	—	—	—
FIRST FLOOR HEIGHT AND FLOODPROOFED UTILITY EQUIPMENT	Elevate Floor 1 Foot						—	—	—	—	—
	Elevate Floor 2 Feet						—	—	—	—	—
	Elevate Floor 3 Feet						—	—	—	—	—
FLOODPROOFED UTILITY EQUIPMENT	Elevate or Protect 1 Foot										
	Elevate or Protect 2 Feet										
	Elevate or Protect 3 Feet										
STRENGTHEN FOUNDATION	Bracing of Timber Pile Foundation						—	—	—	—	—
FLOODPROOFING	Wet 1 Foot										
	Wet 2 Feet										
	Wet 3 Feet										
	Dry 1 Foot	—	—	—	—	—					
	Dry 2 Feet	—	—	—	—	—					
	Dry 3 Feet	—	—	—	—	—					

MITIGATION MEASURES IN COMBINATION		PERCENTAGE CHANGES IN DAMAGE ((REFERENCE DAMAGE RATE - MITIGATED DAMAGE RATE) / REFERENCE DAMAGE RATE) * 100									
		WOOD FRAME STRUCTURE					MASONRY STRUCTURE				
		FLOOD DEPTH (FT) ABOVE GROUND					FLOOD DEPTH (FT) ABOVE GROUND				
		7	9	11	13	15	1	3	5	7	9
STRUCTURE	Mitigated Structure Utility Equipment Elevated 2 Feet Above Floor and Wet Floodproofing 2 Feet										

Form VF-4: Coastal Flood Mitigation Measures, Mean Coastal Flood Damage Ratios and Coastal Flood Loss Costs (Trade Secret Item)

Purpose: This form illustrates the coastal flood damage ratios and coastal flood loss costs for two specific reference structures subject to individual flood mitigation measures and to combinations of flood mitigation measures.

A. Provide the mean damage ratio (prior to any insurance considerations) to the reference structure for each individual flood mitigation measure listed in Form VF-4, Coastal Flood Mitigation Measures, Mean Coastal Flood Damage Ratios and Coastal Flood Loss Costs (Trade Secret item), as well as the percent damage for the combination of the flood mitigation measures.

B. Provide the loss costs rounded to three decimal places, for the reference structures and for each individual flood mitigation measure listed in Form VF-4, Coastal Flood Mitigation Measures, Mean Coastal Flood Damage Ratios and Coastal Flood Loss Costs (Trade Secret item), as well as the loss costs for the combination of the flood mitigation measures.

C. If additional assumptions are necessary to complete this form, provide the rationale for the assumptions as well as a detailed description of how they are included.

D. Provide a graphical representation of the personal residential vulnerability functions for the reference and fully mitigated structures.

Reference Structures

Wood Frame	Masonry
Two story Unbraced timber pile foundation Top of pile 8 feet above grade Wood floor system bolted to piles	One story Slab foundation Top of slab 1 foot above grade Unreinforced masonry exterior walls

Reference and mitigated structures are fully insured personal residential building structures with a zero deductible structure only policy.

Place the reference structures at the following location, with latitude and longitude referenced to the World Geodetic System of 1984 (WGS84) datum.

Gulf of Mexico
Latitude: 27.9957517
Longitude: -82.8277373

E. Provide the ground elevation used from the model elevation database for the reference point.

Form VF-4: Coastal Flood Mitigation Measures, Mean Coastal Flood Damage Ratios and Coastal Flood Loss Costs (Trade Secret Item)

INDIVIDUAL MITIGATION MEASURES		MEAN DAMAGE RATIO											
		WOOD FRAME STRUCTURE					MASONRY STRUCTURE					LOSS COSTS	
		FLOOD DEPTH (FT) ABOVE GROUND					FLOOD DEPTH (FT) ABOVE GROUND					WOOD FRAME STRUCTURE	MASONRY STRUCTURE
		7	9	11	13	15	1	3	5	7	9	ACROSS ALL FLOOD DEPTHS	
	REFERENCE STRUCTURE	—	—	—	—	—	—	—	—	—	—	—	—
FIRST FLOOR HEIGHT AND FLOODPROOFED UTILITY EQUIPMENT	Elevate Floor 1 Foot						—	—	—	—	—		—
	Elevate Floor 2 Feet						—	—	—	—	—		—
	Elevate Floor 3 Feet						—	—	—	—	—		—
FLOODPROOFED UTILITY EQUIPMENT	Elevate or Protect 1 Foot												
	Elevate or Protect 2 Feet												
	Elevate or Protect 3 Feet												
STRENGTHEN FOUNDATION	Bracing of Timber Pile Foundation						—	—	—	—	—		—
FLOODPROOFING	Wet 1 Foot												
	Wet 2 Feet												
	Wet 3 Feet												
	Dry 1 Foot	—	—	—	—	—						—	
	Dry 2 Feet	—	—	—	—	—						—	
	Dry 3 Feet	—	—	—	—	—						—	

MITIGATION MEASURES IN COMBINATION		MEAN DAMAGE RATIO											
		WOOD FRAME STRUCTURE					MASONRY STRUCTURE					LOSS COSTS	
		FLOOD DEPTH (FT) ABOVE GROUND					FLOOD DEPTH (FT) ABOVE GROUND					WOOD FRAME STRUCTURE	MASONRY STRUCTURE
		7	9	11	13	15	1	3	5	7	9	ACROSS ALL FLOOD DEPTHS	
STRUCTURE	Mitigated Structure Utility Equipment Elevated 2 Feet Above Floor and Wet Floodproofing 2 Feet												

Form VF-5: Inland Flood Mitigation Measures, Mean Inland Flood Damage Ratios and Inland Flood Loss Costs (Trade Secret Item)

Purpose: This form illustrates the inland flood damage ratios and inland flood loss costs for two specific reference structures subject to individual flood mitigation measures and to combinations of flood mitigation measures.

A. Provide the mean damage ratio (prior to any insurance considerations) to the reference structure for each individual flood mitigation measure listed in Form VF-5, Inland Flood Mitigation Measures, Mean Inland Flood Damage Ratios and Inland Flood Loss Costs (Trade Secret item), as well as the percent damage for the combination of the flood mitigation measures.

B. Provide the loss costs rounded to three decimal places, for the reference structures and for each individual flood mitigation measure listed in Form VF-5, Inland Flood Mitigation Measures, Mean Inland Flood Damage Ratios and Inland Flood Loss Costs (Trade Secret item), as well as the loss costs for the combination of the flood mitigation measures.

C. If additional assumptions are necessary to complete this form, provide the rationale for the assumptions as well as a detailed description of how they are included.

D. Provide a graphical representation of the personal residential vulnerability functions for the reference and fully mitigated structures.

Reference Structures

Wood Frame	Masonry
Two story Unbraced timber pile foundation Top of pile 8 feet above grade Wood floor system bolted to piles	One story Slab foundation Top of slab 1 foot above grade Unreinforced masonry exterior walls

Reference and mitigated structures are fully insured personal residential building structures with a zero deductible structure only policy.

Place the reference structures at the following location, with latitude and longitude referenced to the World Geodetic System of 1984 (WGS84) datum.

St. Johns River
Latitude: 29.376888
Longitude: -81.619022

E. Provide the ground elevation used from the model elevation database for the reference point.

Form VF-5: Inland Flood Mitigation Measures, Mean Inland Flood Damage Ratios and Inland Flood Loss Costs (Trade Secret Item)

INDIVIDUAL MITIGATION MEASURES		MEAN DAMAGE RATIO											
		WOOD FRAME STRUCTURE					MASONRY STRUCTURE					LOSS COSTS	
		FLOOD DEPTH (FT) ABOVE GROUND					FLOOD DEPTH (FT) ABOVE GROUND					WOOD FRAME STRUCTURE	MASONRY STRUCTURE
		7	9	11	13	15	1	3	5	7	9	ACROSS ALL FLOOD DEPTHS	
	REFERENCE STRUCTURE	—	—	—	—	—	—	—	—	—	—	—	—
FIRST FLOOR HEIGHT AND FLOODPROOFED UTILITY EQUIPMENT	Elevate Floor 1 Foot						—	—	—	—	—		—
	Elevate Floor 2 Feet						—	—	—	—	—		—
	Elevate Floor 3 Feet						—	—	—	—	—		—
FLOODPROOFED UTILITY EQUIPMENT	Elevate or Protect 1 Foot												
	Elevate or Protect 2 Feet												
	Elevate or Protect 3 Feet												
STRENGTHEN FOUNDATION	Bracing of Timber Pile Foundation						—	—	—	—	—		—
FLOODPROOFING	Wet 1 Foot												
	Wet 2 Feet												
	Wet 3 Feet												
	Dry 1 Foot	—	—	—	—	—						—	
	Dry 2 Feet	—	—	—	—	—						—	
	Dry 3 Feet	—	—	—	—	—						—	

MITIGATION MEASURES IN COMBINATION		MEAN DAMAGE RATIO											
		WOOD FRAME STRUCTURE					MASONRY STRUCTURE					LOSS COSTS	
		FLOOD DEPTH (FT) ABOVE GROUND					FLOOD DEPTH (FT) ABOVE GROUND					WOOD FRAME STRUCTURE	MASONRY STRUCTURE
		7	9	11	13	15	1	3	5	7	9	ACROSS ALL FLOOD DEPTHS	
STRUCTURE	Mitigated Structure Utility Equipment Elevated 2 Feet Above Floor and Wet Floodproofing 2 Feet												

ACTUARIAL FLOOD STANDARDS

AF-1 Flood Modeling Input Data and Output Reports

A. Adjustments, edits, inclusions, or deletions to insurance company or other input data used by the modeling organization shall be based upon accepted actuarial, underwriting, and statistical procedures.

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

Purpose: Flood modeled loss costs and probable maximum loss levels rely on certain input data assumptions. Implicit assumptions may or may not be appropriate for a given entity using the flood model, depending on the circumstances.

Different modeling approaches may require different input data.

Relevant Form: GF-5, Actuarial Flood Standards Expert Certification

Disclosures

1. Identify insurance-to-value assumptions and describe the methods and assumptions used to determine the property value and associated flood losses. Provide a sample calculation for determining the property value.

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

3. Describe the different flood policies, contracts, and endorsements as specified in s. 627.715, F.S., that are modeled.

4. Provide a copy of the input form(s) used by the flood model with the flood model options available for selection by the user for the Florida flood model under review. Describe the process followed by the user to generate the flood model output produced from the input form. Include the flood model name and version identification on the input form. All items included in the input form submitted to the Commission should be clearly labeled and defined.

5. Disclose, in a flood model output report, the specific inputs required to use the flood model and the options of the flood model selected for use in a personal residential property flood insurance rate filing. Include the flood model name and version identification on the flood model output report. All items included in the flood model output report submitted to the Commission should be clearly labeled and defined.

6. Explain the differences in data input and model output required for coastal and inland flood modeling.

7. Describe actions performed to ensure the validity of insurer or other input data used for flood model inputs or validation/verification.

8. Disclose if changing the order of the flood model input exposure data produces different flood model output or results.

9. Disclose if removing or adding policies from the flood model input file affects the output for the remaining policies.

Audit

1. Quality assurance procedures, including methods to assure accuracy of flood insurance or other input data, will be reviewed. Compliance with this standard will be readily demonstrated through documented rules and procedures.

2. All flood model inputs and assumptions will be reviewed to determine that the flood model output report appropriately discloses all modifications, adjustments, assumptions, and defaults used to produce the flood loss costs and flood probable maximum loss levels.

3. Explanation of the differences in data input and model output for coastal and inland flood modeling will be reviewed.

AF-2 Flood Events Resulting in Modeled Flood Losses

A. Flood modeled loss costs and flood probable maximum loss levels shall reflect insured flood related damages from both coastal and inland flood events impacting Florida.

B. The modeling organization shall have a documented procedure for addressing double counting or under counting of flood losses from any source.

Purpose: Flood loss costs and flood probable maximum loss levels should reflect the flood losses insurers pay as a result of a flood event (coastal and inland flooding). Note: the flood event may originate outside of Florida and may involve multiple circumstances or a confluence of events (e.g., meteorological events and hydrological events) that contribute to flooding in Florida. Coastal flooding includes storm tide, and inland flooding includes riverine, lacustrine, and surface water flooding.

Flood loss costs and flood probable maximum loss levels should only include insured flood related losses and time element flood losses in Florida resulting from an event modeled as a flood event (as described above) consistent with s. 627.715, F.S., and consistent with the different flood policies, contracts, and endorsements. The event should include all such insured flood related damage due to a flood event causing loss in Florida and should not be over-estimated or under-estimated.

Relevant Forms: GF-5, Actuarial Flood Standards Expert Certification
AF-2, Total Flood Statewide Loss Costs

Disclosures

1. Describe how damage from model generated floods (originating either inside or outside of Florida) is excluded or included in the calculation of flood loss costs and flood probable maximum loss levels for Florida.

2. Describe how wind losses associated with coastal flooding are treated in the calculation of flood loss costs and flood probable maximum loss levels for Florida.

3. Describe how the model considers the correlation and potential overlap of losses associated with coastal and inland flooding.

4. Other than coastal and inland flooding, state whether any other types of flooding events are modeled. If so, describe how damage resulting from these flood type events is treated in the calculation of flood loss costs and flood probable maximum loss levels for Florida.

5. Describe which non-flood water losses are considered losses from water intrusion. Describe how water intrusion losses are considered in the calculation of flood loss costs and flood probable maximum loss levels for Florida.

Audit

1. The flood model will be reviewed to evaluate whether the determination of losses in the flood model is consistent with this standard.

2. The flood model will be reviewed to determine that meteorological or hydrological events originating either inside or outside of Florida are modeled for flood losses occurring in Florida and that such effects are considered in a manner which is consistent with this standard.

3. The flood model will be reviewed to determine whether the model takes into account any damage resulting directly and solely from wind. Losses associated with flooding will be reviewed to determine the treatment of wind losses.

4. The flood model will be reviewed to determine how losses from water intrusion are identified and calculated.

5. The documented procedure addressing the double counting or under counting of flood losses will be reviewed.

6. The effect on loss costs and probable maximum loss levels arising from flood events that are neither inland nor coastal flooding will be reviewed.

AF-3 Flood Coverages

A. The methods used in the calculation of personal residential structure flood loss costs shall be actuarially sound.

B. The methods used in the calculation of personal residential appurtenant structure flood loss costs shall be actuarially sound.

C. The methods used in the calculation of personal residential contents flood loss costs shall be actuarially sound.

D. The methods used in the calculation of personal residential time element flood loss costs shall be actuarially sound.

Purpose: A reasonable representation of personal residential structures, appurtenant structures, contents, and time element flood losses is necessary in order to address how the different flood policies, contracts, and endorsements handle flood losses.

