

# Flood Standards Report of Activities as of November 1, 2021



## Florida Commission on Hurricane Loss Projection Methodology

# FLORIDA COMMISSION ON HURRICANE LOSS PROJECTION METHODOLOGY

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November 1, 2021

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The Honorable Jimmy Patronis, Treasurer  
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Plaza Level 11, The Capitol  
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Dear Trustees:


As Chair of the Florida Commission on Hurricane Loss Projection Methodology (Commission), I am pleased to present to you the *Flood Standards Report of Activities as of November 1, 2021*. This report documents the Commission's work relating to the development and adoption of flood standards and subsequent revisions.

Section 627.0628, F.S., created the Commission as a panel of experts to be administratively housed in the State Board of Administration but requires the Commission to independently exercise its power and duties. The Commission is required to adopt revisions to "previously adopted actuarial methods, principles, standards, models, or output ranges no less than every four years for flood loss projections." Such revisions were made in compliance with the statute.

Honorable Ron DeSantis  
Honorable Ashley Moody  
Honorable Jimmy Patronis  
State Board of Administration Trustees  
November 1, 2021  
Page Two

If you have any questions or comments regarding the work of the Commission, please call me at (847) 804-1643.

Sincerely,

A handwritten signature in black ink, appearing to read "Floyd Yager", written in a cursive style.

Floyd Yager, Chair  
Florida Commission on Hurricane Loss Projection Methodology

# Florida Commission on Hurricane Loss Projection Methodology

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# **INTRODUCTION**

# INTRODUCTION

## *Legislative Findings and Intent*

In 1995, the Florida Legislature enacted s. 627.0628, Florida Statutes (F.S.), creating the Florida Commission on Hurricane Loss Projection Methodology (Commission).<sup>1</sup> The Legislature specifically determined that “reliable projections of hurricane losses are necessary to assure that rates for residential insurance are neither excessive nor inadequate,” and that in recent years computer modeling has made it possible to improve on the accuracy of hurricane loss projections. The Legislature found that “it is the public policy of this state to encourage the use of the most sophisticated actuarial methods to ensure that consumers are charged lawful rates for residential property insurance coverage.”<sup>2</sup> The Legislature clearly supports and encourages the use of computer modeling as part of the ratemaking process.

In 2014, the Florida Legislature expanded the role of the Commission by passing CS/CS/CS/SB 542 creating s. 627.715, F.S., which allowed for authorized insurers in Florida to write flood insurance. Additionally, several existing statutes were amended including the statute creating the Commission, s. 627.0628, F.S., and the insurance rating law statutory section, s. 627.062, F.S., dealing 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 Commission started the process in 2014, and published Discussion Flood Standards as of December 1, 2015 which also provided for various types of feedback leading up to the July 1, 2017, statutory deadline for adopting flood standards. The Commission adopted principles, standards, and output ranges for personal lines residential flood loss in June 2017.

Where appropriate, this *Flood Standards Report of Activities* refers to hurricane and attempts to incorporate the references to hurricane in the context of the Commission’s duties, but the report does not contain any specific hurricane standards nor does it specifically address the process of reviewing hurricane models. The hurricane standards and process of reviewing hurricane models is published in the *Hurricane Standards Report of Activities as of November 1, 2021*. Hurricane models will be reviewed separately from flood models using their respective standards as adopted by the Commission. The adoption of flood standards and the acceptability process for flood models is accomplished in parallel with the Commission’s role regarding hurricane models.

## *The Role of the Commission*

Although the statutory section creating the Commission is in the Florida Insurance Code, the Commission is an independent body and is administratively housed in the State Board of Administration of Florida (SBA). The role of the Commission is limited to adopting findings relating to the accuracy or reliability of particular methods, principles, standards, models, or output ranges used to project hurricane losses, flood losses, and probable maximum loss calculations.

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<sup>1</sup> CS/HB 2619 (Ch. 95-276, Laws of Florida).

<sup>2</sup> Section 627.0628(1)(a), F.S.

Section 627.0628(3)(c), F.S., states that “to the extent feasible,” the SBA must “employ actuarial methods, principles, standards, models, or output ranges found by the Commission to be accurate or reliable” in formulating reimbursement premiums for the Florida Hurricane Catastrophe Fund (FHCF). Under s. 627.0628(3)(d), F.S., individual insurers are required to use the Commission’s findings in order to support or justify a rate filing with the Office of Insurance Regulation (OIR) as follows, “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.”