Relevant Form: GF-5, Actuarial Flood Standards Expert Certification

Disclosures

1. Describe the methods used in the flood model to calculate flood loss costs for residential structure coverage associated with personal residential properties.

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

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

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

Audit

1. The methods used to produce personal residential structure, appurtenant structure, contents, and time element flood loss costs will be reviewed.

AF-4 Modeled Flood Loss Cost and Flood Probable Maximum Loss Level Considerations

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

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

C. Flood loss cost projections and flood probable maximum loss levels shall not include any explicit provision for wind losses.

D. Damage caused from inland and coastal flooding shall be included in the flood model's calculation of flood loss costs and flood probable maximum loss levels.

E. Flood loss cost projections and flood probable maximum loss levels shall be capable of being calculated from exposures at a geocode (latitude-longitude) level of resolution including the consideration of flood extent and depth.

F. Demand surge shall be included in the flood model's calculation of flood loss costs and flood probable maximum loss levels using relevant data and actuarially sound methods and assumptions.

Purpose: The flood loss costs and flood probable maximum loss levels from the flood model should reflect flood losses paid by the insurance company as insurance claims resulting from flood damage from an event as defined in Standard AF-2, Flood Events Resulting in Modeled Flood Losses.

Flood probable maximum loss levels can be either on an annual aggregate, an annual occurrence, or an event basis. All bases can be useful for understanding the flood loss distribution produced by the flood model.

Flood loss costs represent the expected annual loss per $1,000 exposure. Other "expense and profit loads" such as those listed in the standard may be included in rate filings but are outside the scope of the Commission.

Flood loss severity may be influenced by supply and demand factors applicable to material and labor costs. This is generally known as demand surge which occurs at the time of a large catastrophic event and is recognized as an important element for flood modeling.

Flood insurance may also be influenced (although perhaps differently from demand surge) by general price inflation. This is a type of economic inflation that is associated with past insured flood loss experience that has been used to develop and validate flood loss projection models. The standard does not allow for prospective recognition of future economic inflation or price inflation.

Relevant Forms: GF-5, Actuarial Flood Standards Expert Certification
AF-6, Flood Probable Maximum Loss for Florida

Disclosures

1. Describe the method(s) used to estimate annual flood loss costs and flood probable maximum loss levels. Identify any source documents used and any relevant research results.

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

3. Describe how the flood model incorporates demand surge in the calculation of flood loss costs and flood probable maximum loss levels. Indicate if there are any differences in the manner that demand surge is incorporated for coastal and inland flooding.

4. Provide citations to published papers, if any, or modeling organization studies that were used to develop how the flood model estimates demand surge.

5. Describe how economic inflation has been applied to past insurance experience to develop and validate flood loss costs and flood probable maximum loss levels.

Audit

1. How the flood model handles expenses, risk load, investment income, premium reserves, taxes, assessments, profit margin, economic inflation, and any criteria other than direct property flood insurance claim payments will be reviewed.

2. The method of determining flood probable maximum loss levels will be reviewed.

3. The uncertainty in the estimated annual flood loss costs and flood probable maximum loss levels will be reviewed.

4. The data and methods used to incorporate individual aspects of demand surge on personal residential coverages for coastal and inland flooding, inclusive of the effects from building material costs, labor costs, contents costs, and repair time will be reviewed.

5. How the flood model accounts for economic inflation associated with past insurance experience will be reviewed.

6. The treatment of wind losses in the determination of flood losses will be reviewed.

7. The treatment of water intrusion losses will be reviewed.

8. How the flood model determines flood loss costs and flood probable maximum loss levels associated with coastal flooding will be reviewed.

9. How the flood model determines flood loss costs and flood probable maximum loss levels associated with inland flooding will be reviewed.

10. The methods used to ensure there is no systematic over-estimation or under-estimation of flood loss costs and flood probable maximum loss levels from coastal and inland flooding will be reviewed.

11. All referenced literature will be reviewed, in hard copy or electronic form, to determine applicability.

AF-5 Flood Policy Conditions

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

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

C. Deductible loss costs shall be calculated in accordance with s. 627.715, F.S.

Purpose: For a given flood event and personal residential policy type, flood losses may fall below the deductible or above the policy limit; and therefore, the distribution of flood losses is important.

Section 627.715, F.S., presents a number of options regarding deductibles and loss settlement options. Flood policy exclusions are also an important consideration.

Relevant Form: GF-5, Actuarial Flood Standards Expert Certification

Disclosures

1. Describe the methods used in the flood model to treat deductibles, policy limits, policy exclusions, loss settlement provisions, and insurance-to-value criteria when projecting flood loss costs and flood probable maximum loss levels.

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

Example:

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

3. Describe how the flood model treats annual deductibles.

Audit

1. The process used to determine the accuracy of the insurance-to-value criteria in data used to develop and validate the flood model results will be reviewed.

2. To the extent that historical data are used to develop mathematical depictions of deductibles, policy limits, policy exclusions, and loss settlement provisions for flood coverage, the goodness-of-fit of the data to fitted models will be reviewed.

3. To the extent that historical data are used to validate the flood model results, the treatment of the effects of deductibles, policy limits, policy exclusions, coinsurance, and loss settlement provisions for flood coverage in the data will be reviewed.

4. Treatment of annual deductibles will be reviewed.

AF-6 Flood Loss Outputs and Logical Relationships to Risk

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

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

C. Flood loss costs cannot increase as the structure flood damage resistance increases, all other factors held constant.

D. Flood loss costs cannot increase as flood hazard mitigation measures incorporated in the structure increase, all other factors held constant.

E. Flood loss costs shall be consistent with the effects of major flood control measures, all other factors held constant.

F. Flood loss costs cannot increase as the flood resistant design provisions increase, all other factors held constant.

G. Flood loss costs cannot increase as building code enforcement increases, all other factors held constant.

H. Flood loss costs shall decrease as deductibles increase, all other factors held constant.

I. The relationship of flood loss costs for individual coverages, (e.g., personal residential structure, appurtenant structure, contents, and time element) shall be consistent with the coverages provided.

J. Flood output ranges shall be logical for the type of risk being modeled and apparent deviations shall be justified.

K. All other factors held constant, flood output ranges produced by the flood model shall in general reflect lower flood loss costs for personal residential structures that have a higher elevation versus those that have a lower elevation.

L. For flood loss cost and flood probable maximum loss level estimates derived from and validated with historical insured flood losses or other input data and information, the assumptions in the derivations concerning (1) construction characteristics, (2) policy provisions, and (3) contractual provisions shall be appropriate based on the type of risk being modeled.

Purpose: This standard is to ensure that flood probable maximum loss levels are based on an actuarially sound methodology. The actuarial soundness resulting from compliance with the standard is particularly important to capital markets, insurers, reinsurers and rating agencies that frequently use flood probable maximum loss levels.

Modeled flood loss costs should vary according to risk. If the risk of loss due to floods is higher for one area or personal residential structure type, then the flood loss costs should also be higher. Likewise, if there is no difference in risk there should be no difference in flood loss costs. Flood loss costs not having these properties do not have a logical relationship to risk.

Relevant Forms: GF-5, Actuarial Flood Standards Expert Certification
AF-1, Zero Deductible Personal Residential Standard Flood Loss Costs
AF-2, Total Flood Statewide Loss Costs
AF-3, Personal Residential Standard Flood Loss Costs by ZIP Code
AF-4, Flood Output Ranges
AF-5, Logical Relationship to Flood Risk (Trade Secret item)
AF-6, Flood Probable Maximum Loss for Florida
SF-2, Examples of Flood Loss Exceedance Estimates (Coastal and Inland Combined)
SF-4, Average Annual Zero Deductible Statewide Flood Loss Costs – Historical versus Modeled

Disclosures

1. Provide a completed Form AF-1, Zero Deductible Personal Residential Standard Flood Loss Costs. Provide a link to the location of the form [insert hyperlink here].

2. Provide a completed Form AF-2, Total Flood Statewide Loss Costs. Provide a link to the location of the form [insert hyperlink here].

3. Provide a completed Form AF-3, Personal Residential Standard Flood Loss Costs by ZIP Code. Provide a link to the location of the form [insert hyperlink here].

4. Provide a completed Form AF-4, Flood Output Ranges, using the modeling organization specified, predetermined, and comprehensive exposure dataset. Provide a link to the location of the form [insert hyperlink here].

5. Provide a completed Form AF-6, Flood Probable Maximum Loss for Florida. Provide a link to the location of the form [insert hyperlink here].

6. Describe how the flood model produces flood probable maximum loss levels.

7. Provide citations to published papers, if any, or modeling organization studies that were used to estimate flood probable maximum loss levels.

8. Explain any difference between the values provided on Form AF-6, Flood Probable Maximum Loss for Florida, and those provided on Form SF-2, Examples of Flood Loss Exceedance Estimates (Coastal and Inland Combined).

9. Provide an explanation for all anomalies in the flood loss costs that are not consistent with the requirements of this standard.

Audit

1. The data and methods used for flood probable maximum loss levels for Form AF-6, Flood Probable Maximum Loss for Florida, will be reviewed. The Top Event and Conditional Tail Expectations will be reviewed.

2. All referenced literature will be reviewed, in hard copy or electronic form, to determine applicability.

3. Graphical representations of flood loss costs by rating areas and geographic zones (consistent with the modeling organization's grid resolution) will be reviewed.

4. Color-coded maps depicting the effects of topography and flood control measures on flood loss costs by rating areas and geographic zones (consistent with the modeling organization's grid resolution) will be reviewed.

5. The procedures used by the modeling organization to verify the individual flood loss cost relationships will be reviewed. Methods (including any software) used in verifying Standard AF-6 will be reviewed. Forms AF-1, Zero Deductible Personal Residential Standard Flood Loss Costs, AF-2, Total Flood Statewide Loss Costs, AF-3, Personal Residential Standard Flood Loss Costs by ZIP Code, and AF-5, Logical Relationship to Flood Risk (Trade Secret item), will be reviewed to assess flood coverage relationships.

6. The flood loss cost relationships among deductible, construction type, policy form, coverage, flood resistant design provisions, building code enforcement, construction characteristics, elevation of residential structure, and geographic location will be reviewed.

7. The total personal residential insured flood losses provided in Forms AF-2, Total Flood Statewide Loss Costs, and AF-3, Personal Residential Standard Flood Loss Costs by ZIP Code, will be reviewed.

8. Form AF-4, Flood Output Ranges, will be reviewed, including geographical representations of the data where applicable.

9. Form AF-4, Flood Output Ranges, will be reviewed to ensure appropriate relativities among deductibles, coverages, and construction types.

10. Apparent anomalies in the flood output ranges and their justification will be reviewed.

Form AF-1: Zero Deductible Personal Residential Standard Flood Loss Costs

Purpose: This form and the associated maps illustrate the range and variation of zero deductible standard flood loss costs across Florida for personal residential building property and for personal property separately for frame owners, masonry owners, and manufactured homes. Each modeling organization can define its own rating areas or geographic zones.

A. Provide three maps, color-coded by rating areas or geographic zones (with a minimum of six value ranges), displaying zero deductible personal residential standard flood loss costs per $1,000 of exposure for wood frame, masonry, and manufactured homes.

   Note: Standard Flood in Florida is equivalent to the National Flood Insurance Program (NFIP). Rating areas or geographic zones shall be defined by the modeling organization.

B. Create exposure sets for these exhibits by modeling all of the buildings from Notional Set 3 described in the file *"NotionalInput15_Flood.xlsx"* geocoded to each rating area or geographic zone in the state, as provided in the flood model. Define the model's flood rating areas or geographic zones. Provide the predominant County name and the Federal Information Processing Standards (FIPS) Code associated with each rating area or geographic zone. Refer to the Notional Standard Flood Policy Specifications below for additional modeling information. Explain any assumptions, deviations, and differences from the prescribed exposure information.

C. Provide, in the format given in the file named *"2015FormAF1.xlsx"* in both Excel and PDF format, the underlying standard flood loss cost data rounded to three decimal places used for A above. The file name shall include the abbreviated name of the modeling organization, the standards year, and the form name.

Notional Standard Policy Specifications

Policy Type	Assumptions
Owners	**Coverage A = Building Property** • Replacement cost included subject to Coverage A limit • Excludes all appurtenant structures **Coverage B = Personal Property** • Actual cash value included subject to Coverage B limit **Time Element Coverage** • To be defined by the modeling organization

✧ Flood loss costs per $1,000 shall be related to the Coverage A limit for Coverage A, to the Coverage B limit for Coverage B, and to the Time Element limit for Time Element Coverage

Manufactured Homes

Coverage A = Building

- Special loss settlement provision: Minimum of (replacement cost, 1.5 x actual cost value subject to Coverage A limit)

Coverage B = Personal Property

- Actual cash value subject to Coverage B limit

Time Element Coverage

- To be defined by the modeling organization

✧ Flood loss costs per $1,000 shall be related to the Coverage A limit for Coverage A, to the Coverage B limit for Coverage B, and to the Time Element limit for Time Element Coverage

Form AF-2: Total Flood Statewide Loss Costs

Purpose: This form illustrates the modeling organization's ability to replicate reasonably historical flood loss costs.

A. Provide the total personal residential insured flood loss and the dollar contribution to the average annual flood loss assuming zero deductible policies for individual historical flooding events using a modeling organization specified, predetermined and comprehensive exposure dataset. The list of flooding events in this form shall include meteorological and hydrological events and circumstances occurring inside or outside of Florida that resulted in or contributed to flooding in Florida included in the modeling organization flood event dataset (e.g., Florida and by-passing hurricanes, tropical cyclones below hurricane strength that caused flood losses in Florida, rainfall events that caused flood losses in Florida).

   The table below contains the minimum number of tropical cyclones from HURDAT2 and rainfall events to be included in the modeling organization flood event dataset. Each tropical cyclone and rainfall event has been assigned an ID number. The modeling organization may exclude tropical cyclones and rainfall events that had zero modeled impact, or may include additional tropical cyclones and rainfall events when there is clear justification for the additions. For tropical cyclones and rainfall events in the table below resulting in zero loss, the table entry shall be left blank. Additional tropical cyclones and rainfall events included in the modeling organization flood event dataset shall be added to the table below in order of year and assigned an intermediate ID number as the tropical cyclone and rainfall event falls within the bounding ID numbers.

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. Also include Form AF-2, Total Flood Statewide Loss Costs, in a submission appendix.

ID	Landfall/ Closest Approach Date	Year	Name	Personal Residential Insured Losses ($)	Dollar Contribution
005	08/15/1901	1901	NoName04-1901		
010	09/11/1903	1903	NoName03-1903		
015	10/17/1904	1904	NoName04-1904		
020	06/17/1906	1906	NoName02-1906		
025	09/27/1906	1906	NoName06-1906		
030	10/18/1906	1906	NoName08-1906		
035	10/11/1909	1909	NoName11-1909		
040	10/18/1910	1910	NoName05-1910		
045	08/11/1911	1911	NoName02-1911		
050	09/14/1912	1912	NoName04-1912		
055	08/01/1915	1915	NoName01-1915		
060	09/04/1915	1915	NoName04-1915		
065	07/05/1916	1916	NoName02-1916		
070	10/18/1916	1916	NoName14-1916		
075	09/29/1917	1917	NoName04-1917		

ID	Landfall/ Closest Approach Date	Year	Name	Personal Residential Insured Losses ($)	Dollar Contribution
080	09/10/1919	1919	NoName02-1919		
085	10/25/1921	1921	TampaBay06-1921		
090	09/15/1924	1924	NoName05-1924		
095	10/21/1924	1924	NoName10-1924		
100	07/28/1926	1926	NoName01-1926		
105	09/18/1926	1926	GreatMiami07-1926		
110	10/21/1926	1926	NoName10-1926		
115	08/08/1928	1928	NoName01-1928		
120	09/17/1928	1928	LakeOkeechobee04-1928		
125	09/28/1929	1929	NoName02-1929		
130	09/01/1932	1932	NoName03-1932		
135	07/30/1933	1933	NoName05-1933		
140	09/04/1933	1933	NoName11-1933		
145	09/03/1935	1935	LaborDay03-1935		
150	11/04/1935	1935	NoName07-1935		
155	07/31/1936	1936	NoName05-1936		
160	08/11/1939	1939	NoName02-1939		
165	10/06/1941	1941	NoName05-1941		
170	10/19/1944	1944	NoName13-1944		
175	06/24/1945	1945	NoName01-1945		
180	09/15/1945	1945	NoName09-1945		
185	10/08/1946	1946	NoName06-1946		
190	09/17/1947	1947	NoName04-1947		
195	10/12/1947	1947	NoName09-1947		
200	09/22/1948	1948	NoName08-1948		
205	10/05/1948	1948	NoName09-1948		
210	08/26/1949	1949	NoName02-1949		
215	08/31/1950	1950	Baker-1950		
220	09/05/1950	1950	Easy-1950		
225	10/18/1950	1950	King-1950		
230	09/26/1953	1953	Florence-1953		
235	10/09/1953	1953	Hazel-1953		
240	09/25/1956	1956	Flossy-1956		
245	09/10/1960	1960	Donna-1960		
250	08/27/1964	1964	Cleo-1964		
255	09/10/1964	1964	Dora-1964		
260	10/14/1964	1964	Isbell-1964		
265	09/08/1965	1965	Betsy-1965		
270	06/09/1966	1966	Alma-1966		
275	10/04/1966	1966	Inez-1966		
280	10/19/1968	1968	Gladys-1968		
285	06/19/1972	1972	Agnes-1972		
290	09/23/1975	1975	Eloise-1975		
295	09/04/1979	1979	David-1979		
300	09/13/1979	1979	Frederic-1979		
305	09/02/1985	1985	Elena-1985		
310	11/21/1985	1985	Kate-1985		

ID	Landfall/ Closest Approach Date	Year	Name	Personal Residential Insured Losses ($)	Dollar Contribution
315	10/12/1987	1987	Floyd-1987		
320	08/24/1992	1992	Andrew-1992		
325	08/03/1995	1995	Erin-1995		
330	10/04/1995	1995	Opal-1995		
335	07/19/1997	1997	Danny-1997		
340	09/03/1998	1998	Earl-1998		
345	09/25/1998	1998	Georges-1998		
350	10/15/1999	1999	Irene-1999		
355	08/13/2004	2004	Charley-2004		
360	09/05/2004	2004	Frances-2004		
365	09/16/2004	2004	Ivan-2004		
370	09/26/2004	2004	Jeanne-2004		
375	0710/2005	2005	Dennis-2005		
380	08/25/2005	2005	Katrina-2005		
385	10/24/2005	2005	Wilma-2005		
390	08/18/2008	2008	Tropical Storm Fay		
395		May 2009	Unnamed Storm in East Florida		
400		July 2013	Unnamed Storm on Panhandle		
405			Storm chosen by modeling organization		
			Total		

Form AF-3: Personal Residential Standard Flood Loss Costs by ZIP Code

Purpose: This form illustrates the modeling organization's ability to estimate zero deductible standard flood loss costs for a specified set of historical flood events.

A. Provide the percentage of personal residential zero deductible standard flood losses, rounded to four decimal places, and the monetary contribution from the events listed below using the modeling organization specified, predetermined, and comprehensive exposure dataset. Include all ZIP Codes where losses are material. Disclose the materiality threshold.

B. Provide maps color-coded by ZIP Code depicting the percentage total personal residential standard flood losses from each flood event and for the cumulative flood 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%

C. Provide, in the format given in the file named *"2015FormAF3.xlsx"* in Excel format, the total flood loss costs by ZIP Code. The file name shall include the abbreviated name of the modeling organization, the standards year, and the form name. Also include Form AF-3, Personal Residential Standard Flood Loss Costs by ZIP Code, in a submission appendix.

Form AF-3 Events:

- Hurricane Andrew (1992)
- Hurricane Ivan (2004)
- Hurricane Jeanne (2004)
- Hurricane Wilma (2005)
- Tropical Storm Fay (2008)
- Unnamed Storm in East Florida (May 2009)
- Unnamed Storm on Panhandle (July 2013)
- Storm chosen by modeling organization

Form AF-4: Flood Output Ranges

Purpose: This form provides an illustration of the projected personal residential modeled flood loss costs by county and provides a means to review for appropriate differentials among deductibles, coverage, and construction types.

A. Provide personal residential flood output ranges in the format shown in the file named *"2015FormAF4.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. Also include Form AF-4, Flood Output Ranges, in a submission appendix.

B. Provide flood loss costs rounded to three decimal places by county. Within each county, flood 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, and manufactured homes. For each of these categories using rating areas or geographic zones, the flood output range shall show the highest flood loss cost, the lowest flood loss cost, and the weighted average flood loss cost. The aggregate personal residential exposure data for this form shall be developed from the modeling organization specified, predetermined, and comprehensive exposure dataset except for insured values and deductibles information. Insured values shall be based on the standard flood output range specifications given below. When calculating the weighted average flood loss costs, weight the flood loss costs by the total insured value calculated above. Include the statewide range of flood loss costs (i.e., low, high, and weighted average).

C. If a modeling organization has flood loss costs for a rating area or geographic zone for which there is no exposure, give the flood loss costs zero weight (i.e., assume the exposure in that rating area or geographic zone is zero). Provide a list in the submission document of those rating areas or geographic zones where this occurs.

D. If a modeling organization does not have flood loss costs for a rating area or geographic zone for which there is some exposure, do not assume such flood loss costs are zero, but use only the exposures for which there are flood loss costs in calculating the weighted average flood loss costs. Provide a list in the submission document of the rating areas or geographic zones where this occurs.

E. NA shall be used in cells to signify no exposure.

F. All anomalies in flood loss costs that are not consistent with the requirements of Standard AF-6, Flood Loss Outputs and Logical Relationships to Risk, and have been explained in Disclosure AF-6.9 shall be shaded.

Standard Flood Output Range Specifications

Policy Type **Assumptions**

Owners

Coverage A = Building Property
- Coverage A limit = $100,000
- Replacement cost included subject to Coverage A limit
- Deductible = $1,500

Coverage B = Personal Property
- Coverage B limit = $40,000
- Actual cash value included subject to Coverage B limit
- Deductible = $1,000

Time Element Coverage
- To be defined by the modeling organization

✧ Dominant Coverage = A
✧ Flood loss costs per $1,000 shall be specified for each coverage limit

Renters

Coverage B = Personal Property
- Coverage B limit = $25,000
- No coverage for tenant improvements
- Deductible = $1,000
- Actual cash value included subject to Coverage B limit

Time Element Coverage
- To be defined by the modeling organization

✧ Flood loss costs per $1,000 shall be related to the Coverage B limit

Condo Unit Owners

Coverage A = Building Property
- Coverage A limit = 10% of Coverage C limit
- Replacement cost included subject to Coverage A limit

Coverage B = Personal Property
- Coverage B limit = $50,000
- Actual cash value included subject to Coverage B limit
- Deductible = $500

Time Element Coverage
- To be defined by the modeling organization

✧ Flood loss costs per $1,000 shall be related to the Coverage B limit

Manufactured Homes

Coverage A = Building Property

- Coverage A limit = $50,000
- Minimum of replacement cost, actual cash value subject to Coverage A limit
- Deductible = $500

Coverage B = Personal Property

- Coverage B limit = 50% of Coverage A limit
- Replacement cost included subject to Coverage B limit

Time Element Coverage

- To be defined by the modeling organization

✧ Flood loss costs per $1,000 shall be related to the coverage limit

Form AF-5: Logical Relationship to Flood Risk (Trade Secret Item)

Purpose: This form provides an illustration of the flood loss cost relationships among deductible, construction type, policy form, coverage, year of construction, foundation strength, condo unit floor, number of stories, lowest floor elevation, and proximity of the risk to the flood source.

A. Provide the logical relationship to flood risk exhibits in the format shown in the file named *"2015FormAF5.xlsx."*

B. Create exposure sets for each exhibit by modeling all of the flood coverages from the appropriate Notional Set listed below at each of the locations in "Location Grid A" as described in the file *"NotionalInput15_Flood.xlsx."* Refer to the Notional Standard Flood 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
Year Built Sensitivity	Set 5
Foundation Strength Sensitivity	Set 6
Condo Unit Floor Sensitivity	Set 7
Number of Stories Sensitivity	Set 8
Lowest Floor Elevation of Residential Structure Sensitivity	Set 9

Flood models shall treat points in "Location Grid A" as coordinates that would result from a geocoding process. Flood models shall treat points by simulating flood loss at exact location or by using the nearest modeled parcel/street/cell in the flood model. Explain any assumptions, deviations, and differences from the prescribed exposure information.

Report results for each of the points in "Location Grid A" individually, unless specified. Flood loss cost per $1,000 of exposure shall be rounded to three decimal places.

Note: All flood deductibles are $0 except for the Deductible Sensitivity. Coverage Sensitivity includes time element.

C. All anomalies in flood loss costs that are not consistent with the requirements of Standard AF-6, Flood Loss Outputs and Logical Relationships to Risk, and have been explained in Disclosure AF-6.9 shall be shaded.

D. Create an exposure set and report flood loss cost results for strong foundation owners frame buildings (Notional Set 6) for each of the points in "Location Grid B" as described in the file *"NotionalInput15_Flood.xlsx."* Provide a color-coded contour map of the flood loss costs for

coastal flooding. Provide a scatter plot of the flood loss costs (*y*-axis) against distance to closest coast (*x*-axis).

Notional Standard Flood Policy Specifications

Policy Type | **Assumptions**

Owners

Coverage A = Building Property
- Coverage A limit = $100,000
- Replacement cost included subject to Coverage A limit
- Deductible = $1,500

Coverage B = Personal Property
- Coverage B limit = $40,000
- Actual cash value included subject to Coverage B limit
- Deductible = $1,000

Time Element Coverage
- To be defined by the modeling organization

✧ Dominant Coverage = A
✧ Flood loss costs per $1,000 shall be specified for each coverage limit

Renters

Coverage B = Personal Property
- Coverage B limit = $25,000
- No coverage for tenant improvements
- Deductible = $1,000
- Actual cash value included subject to Coverage B limit

Time Element Coverage
- To be defined by the modeling organization

✧ Flood loss costs per $1,000 shall be related to the Coverage B limit

Condo Unit Owners

Coverage A = Building Property
- Coverage A limit = 10% of Coverage C limit
- Replacement cost included subject to Coverage A limit

Coverage B = Personal Property
- Coverage B limit = $50,000
- Actual cash value included subject to Coverage B limit
- Deductible = $500

Time Element Coverage
- To be defined by the modeling organization

✧ Flood loss costs per $1,000 shall be related to the Coverage B limit

Manufactured Homes

Coverage A = Building Property

- Coverage A limit = $50,000
- Minimum of replacement cost, actual cash value subject to Coverage A limit
- Deductible = $500

Coverage B = Personal Property

- Coverage B limit = 50% of Coverage A limit
- Replacement cost included subject to Coverage B limit

Time Element Coverage

- To be defined by the modeling organization

✧ Flood loss costs per $1,000 shall be related to the coverage limit

Form AF-6: Flood Probable Maximum Loss for Florida

Purpose: This form provides an illustration of the distribution of flood losses and illustrates that appropriate calculations were used to produce both expected annual flood losses and flood probable maximum loss levels.

A. Provide a detailed explanation of how the Expected Annual Flood Losses and Annual Exceedance Probabilities are calculated.

B. Complete Part A showing the personal residential flood probable maximum loss for Florida. For the Expected Annual Flood Losses column, provide personal residential, zero deductible statewide flood loss costs using the modeling organization specified, predetermined and comprehensive exposure dataset.

   In the column Annual Exceedance Probability, provide the probability associated with the average flood loss within the ranges indicated on a cumulative basis.

   For example, if the average flood loss is $4,705 million for the range $4,501 million to $5,000 million, provide the annual exceedance probability associated with a flood loss that is $4,705 million or greater.

   For each flood loss range in millions ($1,001-$1,500, $1,501-$2,000, $2,001-$2,500) the average flood loss within that range shall be identified and then the annual exceedance probability associated with that flood loss calculated. The annual exceedance probability is the probability of the flood loss equaling or exceeding this average flood 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). Annual exceedance probabilities shall be based on cumulative probabilities.

   An annual exceedance probability for an average flood loss of $4,705 million within the $4,501-$5,000 million range should be higher than the annual exceedance probability for an average flood loss of $5,455 million associated with a $5,001- $6,000 million range.

C. Provide the estimated flood loss and uncertainty interval for each of the Personal Residential Annual Exceedance Probabilities given in Part B, Annual Aggregate and Part C, Annual Occurrence. Describe how the uncertainty intervals are derived. Also, provide in Parts B and C, the Conditional Tail Expectation, the expected value of losses greater than the Estimated Flood Loss Level.

D. 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. Also include Form AF-6, Flood Probable Maximum Loss for Florida, in a submission appendix.