The Legislature addressed the definition of and the protection of trade secrets used in designing and constructing a hurricane model in 2005 and 2010, and for a flood model in 2014. In s. 627.0628(3)(g), F.S.,<sup>3</sup> the Legislature found that it is a public necessity to protect trade secrets “used in designing and constructing a hurricane or flood loss model,” and therefore, allowed an exemption from the public records law requirements and the public meetings law requirements. The goal of this legislation was to enable the Commission to have access to all aspects of hurricane and flood models and to encourage private companies to submit such models for review without concern that trade secrets will be disclosed. The exemption applies to “a trade secret, as defined in s. 812.081, F.S., which is used in designing and constructing a hurricane or flood loss model” being exempt pursuant to s. 627.0628(3)(g), F.S., from the requirements of the public records law s. 119.07(1), F.S., including s. 24(a), Article I of the State Constitution and the public meetings law s. 286.011, F.S., including s. 24(b), Article I of the State Constitution.

In 2010 the Legislature revised the scope of the public records exemption by providing that the definition of “trade secret” in the Uniform Trade Secrets Act would apply in place of the definition in s. 812.081, F.S.<sup>4</sup> The effect of this change was to make the public records exemption for trade secrets consistent with other similar exemptions.

The 2010 legislation also required that all portions of a closed Commission meeting be recorded. No portion of the closed meeting may be off the record. The bill also created a public records exemption for the recordings of closed meetings.

In 2014 the Legislature expanded the definition of trade secrets and the related protection to include those used in designing and constructing a “flood loss model.”<sup>5</sup>

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<sup>3</sup> Created in 2005 by HB 1939 (Ch. 2005-264, Laws of Florida).

<sup>4</sup> HB 7119 (Ch. 2010-90, Laws of Florida). The language in s. 812.081, F.S., defines trade secrets which relate to theft, robbery, and related crimes. Under s. 688.002(4), F.S., “trade secret” means information, including a formula, pattern, compilation, program, device, method, technique, or process that:

- (a) Derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use; and
- (b) Is the subject of efforts that are reasonable under the circumstances to maintain its secrecy.

<sup>5</sup> SB 1262 (Ch. 2014-98, Laws of Florida).

In 2019 the Legislature removed the scheduled repeal of the trade secret exemptions making them permanent.<sup>6</sup>

### *The Work of the Commission*

The Commission was created as a panel of experts to evaluate computer models and other recently developed or improved actuarial methodologies for projecting hurricane losses, flood losses, and probable maximum loss levels so as “to resolve conflicts among actuarial professionals” and “to provide both immediate and continuing improvement in the sophistication of actuarial methods used to set rates.”<sup>7</sup>

Sections 627.0628(3)(a) and (b), F.S., define the role of the Commission:

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.

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.

The statutory language is clear in that those methods or models that have the potential for improving the accuracy or reliability of hurricane loss projections, flood loss projections, and probable maximum loss levels are the ones to be considered by the Commission. “Improving” suggests that the methods or models should be an improvement over the then existing current methods or models used in the residential rate filing process prior to the Commission’s enactment.

In 2014, the Legislature revised s. 627.0628(3)(e), F.S., establishing a new deadline for the Commission to take action. No later than July 1, 2017, “the Commission shall adopt actuarial methods, principles, standards, models, or output ranges for personal lines residential flood loss.” To achieve the requirements of the new statutory mandate, the Commission, in 2014, created a Flood Standards Development Committee. The committee met monthly to develop a set of “discussion flood standards” which were published December 1, 2015. After receiving input during on-site modeling organization feedback visits and further refinement through committee meetings, the Commission adopted flood standards on June 15 & 16, 2017 meeting the statutory deadline.

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<sup>6</sup> HB 7091 (Ch. 2019-35, Laws of Florida).

<sup>7</sup> Section 627.0628(1)(b), F.S.

Those original standards have subsequently been revised and then adopted on the following dates:

October 25, 2017  
October 26 & 27, 2021.

Section 627.0628(3)(f), F.S., requires the Commission to adopt revisions to “actuarial methods, principles, standards, models, or output ranges no less than every 4 years for flood loss projections.” The flood standards and procedures in this *Flood Standards Report of Activities* were revised and adopted on October 26 & 27, 2021. The Commission will adopt revisions to the flood standards in 2025.

### ***The Mission Statement***

At the September 21, 1995, Commission meeting, the following mission statement was adopted:

The mission of the Florida Commission on Hurricane Loss Projection Methodology is to assess the efficacy of various methodologies which have the potential for improving the accuracy of projecting insured Florida losses resulting from hurricanes and to adopt findings regarding the accuracy or reliability of these methodologies for use in residential rate filings.

The mission statement closely tracks the statute and restates the critical aspects of the Commission’s work. Minor revisions to the mission statement were adopted on November 30, 1995.

The mission statement was revised on September 15, 2009, to reflect the Commission’s role in reviewing models for their ability to project probable maximum loss levels. Thus, the mission statement was modified, as follows:

The mission of the Florida Commission on Hurricane Loss Projection Methodology is to assess the effectiveness of various methodologies which have the potential for improving the accuracy of projecting insured Florida losses and probable maximum loss levels resulting from hurricanes and to adopt findings regarding the accuracy or reliability of these methodologies for use in residential rate filings and probable maximum loss calculations.