Part A – Personal Residential Flood Probable Maximum Loss for Florida

LOSS RANGE (MILLIONS)			TOTAL LOSS	AVERAGE LOSS (MILLIONS)	NUMBER OF FLOODS	EXPECTED ANNUAL FLOOD LOSSES*	ANNUAL EXCEEDANCE PROBABILITY	RETURN PERIOD (YEARS)
$ -	to	$ 500						
$ 501	to	$ 1,000						
$ 1,001	to	$ 1,500						
$ 1,501	to	$ 2,000						
$ 2,001	to	$ 2,500						
$ 2,501	to	$ 3,000						
$ 3,001	to	$ 3,500						
$ 3,501	to	$ 4,000						
$ 4,001	to	$ 4,500						
$ 4,501	to	$ 5,000						
$ 5,001	to	$ 6,000						
$ 6,001	to	$ 7,000						
$ 7,001	to	$ 8,000						
$ 8,001	to	$ 9,000						
$ 9,001	to	$ 10,000						
$ 10,001	to	$ 11,000						
$ 11,001	to	$ 12,000						
$ 12,001	to	$ 13,000						
$ 13,001	to	$ 14,000						
$ 14,001	to	$ 15,000						
$ 15,001	to	$ 16,000						
$ 16,001	to	$ 17,000						
$ 17,001	to	$ 18,000						
$ 18,001	to	$ 19,000						
$ 19,001	to	$ 20,000						
$ 20,001	to	$ 21,000						
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$ 28,001	to	$ 29,000						
$ 29,001	to	$ 30,000						
$ 30,001	to	$ 35,000						
$ 35,001	to	$ 40,000						
$ 40,001	to	$ 45,000						
$ 45,001	to	$ 50,000						
$ 50,001	to	$ 55,000						
$ 55,001	to	$ 60,000						
$ 60,001	to	$ 65,000						
$ 65,001	to	$ 70,000						
$ 70,001	to	$ 75,000						
$ 75,001	to	$ 80,000						
$ 80,001	to	$ 90,000						
$ 90,001	to	$ 100,000						
$ 100,001	to	$ Maximum						
Total								

*Personal residential zero deductible statewide flood loss using the modeling organization specified, predetermined and comprehensive exposure dataset.

Part B – Personal Residential Flood Probable Maximum Loss for Florida (Annual Aggregate)

Annual Exceedance Probability	Estimated Flood Loss Level	Uncertainty Interval	Conditional Tail Expectation
Top Event			---
0.001			
0.002			
0.004			
0.01			
0.02			
0.05			
0.10			
0.20			

Part C – Personal Residential Flood Probable Maximum Loss for Florida (Annual Occurrence)

Annual Exceedance Probability	Estimated Flood Loss Level	Uncertainty Interval	Conditional Tail Expectation
Top Event			---
0.001			
0.002			
0.004			
0.01			
0.02			
0.05			
0.10			
0.20			

COMPUTER/INFORMATION FLOOD STANDARDS

CIF-1 Flood Model Documentation

A. Flood model functionality and technical descriptions shall be documented formally in an archival format separate from the use of letters, slides, and unformatted text files.

B. The modeling organization shall maintain a primary document repository, containing or referencing a complete set of documentation specifying the flood model structure, detailed software description, and functionality. Documentation shall be indicative of accepted model development and software engineering practices.

C. All computer software (i.e., user interface, scientific, engineering, actuarial, data preparation, and validation) relevant to the model shall be consistently documented and dated.

D. The modeling organization shall maintain a table of all substantive changes in the flood model since this year's initial submission.

E. Documentation shall be created separately from the source code.

Purpose: This standard requires the primary document repository to contain or reference all the elements of the flood model and its development.

In some cases, a user may be offsite, and in others, the users may be modeling organization personnel. In either case, clearly written documentation is necessary to maintain the consistency and survivability of the code, irrespective of specific modeling organization personnel.

Relevant Form: GF-6, Computer/Information Flood Standards Expert Certification

Audit

1. The primary document repository, in either electronic or physical form, and its maintenance process will be reviewed. The repository should contain or reference full documentation of the software.

2. All documentation should be easily accessible from a central location in order to be reviewed.

3. Complete user documentation, including all recent updates, will be reviewed.

4. Modeling organization personnel, or their designated proxies, responsible for each aspect of the software (i.e., user interface, quality assurance, engineering, actuarial, verification) should be present when the Computer/Information Flood Standards are being reviewed. Internal users of the software will be interviewed.

5. Verification that documentation is created separately from, and is maintained consistently with, the source code will be reviewed.

6. The tables specified in CIF-1.D that contain the items listed in Standard GF-1, Scope of the Flood Model and Its Implementation, Audit 5 will be reviewed. The tables should contain the item number in the first column. The remaining five columns should contain specific document or file references for affected components or data relating to the following Computer/Information Flood Standards: CIF-2, Flood Model Requirements, CIF-3, Flood Model Architecture and Component Design, CIF-4, Flood Model Implementation, CIF-5, Flood Model Verification, and CIF-6, Flood Model Maintenance and Revision.

7. Tracing of the flood model changes specified in Standard GF-1, Scope of the Flood Model and Its Implementation, Audit 5 through all Computer/Information Flood Standards will be reviewed.

CIF-2 Flood Model Requirements

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 flood model.

Purpose: Software development begins with a thorough specification of requirements for each component, database, or data file accessed by a component. These requirements are frequently documented informally in natural language, with the addition of flowcharts and other illustrations that aid both users and software engineers in specifying components, databases, or data files accessed by a component for the software product and process. Requirements drive the design and implementation of the flood model.

A typical division of requirements into categories would include:

1. ***Interface:*** For example, use the web browser Internet Explorer, with ActiveX technology, to show county and ZIP Code maps of Florida. Allow text search commands for browsing and locating counties.

2. ***Human Factors:*** For example, ZIP Code boundaries, and contents, can be scaled to the extent that the average user can visually identify residential home exposures marked with small circles.

3. ***Functionality:*** For example, make the software design at the topmost level a data flowchart containing the following components: FLOODS, TERRAIN, FLOOD ELEVATION AND DEPTH, WAVE CONDITIONS, FLOOD EXTENT, DAMAGE, and LOSS COSTS. Write the low-level code in Java.

4. ***Documentation:*** For example, use Acrobat PDF for the layout language, and add PDF hyperlinks in documents to connect the sub-documents.

5. ***Data:*** For example, store the vulnerability data in an Excel spreadsheet using a different sheet for each construction type.

6. ***Human Resources:*** For example, task individuals for the six-month coding of the flood extent and depth simulation. Ask others to design the user-interface by working with the Quality Assurance team.

7. ***System Models:*** For example, models with representations of software, data, and associated human collaboration, will use Business Process Model and Notation (BPMN), Unified Modeling Language (UML), or Systems Modeling Language (SysML).

8. ***Security:*** For example, store tapes off-site, with incremental daily backups. Password-protect all source files.

9. ***Quality Assurance:*** For example, filter insurance claims data against norms and extremes created for the last project.

Relevant Form: GF-6, Computer/Information Flood Standards Expert Certification

Disclosure

1. Provide a description of the documentation for interface, human factors, functionality, documentation, data, human and material resources, security, and quality assurance.

Audit

1. Maintenance and documentation of a complete set of requirements for each software component, database, and data file accessed by a component will be reviewed.

CIF-3 Flood Model Architecture and Component Design

The modeling organization shall maintain and document (1) detailed control and data flowcharts and interface specifications for each software component, (2) schema definitions for each database and data file, (3) flowcharts illustrating flood model-related flow of information and its processing by modeling organization personnel or consultants, and (4) system model representations associated with (1)-(3). Documentation shall be to the level of components that make significant contributions to the flood model output.

Purpose: Component-based design is essential in creating system models and software that reduce errors and promote comprehension of the role for each component. Moreover, the component network needs to be shown to operate "as a whole." Example components include FLOODS, TERRAIN, FLOOD ELEVATION AND DEPTH, WAVE CONDITIONS, FLOOD EXTENT, DAMAGE, and LOSS COSTS, and the major components of each. The purpose of each example component is, as follows:

1. FLOODS accepts historical flood event data sources and generates historical and stochastic flood events;

2. TERRAIN accepts topographic, bathymetric, and land use/land cover data and produces ground surface characteristics used by FLOOD ELEVATION AND DEPTH, WAVE CONDITIONS, and FLOOD EXTENT;

3. FLOOD ELEVATION AND DEPTH accepts the output from FLOODS and TERRAIN and produces a stillwater flood surface and site-specific flood depths throughout the area inundated by a flood event;

4. WAVE CONDITIONS accepts the output from FLOODS, FLOOD ELEVATION AND DEPTH, and TERRAIN and produces wave characteristics and wave elevations throughout the area inundated by a coastal flood event;

5. FLOOD EXTENT accepts the output from FLOOD ELEVATION AND DEPTH, TERRAIN, and WAVE CONDITIONS and generates the horizontal limits of flooding for a flood event;

6. DAMAGE accepts the output from FLOOD ELEVATION AND DEPTH and WAVE CONDITIONS and generates flood damage to personal residential property;

7. LOSS COSTS accepts the output from DAMAGE and generates loss costs.

Relevant Form: GF-6, Computer/Information Flood Standards Expert Certification

Audit

1. The following will be reviewed:
    a. Detailed control and data flowcharts, completely and sufficiently labeled for each component,
    b. Interface specifications for all components in the flood model,
    c. Documentation for schemas for all data files, along with field type definitions,
    d. Each network flowchart including components, sub-component flowcharts, arcs, and labels, and
    e. Flowcharts illustrating flood model-related information flow among modeling organization personnel or consultants (e.g., BPMN, UML, SysML, or equivalent technique including a modeling organization internal standard).

2. A flood model component custodian, or designated proxy, should be available for the review of each component.

CIF-4 Flood Model Implementation

A. The modeling organization shall maintain a complete procedure of coding guidelines consistent with accepted software engineering practices.

B. The modeling organization shall maintain a complete procedure used in creating, deriving, or procuring and verifying databases or data files accessed by components.

C. All components shall be traceable, through explicit component identification in the model representations (e.g., flowcharts) down to the code level.

D. The modeling organization shall maintain a table of all software components affecting flood loss costs and flood probable maximum loss levels, 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.

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.

F. The modeling organization shall maintain the following documentation for all components or data modified by items identified in Standard GF-1, Scope of the Flood Model and Its Implementation, Audit 5:

1. A list of all equations and formulas used in documentation of the flood model with definitions of all terms and variables.

2. A cross-referenced list of implementation source code terms and variable names corresponding to items within F.1 above.

Purpose: A high-level graphical view of a program promotes understanding, maintenance, and evolution. All compositions are to be made clear through explicit textual or interactively supported reference within each graphical component. Each component is refined into subcomponents, and at the end of the component tree there are blocks of code. All documentation and binder identifications are to be referenced within this tree. This creates a traceable design from aggregate components down to the code level.

Relevant Form: GF-6, Computer/Information Flood Standards Expert Certification

Disclosure

1. Specify the hardware, operating system, other software, and all computer languages required to use the flood model.

Audit

1. The interfaces and the coupling assumptions will be reviewed.

2. The documented coding guidelines, including procedures for ensuring readable identifiers for variables, constants, and components, and confirmation that these guidelines are uniformly implemented will be reviewed.

3. The procedure used in creating, deriving, or procuring and verifying databases or data files accessed by components will be reviewed.

4. The traceability among components at all levels of representation will be reviewed.

5. The following information will be reviewed for each component, either in a header comment block, source control database, or the documentation:
    a. Component name,
    b. Date created,
    c. Dates modified, modification rationale, and by whom,
    d. Purpose or function of the component, and
    e. Input and output parameter definitions.

6. The table of all software components as specified in CIF-4.D will be reviewed.

7. Flood model components and the method of mapping to elements in the computer program will be reviewed.

8. Comments within components will be reviewed for sufficiency, consistency, and explanatory quality.

CIF-5 Flood Model Verification

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.

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 flood model components. Sufficient testing shall be performed to ensure that all components have been executed at least once.

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.

Purpose: This standard requires tests to be run by varying component inputs to ensure correct output. Invariants are one method of achieving verification, where one brackets a block of code to ensure that data values do not stray from their required ranges. Other methods of verification include hand-calculations or parallel coding efforts (using a different language or tool, but with the same requirements).

Relevant Form: GF-6, Computer/Information Flood Standards Expert Certification

Disclosures

1. State whether any two executions of the flood model with no changes in input data, parameters, code, and seeds of random number generators produce the same flood loss costs and flood probable maximum loss levels.

2. Provide an overview of the component testing procedures.

3. Provide a description of verification approaches used for externally acquired data, software, and models.

Audit

1. The components will be reviewed for containment of sufficient logical assertions, exception-handling mechanisms, and flag-triggered output statements to test the correct values for key variables that might be subject to modification.

2. The testing software used by the modeling organization will be reviewed.

3. The component (unit, regression, aggregation) and data test processes and documentation will be reviewed including compliance with independence of the verification procedures.

4. Fully time-stamped, documented cross-checking procedures and results for verifying equations, including tester identification, will be reviewed. Examples include mathematical calculations versus source code implementation, or the use of multiple implementations using different languages.

5. Flowcharts defining the processes used for manual and automatic verification will be reviewed.

6. The response to Disclosure 1 will be reviewed.

7. Verification approaches used for externally acquired data, software, and models will be reviewed.

CIF-6 Flood Model Maintenance and Revision

A. The modeling organization shall maintain a clearly written policy for flood model review, maintenance, and revision, including verification and validation of revised components, databases, and data files.

B. A revision to any portion of the flood model that results in a change in any Florida personal residential flood loss cost or flood probable maximum loss level shall result in a new flood model version identification.

C. The modeling organization shall use tracking software to identify and describe all errors, as well as modifications to code, data, and documentation.

D. The modeling organization shall maintain a list of all flood model versions since the initial submission for this year. Each flood model description shall have a unique version identification and a list of additions, deletions, and changes that define that version.

Purpose: The Commission will determine to be acceptable only those flood models for which the owners have a clearly written policy for flood model revision with respect to methodologies and data.

Once the software is constructed, it is essential to track and maintain all source code, data, and documentation through a unique version identification system.

Relevant Form: GF-6, Computer/Information Flood Standards Expert Certification

Disclosures

1. Identify procedures used to review and maintain code, data, and documentation.

2. Describe the rules underlying the flood model and code revision identification systems.

Audit

1. All policies and procedures used to review and maintain the code, data, and documentation will be reviewed. For each component in the system decomposition, the installation date under configuration control, the current version identification, and the date of the most recent change(s) will be reviewed.

2. The policy for flood model revision and management will be reviewed.

3. Portions of the code will be reviewed.

4. The tracking software will be reviewed and checked for the ability to track date and time.

5. The list of all flood model revisions as specified in CIF-6.D will be reviewed.

CIF-7 Flood Model Security

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 flood 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.

Purpose: Security procedures are necessary to maintain an adequate, secure, and correct base for code, data, and documentation. The modeling organization is expected to have a secure location supporting all code, data, and documentation development and maintenance. Necessary measures include, but are not limited to, (1) virus protection, (2) limited access protocols for software, hardware, and networks, and (3) backup and redundancy procedures.

Relevant Form: GF-6, Computer/Information Flood Standards Expert Certification

Disclosure

1. Describe methods used to ensure the security and integrity of the code, data, and documentation.

Audit

1. The written policy for all security procedures and methods used to ensure the security of code, data, and documentation will be reviewed.

2. Documented security procedures for access, client flood model use, anti-virus software installation, and off-site procedures in the event of a catastrophe will be reviewed.

WORKING DEFINITIONS OF TERMS USED IN THE DISCUSSION FLOOD STANDARDS

Working Definitions of Terms Used in the Discussion Flood Standards

(These terms are meant to be specific to the Discussion Flood Standards)

Actual Cash Value (ACV):

Cost of replacing damaged or destroyed property with comparable new property minus depreciation.

Actuary:

A highly specialized professional with mathematical and statistical sophistication trained in the risk aspects of insurance, whose functions include the calculations involved in determining proper insurance rates, evaluating reserves, and various aspects of insurance research; a member of the Casualty Actuarial Society or Society of Actuaries with requisite experience.

Acyclic Graph:

A graph containing no cycles.

Additional Living Expense (ALE):

If a home becomes uninhabitable due to a covered loss, ALE coverage pays for the extra costs of housing, dining expenses, etc. up to the limits for ALE in the policy.

Aggregate Data:

Summarized datasets or data summarized by using different variables. For example, data summarizing the exposure amounts by line of business by ZIP Code is one set of aggregated data.

Annual Aggregate Loss Distributions:

For the Commission's purposes, the aggregate losses which are expected to occur for all flood events in any one year. Another way to state it is the aggregate probable maximum loss. See below for Probable Maximum Loss (PML).

Annual Exceedance Probability:

Probability of an annual loss outcome greater than a specified value. Reciprocal of the return period.

Annual Occurrence Loss Distribution:

For the Commission's purposes, the distribution of the largest loss that is expected to occur for all modeled flood events in each year.

Antecedent Soil Conditions:

The initial conditions (generally related to moisture content) of a soil preceding a precipitation or flood event, which affect the soil infiltration rate and maximum infiltration volume. The antecedent conditions of soil can have a large impact on rainfall

runoff, due to the ability (or inability) of the soil to absorb water. Antecedent moisture conditions of a soil can be affected by groundwater levels or recent rainfall events.

Appurtenant Structures:

Detached buildings and other structures located on the same property as the principal insured building (e.g., detached garage, fences, swimming pools, patios). For standard flood policies, contracts, and endorsements, appurtenant structures include detached garage only, and for other flood policies, contracts, and endorsements, appurtenant structures include detached garage and may include other detached structures.

Assertion:

A logical expression specifying a program state that must exist or a set of conditions that program variables must satisfy at a particular point during program execution. Types include input assertion, loop assertion, output assertion. Assertions may be handled specifically by the programming language (i.e., with an "assert" statement) or through a condition (i.e., "if") statement.

Average:

Arithmetic average or arithmetic mean.

Average Annual Loss (AAL):

The sum of all losses arising from flood events expected in any one year. The AAL is the expected value of the annual aggregate loss distribution.

Bathymetry:

Spatial variation of ocean depth relative to mean sea level.

Business Process Model and Notation (BPMN):

A graphical representation for specifying business processes in a business process model.

By-Passing Hurricane:

A hurricane which does not make landfall, but still causes damage in Florida.

Calibration:

Process of adjusting values of model input parameters in an attempt to fit appropriate target data sets.

Characteristics (Output):

For the Commission's purposes, resulting values or datasets which are generated by the model through a process of analyzing, evaluating, interpreting, or performing calculations on parameters (input).

Code:

In software engineering, computer instructions and data definitions expressed in a programming language or in a form output by an assembler, compiler, or other translator. *Synonym*: **Program**.

Coding Guidelines:

Organization, format, and style directives in the development of programs and the associated documentation.

Coinsurance:

A specific provision used in a property insurance policy in which an insurer assumes liability only for a proportion of a loss.

Component:

One of the parts that make up a system. A component may be subdivided into other components. The terms "module," "component," and "unit" are often used interchangeably or defined to be sub-elements of one another in different ways depending on the context. For non-object oriented software, a component is defined as the main program, a subprogram, or a subroutine. For object-oriented software, a component is defined as a class characterized by its attributes and component methods.

Component Tree:

An acyclic graph depicting the hierarchical decomposition of a software system or model. *See also*: **System Decomposition**.

Conditional Tail Expectation:

Expected value of the loss above a given loss level.

Condominium Owners Policy:

The coverage provided to the condominium unit owner in a building against damage to the interior of the unit.

Continental Shelf:

A gently sloping undersea plain between a continent and the deep ocean. The shelf represents the extension of a continent's landmass under the ocean.

Control Flow:

The sequence in which operations are performed during the execution of a computer program. *Contrast with*: **Data Flow**.

Conversion Factor:

Either the ratio of the 1-minute 10-meter wind to a reference wind (e.g., another level, gradient wind, or boundary layer depth-average), or a constant used to convert one unit of measure to another (as in 1 knot = 1.15 mph).

Correctness:

(1) The degree to which a system or component is free from faults in its specification, design, and implementation; (2) the degree to which software, documentation, or other items comply with specified requirements.

Current State-of-the-Science:

A technique, methodology, process, or data that clearly advances or improves the science and may or may not be of a proprietary nature. Such advancement or improvement should be agreed upon and acceptable to the Commission. Includes currently accepted scientific literature.

Currently Accepted Scientific Literature:

Published in a refereed or peer reviewed journal specific to the academic discipline involved and recognized by the academic community as an advancement or significant contribution to the literature which has not been superseded or replaced by more recent literature.

Damage:

(1) Physical harm caused to something in such a way as to impair its value, usefulness, or normal function; (2) the Commission recognizes that the question, "What is the damage to the house?" may be answered in a number of ways. In constructing their models, the modeling organizations assess "losses" in more than one way, depending on the use to which the information is to be put in the model. A structural engineer might determine that a house is 55% damaged and consider it still structurally sound. A claims adjuster might look at the same house and determine that 55% damage translates into a total loss because the house will be uninhabitable for some time, and further, because of a local ordinance relating to damage exceeding 50%, will have to be completely rebuilt according to updated building requirements. Since the Commission is reviewing flood models for purposes of personal lines residential rate filings in Florida, loss costs must be a function of insurance damage rather than engineering damage.

Damage Ratio:

Percentage of a property damaged by an event relative to the total cost to rebuild or replace the property of like kind and quality.

Damaging Waves:

Waves with sufficient energy to cause structural damage to a personal residential structure.

Data Flow:

The sequence in which data transfer, use, and transformation are performed during the execution of a computer program. *Contrast with*: **Control Flow**.

Data Validation:

Techniques to assure the needed accuracy, required consistency, and sufficient completeness of data values used in model development and revision.

Datum, Horizontal & Vertical:

The reference specifications of a measurement system, usually a system of coordinate positions on a surface (horizontal datum) or heights above or below a surface (vertical datum). A datum provides a base line reference for numerical values associated with location or height. Common datums used in the U.S. include North American Datum, NAD27 and NAD83 (horizontal) and National Geodetic Vertical Datum, NGVD29 and National American Vertical Datum, NAVD88 (vertical).

Demand Surge:

A sudden and generally temporary increase in the cost of claims due to amplified payments following a flood event or a series of flood events.

Depreciation:

The decrease in the value of property over time.

Discharge:

The volume of water moving through a specifically defined location or two-dimensional area over a quantity of time, usually quantified in cubic feet per second (cfs).

Dry Floodproofing:

Measures that result in a building being watertight, with walls and exterior surfaces substantially impermeable to the passage of floodwater, and with structural components having the capacity to resist flood loads.

Economic Inflation:

With regards to insurance, the trended long-term increase in the costs of coverages brought about by the increase in costs for the materials and services.

Envelope of High Water (EOHW):

The spatial distribution of the maximum depth of water that occurred at each point over the course of a storm event. Over land, depth is determined with respect to land surface elevation, and over ocean, depth is determined with respect to mean sea level plus predicted tide.

Erosion (Flood Induced):

The wearing away, collapse, undermining or subsidence of land during a flood, due to waves or currents exceeding their cyclical levels.

Exception:

A state or condition that either prevents the continuation of program execution or initiates, on its detection, a pre-defined response through the provision of exception-handling capabilities.

Exposure:

The unit of measure of the amount of risk assumed. Rates and loss costs are expressed as dollars per exposure. Sometimes the number of houses is used in homeowner's insurance as a loose equivalent.

Flag-Triggered Output Statements:

Statements that cause intermediate results (output) to be produced based on a Boolean-valued flag. This is a common technique for program testing.

Flood:

A general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties, at least one of which is the policyholder's property, from:

1. Overflow of inland or tidal waters;
2. Unusual and rapid accumulation or runoff of surface waters from any source;
3. Mudflow; or
4. Collapse or subsidence of land along the shore of a lake or similar body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels that result in a flood as defined above.

See s. 627.715(1)(a)5.(b), F.S.

Flood Barriers:

A structural component attached to or constructed around a building or building opening, preceding a flood event, to prevent flood waters from entering a building or area by creating a watertight barrier. Flood barriers can include permanent but movable components, such as watertight doors and seals, or temporary (removable) components, such as floodwall panels.

Floodborne Debris:

Objects carried or moved by floodwaters into a personal residential structure and capable of causing damage to that structure.

Flood, Coastal:

Flood resulting from astronomical tides and/or storm surge.

Flood Control Measure (Major):

Measure undertaken on a large scale, to reduce the presence, depth, or energy of flow or waves in areas that receive flood protection from the measure. Major flood control measures include dams, levees, and floodwalls whose failure could affect hundreds of personal residential properties or more.

Flood Depth:

(1) For flood hazard purposes, flood depth equals flood elevation minus ground elevation; (2) for building vulnerability calculations, flood depth equals flood elevation minus lowest floor elevation. For coastal floods, flood depth is measured from the wave crest elevation or from the water surface including wave runup.

Flood Elevation:

Elevation of the water surface relative to a vertical datum, including coastal wave effects where present. For coastal floods, the flood elevation includes wave setup (wave radiation stress) and is taken at the wave crest elevation or the water surface including wave runup.

Flood Extent:

The horizontal limits of a given flood event, occurring where the ground elevation equals the flood elevation.

Flood Duration:

The length of time in which an area or building is inundated by floodwaters.

Flood Frequency:

The probability, in percentage, that a flood of a specific level will occur or be exceeded in any given year. For example, a flood with a 1% flood frequency (i.e., 1% annual chance) is a flood that has a 1% chance of being equaled or exceeded in any year. This same flood frequency can also be written as a decimal (i.e., 0.01 annual exceedance probability) or a return period, which is the inverse of the decimal (i.e., 100-year return period).

Flood, Inland:

Flood not of coastal origin. Inland floods typically are due to rainfall, runoff, ponding, and include riverine floods, lacustrine floods, and stormwater flooding.

Flood Inundation:

The rising of a body or source of water and its overflowing onto normally dry land.

Flood Life Cycle:

The full progression of flooding conditions, beginning with the initial flood inundation; continuing through the rise, peak, and fall of floodwaters; and ending when floodwaters have receded below the threshold set in the definition of flood.

Flood Mitigation Measure:

Any measure which permanently reduces flood damage to a building by: 1) preventing flood waters from inundating the building (e.g., elevating a building above the estimated flood elevation), or 2) decreasing the damage which flood inundation would cause to a building (e.g., elevating electrical and other flood-susceptible components of the building above the flood elevation, and retrofitting the portions of the building which would be inundated with flood-resistant materials).

Flood Policies, Contracts and Endorsements:

Various ways flood coverage can be offered; see s. 627.715, F.S.

Floodplain:

Any land area susceptible to being inundated by floodwaters from any source.

Floodwater:

The water that inundates an area during a flood, usually containing debris and possible contaminants.

Flowchart:

A diagram that visually depicts information moving through a system identified by iconic representations of components. Components are interconnected by pathways frequently represented by arrows. Examples of flowcharts are (1) flow of data and control, and (2) flow of information in a system comprised of people and machines.

Flow Velocity:

The velocity of water as it moves within a channel or over land, usually quantified in feet per second (ft/s).

Function:

(1) In programming languages, a subprogram, usually with formal parameters, that produces a data value that it returns to the place of the invocation. A function may also produce other changes through the use of parameters; (2) A specific purpose of an entity, or its characteristic action.

Functionality:

The degree to which the intended function of an entity is realized. *See also*: **Function**.

Fundamental Engineering Principles:

The basic engineering tools, physical laws, rules, or assumptions from which other engineering tools can be derived.

Geocoding:

Assignment of a location to geographic coordinates.

Geographic Grid:

An array of cells used to define geographic space. Each cell stores a numeric value that represents a geographic attribute (e.g., elevation) for that unit of space. Data from the grid cells can be compiled into a set of contours or used to create a three-dimensional surface. When the grid is drawn as a map, cells are often assigned colors according to their numeric value. Each grid cell is referenced by its *x,y* coordinate location.

Geographic Information System (GIS):

An integrated collection of computer software and data used to review and manage information about geographic places, analyze spatial relationships, and model spatial processes. A GIS provides a framework for gathering and organizing spatial data and related information so that it can be displayed and analyzed.

Geographic Location Data:

Information related to the geocoding process within the model software.

Ground Up Loss:

Loss to a structure or location prior to the application of a deductible, policy limit, coinsurance penalty, depreciation, exclusion or other policy provision.

Homeowner Insurance Policy (HO):

A package policy for the homeowner that typically combines protection on the structure and contents, additional living expense protection, and personal liability insurance. Homeowner's policies were first developed in the 1950's. Prior to that time, homeowners wishing coverage for fire, theft, and liability had to purchase three separate policies. Homeowner's policies do not cover earthquake or flood. These are sold separately.

Human Factors:

Study of the interrelationships between humans, the tools they use, and the environment in which they live and work. *See also*: **User Interface**.

Hurricane:

A tropical cyclone in which the maximum one-minute average windspeed at 10-meters height is 74 miles per hour or greater.

Implementation:

The process of transforming a design specification into a system realization with components in hardware, software and "humanware." *See also*: **Code**.

Incremental Build:

A system development strategy that begins with a subset of required capabilities and progressively adds functionality through a cyclical build and test approach.

Independent:

An independent characteristic or event is one which is unaffected by the existence of another characteristic or by whether or not another event occurs.

Inflow Angle:

The angle that near-surface hurricane wind vectors make with respect to the azimuthal direction about the storm center. The angle is measured inward toward the storm center. It is a parameter used to transform assumed circular hurricane winds appropriate for the free troposphere to inward directed winds appropriate for the near-surface.

Insurance Policy:

A contractual document which defines the amount and scope of insurance provided by the insurer resulting in a transfer of risk.

Insurance to Value:

The relationship of the amount of insurance to replacement cost. 100% insurance to value means that the amount of insurance equals the replacement cost.

Insured Loss:

The cost to repair/restore property after an insured event, including ALE, payable by the insurance company after the application of policy terms and limits.

Insured Primary Damage:

Damage that is not excess of or secondary to another policy, contract, or endorsement.

Interface Specification:

An unambiguous and complete description of the meaning, type, and format of data exchanges among system components (software, hardware, and "humanware"). *See also*: **User Interface**.

Invariant:

A logical expression that remains true within the context of a code segment.

Lacustrine Flood:

A type of inland flooding usually associated with a generally non-moving water source (e.g., lake, pond) caused by water levels rising and inundating adjacent areas with standing water.

Landfall:

A landfall has occurred when the center of tropical cyclone circulation crosses the coastline from sea to land.

Loss Adjustment Expenses (LAE):

The expenses incurred by an insurer to adjust a claim by a policyholder. These expenses are divided into allocated loss adjustment expenses (ALAE) and unallocated loss adjustment expenses (ULAE). Allocated loss adjustment expenses are specific amounts attributable to individual claims such as attorney's fees and court costs. Unallocated loss adjustment expenses are all other types of LAE.

Loss Costs:

The portion of the insurance premium applicable to the payment of insured losses only, exclusive of insurance company expenses and profits, per unit of insured exposure. Loss costs are generally stated per thousand dollars.

Loss Exceedance Estimate:

The loss amount which would be exceeded at a given level of probability based on a specific exposure data set.

Lowest Floor:

The lowest floor of the lowest enclosed area, including basement, but excluding any unfinished or flood-resistant enclosure, usable solely for vehicle parking, building access, or limited storage, provided that such enclosure is not built so as to render the structure in violation of building code and floodplain management requirements.

Manning *n*:

An empirically-determined coefficient, also known as the Manning's Roughness Coefficient, describing the roughness of a ground and ground-cover combination.

Manufactured Home:

Type of ***Mobile Home***, fabricated in a plant on or after June 15, 1976, in compliance with the federal Manufactured Home Construction and Safety Standard Act, and according to standards promulgated by the U.S. Department of Housing and Urban Development (HUD). Manufactured homes are transportable in one or more sections, eight feet or more in width and built on an integral chassis. They are designed to be used as a dwelling when set in place and connected to the required utilities and includes the plumbing, heating air-conditioning, and electrical systems contained therein. Persons licensed by the Florida Department of Highway Safety and Motor Vehicles must perform installation. The structures are typically covered by mobile/manufactured home insurance policies (MH).

Mobile Home:

Common term used to describe ***Manufactured Home*** (see above). Technically, mobile homes were fabricated prior to June 15, 1976. These structures are covered by mobile/manufactured home insurance policies (MH).

Model:

A comprehensive set of formal structures, data, and components used to capture processes associated with the effects of hurricanes and/or floods and their impacts on personal residential and commercial properties leading to insured losses. These processes include the following: (1) scientific and engineering representations such as equations, pseudo-codes, flowcharts, and source code, (2) all data necessary for producing such losses, and (3) system representations, involving human collaboration and communication, relating to (1) and (2).

Model Architecture:

The structure of components in a program/system, their interrelationships, and the principles and guidelines governing their design and evolution over time.

Model Component Custodian:

The individual who can explain the functional behavior of the component and is responsible for changes (revisions in code, documentation, or data) to that component.

Model Management:

The processes associated with the model lifecycle, including design, creation, implementation, verification, validation, maintenance, and documentation of the model.

Modeling Organization:

The entity(s) encompassing the requisite qualifications and experience (as found in Standard GF-2, Qualifications of Modeling Organization Personnel and Consultants Engaged in Development of the Flood Model) that organize resources to develop and maintain any models that have the potential for improving the accuracy or reliability of the hurricane loss projections used in residential rate filings and/or flood loss projections used in personal residential rate filings.

Model Revision:

The process of changing a model to correct discovered faults, add functional capability, respond to technology advances, or prevent invalid results or unwarranted uses. *See also*: **Regression Test**.

Model Validation:

A comparison between model behavior and empirical (i.e., physical) behavior.

Model Verification:

Assuring that the series of transformations, initiating with requirements and concluding with an implementation, follow the prescribed software development process.

Modular Home:

Dwelling, manufactured off-site and erected/assembled on-site in accordance with Florida Building Code requirements. All site related work (erection, assembly, and other construction at the site, including all foundation work, utility connection, etc.) is subject to local permitting and inspections. Modular homes are typically covered by homeowner insurance policies (i.e., HO-3).

National Flood Insurance Program (NFIP):

The program of flood insurance coverage and floodplain management administered under the National Flood Insurance Act of 1968 (and any amendments to it), and applicable Federal regulations promulgated in Title 44 of the Code of Federal Regulations, Subchapter B.

National Geodetic Vertical Datum of 1929 (NGVD29):

A vertical datum, established in 1929 and renamed in 1973, derived from observed mean sea level at 26 tide gauges in the United States and Canada, and a series of benchmarks established across the United States from those tide gauges.

NOAA:

Acronym for the National Oceanic and Atmospheric Administration.

Non-Tropical Storm:

A storm that has none or only some of the meteorological characteristics of a tropical cyclone. It is driven in part or full by energy sources other than the heat content of seawater. Such storms include but are not limited to extra-tropical cyclones, sub-tropical cyclones, post-tropical cyclones, and remnant lows that may have had tropical origin, as well as mid-latitude cyclones and frontal systems that did not have tropical origins.

North American Vertical Datum of 1988 (NAVD88):

A vertical datum, established in 1991, derived from measurements taken in the United States, Canada, and Mexico to address changes in land surface and the resulting elevation distortions due to the motion of the earth's crust, postglacial rebound, and ground subsidence.

Parameters (Input):

For Commission purposes, values entered into the model which are used, singularly or in combination, to calculate a characteristic (output).

Percolation:

The slow movement of water through the pores in soil or permeable rock, usually occurring under mostly saturated conditions.

Personal Residential Property Insurance:

The type of coverage provided by homeowner's, manufactured home owner's, dwelling, tenant's, condominium unit owner's, cooperative unit owner's, and similar policies; see s. 627.4025, F.S.

Planetary Boundary Layer (PBL) Models:

Mathematical and statistical representations of the planetary boundary layer (PBL). The PBL is the bottom layer of the atmosphere that is in contact with the surface of the earth, and its properties are highly influenced by frictional contact with the surface. The PBL is often turbulent and ranges in depth from tens of meters to several kilometers depending on time of day and surface geography.

Premium:

The consideration paid or to be paid to an insurer for the issuance and delivery of any binder or policy of insurance; see s. 626.014(2), F.S. Premium is the amount charged to the policyholder and includes all taxes and commissions.

Pressure Field:

The spatial distribution of sea level pressure associated with a storm. Typically, the sea level pressure increases radially from a minimum at the storm center until it is indistinguishable from the environmental background pressure.

Probable Maximum Loss (PML):

Given an annual probability, the loss that is likely to be exceeded on a particular portfolio of personal residential exposures in Florida. Modeling organizations can determine the PML on various bases depending on the needs of the user.

Program:

See: **Code**.

Projection, Horizontal & Vertical:

A method by which the curved surface of the earth is portrayed on a flat surface. This generally requires a mathematical transformation of the earth's latitude and longitude, and projections vary by the portion of the earth being depicted. All projections distort distance, area, shape, direction, or some combination thereof. A common horizontal projection system used in Florida is State Plane Coordinates, divided into three zones: north, east, and west. Vertical components are added to a horizontal projection (*x*,*y* coordinates) to create a projected coordinate system (*x*,*y*,*z* coordinates).

Property Insurance:

Insurance on real or personal property of every kind, whether the property is located on land, on water, or in the air, against loss or damage from any and all perils (hazards or causes); see s. 624.604, F.S.

Quality Assurance:

The responsibility and consequent procedures for achieving the targeted levels of quality in the model and the continual improvement of the model development process.

Rate:

The amount by which the exposure is multiplied to determine the premium; see s. 627.041(1), F.S. Rate times exposure equals premium.

Regression Test:

A procedure that attempts to identify new faults that might be introduced in the changes to remove existing deficiencies (correct faults, add functionality, or prevent user errors). A regression test is a test applied to a new version or release to verify that it performs the intended functions without introducing new faults or deficiencies. This procedure is not to be confused with ordinary least squares as used in statistics. *See also*: **Model Revision**.

Replacement Cost:

The cost to replace damaged property with a new item of like kind and quality.

Residential Property Insurance:

See s. 627.4025, F.S. *See also:* **Personal Residential Property Insurance**.

Requirements Specification:

A document that specifies the requirements for a system or component. Typically included are functional requirements, performance requirements, interface requirements, design requirements, quality requirements, and development standards.

Return Period:

The reciprocal of an annual exceedance probability of a given loss or set of events.

Riverine Flood:

A type of inland flooding usually associated with a watercourse (e.g., river, stream) which results in water overflowing the banks of the watercourse and inundating adjacent areas with moving water. The velocity of the floodwater can be a major factor in the resulting damage and injuries associated with the flood.

Roughness:

Surface characteristics capable of disrupting airflow. Roughness elements may be natural (e.g., mountains, trees, grasslands) or man-made (e.g., buildings, bridges).

Salinity:

The dissolved salt content of water, often expressed as a mass fraction. Typical salinity of seawater is 35 parts per thousand, but values vary due to river input, precipitation, evaporation, and other factors.

Schema:

(1) A complete description of the structure of a database pertaining to a specific level of consideration; (2) The set of statements, expressed in a data definition language, that completely describes the structure of a database.

Sea Surface Drag Coefficient:

The ratio of the wind stress on the sea surface to the 10-meter wind kinetic energy. It is used to relate the near-surface windspeed to the sea surface wind stress required for storm surge modeling. The coefficient is estimated semi-empirically and is observed to be a function of windspeed.

Sensitivity:

The effect that a change in the value of an input variable will have on the output of the model.

Sensitivity Analysis:

Determination of the magnitude of the change in response of a model to changes in model inputs and specifications.

Site-Built Home:

Dwelling that is constructed on the building site in accordance with the Florida Building Code. All site related work (foundation, building, and other construction at the site, utility connection, etc.) is subject to local permitting and inspections. Site-built homes are typically covered by homeowner insurance policies (i.e., HO-3).

SLOSH:

Acronym for Sea, Lake and Overland Surges from Hurricanes. SLOSH is a National Weather Service (NWS) computer model developed to estimate storm surge heights resulting from historical, hypothetical, or predicted hurricanes by taking into account the atmospheric pressure (difference between central pressure and ambient pressure far from the storm), radius of maximum winds, and track data (forward speed and direction).

Software Engineering:

The application of a systematic, disciplined, and quantifiable approach to the design, development, operation, and maintenance of software; that is, the application of engineering to software.

Soil Infiltration:

The downward entry of water into the soil or rock surface.

Soil Infiltration Rate:

The rate at which a soil under specified conditions absorbs falling rain, melting snow, or surface water, expressed in depth of water per unit of time (e.g., inches/hour). Infiltration rate usually has a rapid decline with time from the beginning of infiltration and reaches a steady state as the soil eventually becomes saturated. At this stage, the infiltration rate would be approximately equal to the percolation rate.

Special Loss Settlement:

Loss provision used by National Flood Insurance Program (NFIP) for manufactured homes equal to the minimum of the following three quantities: replacement cost, 1.5 times actual cash value, and policy limit.

Standard Flood Insurance:

Insurance that must cover only losses from the peril of flood equivalent to that provided under a standard flood insurance policy under the National Flood Insurance Program (NFIP). Standard flood insurance issued in Florida must provide the same coverage, including deductible and adjustment of losses, as that provided under a standard flood insurance policy under the NFIP; see s. 627.715, F.S.

Statistical Terms:

Definitions of statistical terms are available in: A Dictionary of Statistical Terms, Fifth Edition, F.H.C. Marriott, John Wiley & Sons, 1990.

Stillwater Elevation:

The elevation of the water surface (relative to a vertical datum) resulting from freshwater inputs, and where present, astronomical tides and storm surge. For coastal floods, the stillwater elevation may include wave setup (wave radiation stress) but excludes coastal wave forms (wave height, wave runup) that fluctuate above and below the stillwater elevation.

Storm Surge:

An abnormal rise in sea level accompanying a storm, and whose height is the difference between the observed level of the sea surface and the level that would have occurred in the absence of the storm. Storm surge is usually estimated by subtracting the normal or astronomical tide from the observed storm tide.

Storm Tide:

The level of the sea surface including the effects of both the storm and the astronomical tide.

Storm Track:

The path along that a tropical cyclone has already moved.

Stormwater:

Water from precipitation events which typically runs off impervious (e.g., paved) areas and is then conveyed via roadways and other impervious areas into systems of swales, ditches, pipes, channels, and ponds. Stormwater usually contains contaminants from impervious areas (e.g., oil, chemicals) and can accumulate to cause flooding during larger precipitation events.

Sub-Component:

A component that is encapsulated within another component. *See also*: **Component Tree**.

Surface Water Flood:

Flooding caused by the accumulation of above-ground water which is not associated with a specific watercourse or water body. Surface water flooding excludes water from increased ground water levels.

System Decomposition:

The hierarchical division of a system into components. *See also*: **Component Tree**.

Systems Modeling Language (SysML):

A general-purpose modeling language for systems engineering applications that supports the specification, analysis, design, verification, and validation of a broad range of systems and systems-of-systems.

Temporary Flood Protection Measures:

Any measure temporarily installed preceding a flood event to protect a building or area from inundation by floodwaters, which is then removed after the flood event.

Terrain:

Terrain or terrain roughness for structures or a site is determined by the surface area surrounding the site including other structures (height and density) and topographic features such as ground elevation, vegetation or trees, and bodies of water.

Test:

A phase in the software (model) development process that focuses on the examination and dynamic analysis of execution behavior. Test plans, test specifications, test procedures, and test results are the artifacts typically produced in completing this phase.

Testing:

Software testing involves executing an implementation of the software with test data and examining the outputs of the software and its operational behavior to check that it is performing as required. Testing is a dynamic technique of verification and validation because it works with an executable representation of the system. Typical testing approaches include (1) unit, (2) aggregation, (3) regression, and (4) functional testing.

Time Element Coverage:

Insurance for a covered incident resulting in loss of use of property for a period of time. The loss is considered to be time lost, not actual property damage. Examples of time element coverage include business interruption, extra expense, rents and rental value, additional living expenses, and leasehold interest coverage.

Topography:

A detailed graphic description or representation of the natural and artificial surface features of an area of land, in a way to show relative positions and elevations, and usually not including portions of land which are always or normally submerged. *See also:* **Bathymetry**.

Tropical Cyclone:

A generic term for a non-frontal synoptic-scale cyclone originating over tropical or subtropical waters with organized convection and definite cyclonic surface wind circulation.

Tropical Storm:

A tropical cyclone in which the maximum one-minute average windspeed at 10-meters height ranges from 39 to 73 miles per hour inclusive.

Uncertainty Analysis:

Determination of the variation or imprecision in model output resulting from the collective variation in the model inputs.

Underwriting:

The process of identifying and classifying the potential degree of risk represented by a proposed exposure unit. Potential insureds that satisfy an insurer's underwriting standards are offered insurance or are offered a renewal while others are declined or non-renewed.

Unified Modeling Language (UML):

A standardized modeling language in software engineering using graphic notation to create visual models of software systems. This language is designed to enable software developers to specify, visualize, construct, and document artifacts in object-oriented software development.

Unit:

Synonym: **Component**.

Unit Test:

Each component is tested on its own, isolated from the other components in the system.

User:

A person who uses a computer to execute code, to provide the code with input through a user interface, or to obtain textual or visual output.

User Documentation:

Documentation describing a way in which a system or component is to be used to obtain desired results. *See also*: **User Manual**.

User Interface:

An interface that enables information to be passed between a human user and hardware or software components of a computer system. *See also*: **Interface Specification**.

User Manual:

A document that presents the information necessary to employ a system or component to obtain desired results. Typically described are system or component capabilities, limitations, options, permitted inputs, expected outputs, possible error messages, and special instructions.

Validation:

The process of determining the degree to which a model or simulation is an accurate representation of the real-world from the perspective of the intended uses of the model or simulation.

Verification:

The process of determining that a model representation accurately represents the developer's conceptual description, specification, and requirements. Verification also evaluates the extent to which the model development process is based on sound and established software engineering techniques. Testing, inspections, reviews, calculation crosschecks and walkthroughs, applied to design and code, are examples of verification techniques. *See also*: **Walkthrough**.

Version:

(1) An initial release or re-release of a computer software configuration item, associated with a complete compilation or recompilation of the computer software configuration item; (2) an initial release or complete re-release of a document, as opposed to a revision resulting from issuing change pages to a previous release; (3) an initial release or re-release of a database or file.

Vulnerability Function:

The curve that represents the damage ratios expected at various flood depths for a given structural type.

Walkthrough:

A static analysis technique in which a designer or programmer leads members of the development team and other interested parties through a segment of the documentation or code, and the participants ask questions and make comments about possible errors, violation of development standards, and other problems.

Water Intrusion:

Penetration of water from outside the structure into the structure, by means not included in the definition of flood.

Wave Crest Elevation:

Elevation (relative to vertical datum) of the top (crest) of a coastal wave. The wave crest elevation must be above the stillwater elevation.

Wave Height:

The vertical distance between the crest and the preceding trough of a wave.

Wave Runup:

The rush of water up a slope or structure face. Wave runup occurs as waves break and run up above the stillwater elevation.

Wave Runup Elevation:

Elevation (relative to vertical datum) that a wave runs up a slope or structure face. The wave runup elevation must be above the stillwater elevation.

Wave Setup (Wave Radiation Stress):

Superelevation of the water surface over normal storm surge elevation due to onshore mass transport of water by wave action alone.

Wet Floodproofing:

Measures that allow floodwaters to enter a building while preventing or providing resistance to flood damage to the building and its contents.

Windfield:

The area of winds associated with a tropical cyclone. Winds are typically asymmetric in a moving tropical cyclone with winds in the right front quadrant, relative to motion, being strongest.

III. APPENDICES

Figure 2

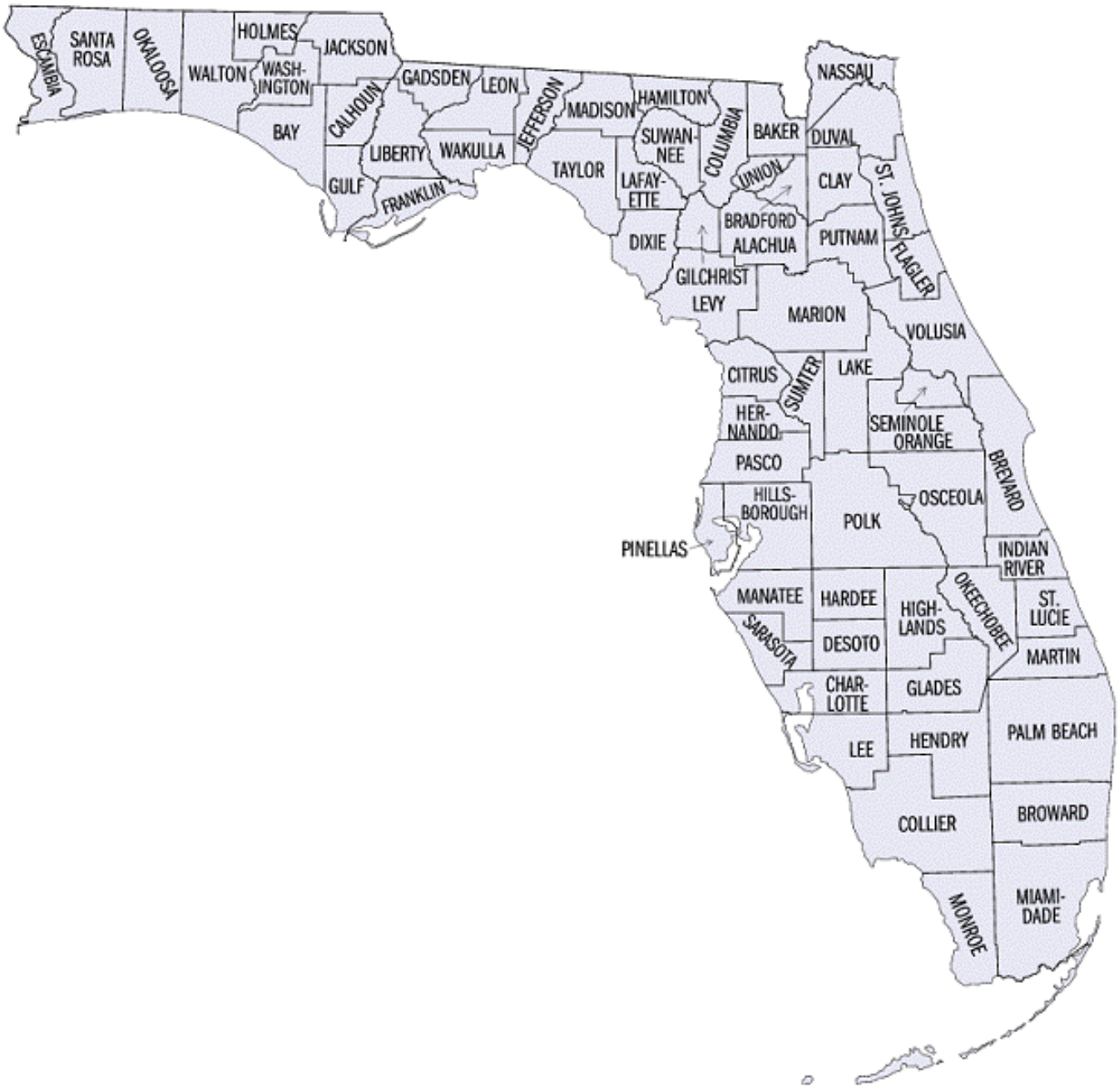
Florida County Codes

County Code	County Name	County Code	County Name	County Code	County Name
001	Alachua	**049**	Hardee	**093**	Okeechobee
003	Baker	**051**	Hendry	**095**	Orange
005	Bay	**053**	Hernando	**097**	Osceola
007	Bradford	**055**	Highlands	**099**	Palm Beach
009	Brevard	**057**	Hillsborough	**101**	Pasco
011	Broward	**059**	Holmes	**103**	Pinellas
013	Calhoun	**061**	Indian River	**105**	Polk
015	Charlotte	**063**	Jackson	**107**	Putnam
017	Citrus	**065**	Jefferson	**109**	St. Johns
019	Clay	**067**	Lafayette	**111**	St. Lucie
021	Collier	**069**	Lake	**113**	Santa Rosa
023	Columbia	**071**	Lee	**115**	Sarasota
027	De Soto	**073**	Leon	**117**	Seminole
029	Dixie	**075**	Levy	**119**	Sumter
031	Duval	**077**	Liberty	**121**	Suwannee
033	Escambia	**079**	Madison	**123**	Taylor
035	Flagler	**081**	Manatee	**125**	Union
037	Franklin	**083**	Marion	**127**	Volusia
039	Gadsden	**085**	Martin	**129**	Wakulla
041	Gilchrist	**086**	Miami-Dade	**131**	Walton
043	Glades	**087**	Monroe	**133**	Washington
045	Gulf	**089**	Nassau		
047	Hamilton	**091**	Okaloosa		

Note: These codes are derived from the Federal Information Processing Standards (FIPS) Codes.

Figure 3

State of Florida
By County



Acronyms Used in the Discussion Flood Standards

(These acronyms are meant to be specific to the Discussion Flood Standards)

AAL	Average Annual Loss
ACV	Actual Cash Value
ALAE	Allocated Loss Adjustment Expenses
ALE	Additional Living Expense
BPMN	Business Process Model and Notation
Commission	Florida Commission on Hurricane Loss Projection Methodology
cfs	Cubic Feet per Second
CS	Committee Substitute
EOHW	Envelope of High Water
FIPS	Federal Information Processing Standards
F.S.	Florida Statutes
ft/s	Feet per Second
FWMD	Florida Water Management District
GIS	Geographic Information System
HO	Homeowner Insurance Policy
HUD	U.S. Department of Housing and Urban Development
HURDAT2	Hurricane Data 2nd generation
LAE	Loss Adjustment Expenses
LULC	Land Use Land Cover
MH	Manufactured Home Insurance Policy
mph	Miles per Hour
MRLC	Multi-Resolution Land Characteristics
n	Gauckler-Manning roughness coefficient
NA	Not Applicable
NAD	North American Datum
NAVD	North American Vertical Datum
NFIP	National Flood Insurance Program
NGVD	National Geodetic Vertical Datum
NLCD	National Land Cover Database
NOAA	National Oceanic & Atmospheric Administration
NWS	National Weather Service
PBL	Planetary Boundary Layer
PML	Probable Maximum Loss
ROA	Report of Activities
s	Section of Florida Statutes
SB	Senate Bill
SBA	State Board of Administration
SLOSH	Sea, Lake, and Overland Surges from Hurricanes
SysML	Systems Modeling Language
ULAE	Unallocated Loss Adjustment Expenses
UML	Unified Modeling Language
USGS	United States Geological Survey
WGS	World Geodetic System
ZIP	Zone Improvement Plan

627.0628 Florida Commission on Hurricane Loss Projection Methodology; public records exemption; public meetings exemption.–

(1) LEGISLATIVE FINDINGS AND INTENT.–

(a) Reliable projections of hurricane losses are necessary in order to assure that rates for residential property insurance meet the statutory requirement that rates be neither excessive nor inadequate. The ability to accurately project hurricane losses has been enhanced greatly in recent years through the use of computer modeling. It is the public policy of this state to encourage the use of the most sophisticated actuarial methods to assure that consumers are charged lawful rates for residential property insurance coverage.

(b) The Legislature recognizes the need for expert evaluation of computer models and other recently developed or improved actuarial methodologies for projecting hurricane losses, in order to resolve conflicts among actuarial professionals, and in order to provide both immediate and continuing improvement in the sophistication of actuarial methods used to set rates charged to consumers.

(c) It is the intent of the Legislature to create the Florida Commission on Hurricane Loss Projection Methodology as a panel of experts to provide the most actuarially sophisticated guidelines and standards for projection of hurricane losses possible, given the current state of actuarial science. It is the further intent of the Legislature that such standards and guidelines must be used by the State Board of Administration in developing reimbursement premium rates for the Florida Hurricane Catastrophe Fund, and, subject to paragraph (3)(d), must be used by insurers in rate filings under s. 627.062 unless the way in which such standards and guidelines were applied by the insurer was erroneous, as shown by a preponderance of the evidence.

(d) It is the intent of the Legislature that such standards and guidelines be employed as soon as possible, and that they be subject to continuing review thereafter.

(e) The Legislature finds that the authority to take final agency action with respect to insurance ratemaking is vested in the Office of Insurance Regulation and the Financial Services Commission, and that the processes, standards, and guidelines of the Florida Commission on Hurricane Loss Projection Methodology do not constitute final agency action or statements of general applicability that implement, interpret, or prescribe law or policy; accordingly, chapter 120 does not apply to the processes, standards, and guidelines of the Florida Commission on Hurricane Loss Projection Methodology.

(2) COMMISSION CREATED.–

(a) There is created the Florida Commission on Hurricane Loss Projection Methodology, which is assigned to the State Board of Administration. For the purposes of this section,

the term "commission" means the Florida Commission on Hurricane Loss Projection Methodology. The commission shall be administratively housed within the State Board of Administration, but it shall independently exercise the powers and duties specified in this section.

(b) The commission shall consist of the following 12 members:
1. The insurance consumer advocate.
2. The senior employee of the State Board of Administration responsible for operations of the Florida Hurricane Catastrophe Fund.
3. The Executive Director of the Citizens Property Insurance Corporation.
4. The Director of the Division of Emergency Management.
5. The actuary member of the Florida Hurricane Catastrophe Fund Advisory Council.
6. An employee of the office who is an actuary responsible for property insurance rate filings and who is appointed by the director of the office.
7. Five members appointed by the Chief Financial Officer, as follows:
   a. An actuary who is employed full time by a property and casualty insurer that was responsible for at least 1 percent of the aggregate statewide direct written premium for homeowner insurance in the calendar year preceding the member's appointment to the commission.
   b. An expert in insurance finance who is a full-time member of the faculty of the State University System and who has a background in actuarial science.
   c. An expert in statistics who is a full-time member of the faculty of the State University System and who has a background in insurance.
   d. An expert in computer system design who is a full-time member of the faculty of the State University System.
   e. An expert in meteorology who is a full-time member of the faculty of the State University System and who specializes in hurricanes.
8. A licensed professional structural engineer who is a full-time faculty member in the State University System and who has expertise in wind mitigation techniques. This appointment shall be made by the Governor.

(c) Members designated under subparagraphs (b)1.-5. shall serve on the commission as long as they maintain the respective offices designated in subparagraphs (b)1.-5. The member appointed by the director of the office under subparagraph (b)6. shall serve on the commission until the end of the term of office of the director who appointed him or her, unless removed earlier by the director for cause. Members appointed by the Chief Financial Officer under subparagraph (b)7. shall serve on the commission until the end of the term of office of the Chief Financial Officer who appointed them, unless earlier removed by the Chief Financial Officer for cause. Vacancies on the commission shall be filled in the same manner as the original appointment.

(d) The State Board of Administration shall annually appoint one of the members of the commission to serve as chair.

(e) Members of the commission shall serve without compensation, but shall be reimbursed for per diem and travel expenses pursuant to s. 112.061.

(f) The State Board of Administration shall, as a cost of administration of the Florida Hurricane Catastrophe Fund, provide for travel, expenses, and staff support for the commission.

(g) There shall be no liability on the part of, and no cause of action of any nature shall arise against, any member of the commission, any member of the State Board of Administration, or any employee of the State Board of Administration for any action taken in the performance of their duties under this section. In addition, the commission may, in writing, waive any potential cause of action for negligence of a consultant, contractor, or contract employee engaged to assist the commission.

(3) ADOPTION AND EFFECT OF STANDARDS AND GUIDELINES.–

(a) The commission shall consider any actuarial methods, principles, standards, models, or output ranges that have the potential for improving the accuracy of or reliability of the hurricane loss projections used in residential property insurance rate filings and flood loss projections used in rate filings for personal lines residential flood insurance coverage. The commission shall, from time to time, adopt findings as to the accuracy or reliability of particular methods, principles, standards, models, or output ranges.

(b) The commission shall consider any actuarial methods, principles, standards, or models that have the potential for improving the accuracy of or reliability of projecting probable maximum loss levels. The commission shall adopt findings as to the accuracy or reliability of particular methods, principles, standards, or models related to probable maximum loss calculations.

(c) In establishing reimbursement premiums for the Florida Hurricane Catastrophe Fund, the State Board of Administration must, to the extent feasible, employ actuarial methods, principles, standards, models, or output ranges found by the commission to be accurate or reliable.

(d) With respect to a rate filing under s. 627.062, an insurer shall employ and may not modify or adjust actuarial methods, principles, standards, models, or output ranges found by the commission to be accurate or reliable in determining hurricane loss factors and probable maximum loss levels for use in a rate filing under s. 627.062. An insurer may employ a model in a rate filing until 120 days after the expiration of the commission's acceptance of that model and may not modify or adjust models found by the commission to be accurate or reliable in determining probable maximum loss levels. This paragraph does not prohibit an insurer from using a straight average of model results or output ranges for the purposes of a rate filing for personal lines residential flood insurance coverage under s. 627.062.

(e) The commission shall adopt actuarial methods, principles, standards, models, or output ranges for personal lines residential flood loss no later than July 1, 2017.

(f) The commission shall revise previously adopted actuarial methods, principles, standards, models, or output ranges every odd-numbered year.

(g) 1. A trade secret, as defined in s. 688.002, which is used in designing and constructing a hurricane or flood loss model and which is provided pursuant to this section, by a private company, to the commission, office, or consumer advocate appointed pursuant to s. 627.0613 is confidential and exempt from s. 119.07(1) and s. 24(a), Art. 1 of the State Constitution.

2. a. That portion of a meeting of the commission or of a rate proceeding on an insurer's rate filing at which a trade secret made confidential and exempt by this paragraph is discussed is exempt from s. 286.011 and s. 24(b), Art. 1 of the State Constitution. The closed meeting must be recorded, and no portion of the closed meeting may be off the record.

b. The recording of a closed portion of a meeting is exempt from s. 119.07(1) and s. 24(a), Art. 1 of the State Constitution.

c. This paragraph is subject to the Open Government Sunset Review Act in accordance with s. 119.15, and shall stand repealed on October 2, 2019, unless reviewed and saved from repeal through reenactment by the Legislature.

History.-- s. 6, ch. 95-276; s. 6, ch. 96-194; s. 3, ch. 97-55; s. 4, ch. 2000-333; s. 1066, ch. 2003-261; s. 79, ch. 2004-390; s. 4, ch. 2005-111; s. 3, ch. 2005-264; s. 12, ch. 2006-12; s. 145, ch. 2008-4; s. 11, ch. 2008-66; s. 83, ch. 2009-21; s. 10, ch. 2009-70; s. 16, ch. 2009-87; s. 1, ch. 2010-89; s. 431, ch. 2011-142; s. 76, ch. 2012-5; s. 5, ch.2013-60; s. 2, ch. 2014-80; s.1, ch. 2014-98; s. 2, ch. 2015-135.

627.715 Flood insurance. –

An authorized insurer may issue an insurance policy, contract, or endorsement providing personal lines residential coverage for the peril of flood on any structure or the contents of personal property contained therein, subject to this section. This section does not apply to commercial lines residential or commercial lines nonresidential coverage for the peril of flood. This section also does not apply to coverage for the peril of flood that is excess coverage over any other insurance covering the peril of flood. An insurer may issue flood insurance policies, contracts, or endorsements on a standard, preferred, customized, or supplemental basis.

(1) (a) 1. Standard flood insurance must cover only losses from the peril of flood, as defined in paragraph (b), equivalent to that provided under a standard flood insurance policy under the National Flood Insurance Program. Standard flood insurance issued under this section must provide the same coverage, including deductibles and adjustment of losses, as that provided under a standard flood insurance policy under the National Flood Insurance Program.

2. Preferred flood insurance must include the same coverage as standard flood insurance but:
   a. Include, within the definition of "flood," losses from water intrusion originating from outside the structure that are not otherwise covered under the definition of "flood" provided in paragraph (b).
   b. Include coverage for additional living expenses.
   c. Require that any loss under personal property or contents coverage that is repaired or replaced be adjusted only on the basis of replacement costs up to the policy limits.

3. Customized flood insurance must include coverage that is broader than the coverage provided under standard flood insurance.

4. Flexible flood insurance must cover losses from the peril of flood, as defined in paragraph (b), and may also include coverage for losses from water intrusion originating from outside the structure which is not otherwise covered by the definition of flood. Flexible flood insurance must include one or more of the following provisions:
   a. An agreement between the insurer and the insured that the flood coverage is in a specified amount, such as coverage that is limited to the total amount of each outstanding mortgage applicable to the covered property.
   b. A requirement for a deductible in an amount authorized under s. 627.701, including a deductible in an amount authorized for hurricanes.
   c. A requirement that flood loss to a dwelling be adjusted in accordance with s. 627.7011(3) or adjusted only on the basis of the actual cash value of the property.
   d. A restriction limiting flood coverage to the principal building defined in the policy.
   e. A provision including or excluding coverage for additional living expenses.
   f. A provision excluding coverage for personal property or contents as to the peril of flood.

5. Supplemental flood insurance may provide coverage designed to supplement a flood policy obtained from the National Flood Insurance Program or from an insurer issuing standard or preferred flood insurance pursuant to this section. Supplemental flood insurance may provide, but need not be limited to, coverage for jewelry, art, deductibles, and additional living expenses.

(b) "Flood" means a general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties, at least one of which is the policyholder's property, from:
1. Overflow of inland or tidal waters;
2. Unusual and rapid accumulation or runoff of surface waters from any source;
3. Mudflow; or
4. Collapse or subsidence of land along the shore of a lake or similar body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels that result in a flood as defined in this paragraph.

(2) Flood coverage deductibles and policy limits pursuant to this section must be prominently noted on the policy declarations page or face page.

(3) (a) An insurer may establish and use flood coverage rates in accordance with the rate standards provided in s. 627.062.

(b) For flood coverage rates filed with the office before October 1, 2019, the insurer may also establish and use such rates in accordance with the rates, rating schedules, or rating manuals filed by the insurer with the office which allow the insurer a reasonable rate of return on flood coverage written in this state. Flood coverage rates established pursuant to this paragraph are not subject to s. 627.062(2)(a) and (f). An insurer shall notify the office of any change to such rates within 30 days after the effective date of the change. The notice must include the name of the insurer and the average statewide percentage change in rates. Actuarial data with regard to such rates for flood coverage must be maintained by the insurer for 2 years after the effective date of such rate change and is subject to examination by the office. The office may require the insurer to incur the costs associated with an examination. Upon examination, the office, in accordance with generally accepted and reasonable actuarial techniques, shall consider the rate factors in s. 627.062(2)(b), (c), and (d), and the standards in s. 627.062(2)(e), to determine if the rate is excessive, inadequate, or unfairly discriminatory. If the office determines that a rate is excessive or unfairly discriminatory, the office shall require the insurer to provide appropriate credit to affected insureds or an appropriate refund to affected insureds who no longer receive coverage from the insurer.

(4) A surplus lines agent may export a contract or endorsement providing flood coverage to an eligible surplus lines insurer without making a diligent effort to seek such coverage from three or more authorized insurers under s. 626.916(1)(a). This subsection expires July 1, 2017.

(5) In addition to any other applicable requirements, an insurer providing flood coverage in this state must:

(a) Notify the office at least 30 days before writing flood insurance in this state; and

(b) File a plan of operation and financial projections or revisions to such plan, as applicable, with the office.

(6) Citizens Property Insurance Corporation may not provide insurance for the peril of flood.

(7) The Florida Hurricane Catastrophe Fund may not provide reimbursement for losses proximately caused by the peril of flood, including losses that occur during a covered event as defined in s. 215.555(2)(b).

(8) An agent must, upon receiving an application for flood coverage from an authorized or surplus lines insurer for a property receiving flood insurance under the National Flood Insurance Program, obtain an acknowledgment signed by the applicant before placing the coverage with the authorized or surplus lines insurer. The acknowledgment must notify the applicant that, if the applicant discontinues coverage under the National Flood Insurance Program which is provided at a subsidized rate, the full risk rate for flood insurance may apply to the property if the applicant later seeks to reinstate coverage under the program.

(9) With respect to the regulation of flood coverage written in this state by authorized insurers, this section supersedes any other provision in the Florida Insurance Code in the event of a conflict.

(10)If federal law or rule requires a certification by a state insurance regulatory official as a condition of qualifying for private flood insurance or disaster assistance, the Commissioner of Insurance Regulation may provide the certification, and such certification is not subject to review under chapter 120.

(11)(a) An authorized insurer offering flood insurance may request the office to certify that a policy, contract, or endorsement provides coverage for the peril of flood which equals or exceeds the flood coverage offered by the National Flood Insurance Program. To be eligible for certification, such policy, contract, or endorsement must contain a provision stating that it meets the private flood insurance requirements specified in 42 U.S.C. s. 4012a(b) and may not contain any provision that is not in compliance with 42 U.S.C. s. 4012a(b).

(b) The authorized insurer or its agent may reference or include a certification under paragraph (a) in advertising or communications with an agent, a lending institution, an insured, or a potential insured only for a policy, contract, or endorsement that is certified under this subsection. The authorized insurer may include a statement that notifies an insured of the certification on the declarations page or other policy documentation related to flood coverage certified under this subsection.

(c) An insurer or agent who knowingly misrepresents that a flood policy, contract, or endorsement is certified under this subsection commits an unfair or deceptive act under s. 626.9541.

History.-- ss. 3, 4, ch. 2014-80; s. 3, ch. 2015-69.

Flood Standards Related Meeting Schedule

2014

September 30	Acceptability Process Committee Meeting to discuss the process and timeline for developing flood standards
October 30	Flood Standards Development Committee Meeting
November 14	Flood Standards Development Committee Meeting
December 16	Flood Standards Development Committee Meeting

2015

January 29	Flood Standards Development Committee Meeting
February 19	Flood Standards Development Committee Meeting
March 31	Flood Standards Development Committee Meeting
April 22	Flood Standards Development Committee Meeting
June 4	Flood Standards Development Committee Meeting
June 30	Flood Standards Development Committee Meeting
July 1	Flood Standards Development Committee Meeting
August 11	Flood Standards Development Committee Meeting
September 24	Flood Standards Development Committee Meeting
October 8	Flood Standards Development Committee Meeting
November 17	Commission Meeting to Consider Publication of Discussion Flood Standards

Transcript Information

All public meetings of the Florida Commission on Hurricane Loss Projection Methodology are transcribed by a Court Reporter. If you would like to purchase copies of any transcript, contact the Court Reporter for the date of the meeting.

September 30, 2014	Tracy Brown, Accurate Stenotype Reporters, Inc., 850-878-2221
October 30, 2014	Mary Kay Kline, Accurate Stenotype Reporters, Inc., 850-878-2221
November 14, 2014	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
December 16, 2014	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
January 29, 2015	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
February 19, 2015	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
March 31, 2015	Tracy Brown, Accurate Stenotype Reporters, Inc., 850-878-2221
April 22, 2015	Tracy Brown, Accurate Stenotype Reporters, Inc., 850-878-2221
June 4, 2015	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
June 30, 2015	Tracy Brown, Accurate Stenotype Reporters, Inc., 850-878-2221
July 1, 2015	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
August 11, 2015	Lori Dezell, 850-251-1482
September 24, 2015	Lori Dezell, 850-251-1482
October 8, 2015	Lori Dezell, 850-251-1482
November 17, 2015	Carolyn Rankine, Premier Reporting, 850-894-0828

Commission Documentation

The State Board of Administration, in its responsibility as administrator for the Commission, maintains documentation for all meetings of the Commission. This information may be obtained by writing to:

Donna Sirmons
Florida Commission on Hurricane Loss Projection Methodology
c/o State Board of Administration
P. O. Box 13300
Tallahassee, Florida 32317-3300

or by e-mailing to donna.sirmons@sbafla.com.

There is a $0.15 charge per page per s. 119.07(4)(a), F.S.

This publication is available for a charge of $14.08.

Documentation is also available on the Commission website at *www.sbafla.com/methodology*.