The mission statement was revised again on October 13, 2015, to reflect the Commission’s role in reviewing models for their ability to project flood losses used in rate filings for personal lines residential flood insurance coverage. Thus, the mission statement was modified, as follows:

The mission of the Florida Commission on Hurricane Loss Projection Methodology is to assess the effectiveness of various methodologies which have the potential for improving the accuracy of projecting insured Florida losses and probable maximum loss levels resulting from hurricanes and floods and to adopt findings regarding the accuracy or reliability of these methodologies for use in residential rate filings (hurricane loss projections), personal lines residential rate filings (flood loss projections), and probable maximum loss calculations.

## ***Overview***

To date, the following flood models have been evaluated by the Commission against the standards for the applicable years listed below and were found acceptable.

<b><u>Modeling Organization</u></b>	<b><u>Standards</u></b>
Karen Clark & Company	2017

# **PRINCIPLES**

## PRINCIPLES

1. The mission of the Florida Commission on Hurricane Loss Projection Methodology is to assess the effectiveness of various methodologies which have the potential for improving the accuracy of projecting insured Florida losses and probable maximum loss levels resulting from hurricanes and floods and to adopt findings regarding the accuracy or reliability of these methodologies for use in residential rate filings (hurricane loss projections), personal lines residential rate filings (flood loss projections), and probable maximum loss calculations. *History-New 9/21/95, rev. 11/30/95, rev. 9/15/09, rev. 10/13/15*
2. The Commission shall recognize that a modeling organization may develop either a hurricane model, a flood model, or both. As a result, the Commission's adoption of standards and the review of each respective model shall be independent and separate of the other type of model. The acceptability or failure of one type of model shall not have an immediate impact on the acceptability or failure of another type of model from the same modeling organization. Although the review process is similar in context for all types of models, the Commission shall recognize the unique process applicable to a hurricane model review and the unique process applicable to a flood model review. Only one type of model shall be submitted at a time by a modeling organization for review for that type of model (hurricane or flood) except as provided for in the Acceptability Process of its most recent *Hurricane Standards Report of Activities* or *Flood Standards Report of Activities*. *History-New 6/16/17*
3. The Commission shall consider the costs and benefits associated with its review process, including costs and benefits to the State and its citizens, to the insurance industry, and to the modeling organizations. *History-New 8/18/06*
4. The general focus of the Commission shall be on those areas of modeling which produce the most variation in output results and have the most promise of improving the science of modeling. *History-New 8/18/06*
5. The Commission shall pursue and promote research opportunities from time to time when issues need resolution and such research would advance the science of modeling. *History-New 8/18/06*
6. All models or methods shall be theoretically sound. *History-New 9/21/95, rev. 8/18/06*
7. The Commission's review process shall be active and designed to test model output for reasonableness and to test model assumptions. *History-New 8/18/06*
8. Models or methods shall not be biased in a way that overstates or understates results. *History-New 9/21/95, rev. 8/18/06*
9. All sensitive components of models or methods shall be identified. *History-New 9/21/95, rev. 8/18/06*



10. The trade secret aspects of models or methods being reviewed by the Commission shall be protected. *History-New 11/30/95, rev. 5/20/96, rev. 9/14/05, rev. 8/18/06*
11. Commission members shall have sufficient information concerning model assumptions and factors used in model development, whether trade secret or not, to make a finding about a model's acceptability. *History-New 8/18/06*
12. The Commission's review process of models or methods shall not restrict competition in the catastrophe modeling industry or thwart innovation in that industry. *History-New 11/30/95, rev. 5/20/96, rev. 8/18/06*
13. The Commission shall consider how advances in science or technology shall be incorporated in its revision of standards, and, where and when appropriate, develop new standards or revise existing standards to reflect these advances. *History-New 8/18/06, rev. 9/16/09*
14. The Commission shall consider how statutory changes shall be incorporated in its revision of standards, and, where and when appropriate, develop new standards or revise existing standards to reflect these statutory changes. *History-New 8/18/06, rev. 9/16/09*
15. The Commission's review of models or methods for acceptability shall give priority to new standards and standards that have been modified. *History-New 8/18/06, rev. 9/16/09*
16. The output of models or methods shall be reasonable and the modeling organization shall demonstrate its reasonableness. *History-New 9/21/95, rev. 8/22/03, rev. 8/18/06*
17. All adoptions of findings and any other formal action taken by the Commission shall be made at a publicly-noticed meeting, by motion followed by a formal member by member roll call vote, all of which shall be transcribed by a court reporter, such transcription to be made a part of the official record of the proceedings of the Commission. The Commission shall not record a transcript for the portion of a Commission meeting where trade secrets used in the design and construction of the model are discussed. No official action or decision shall be made in a closed meeting. *History-New 11/30/95, rev. 8/22/03, rev. 9/14/05, rev. 8/18/06, rev. 9/15/09, rev. 10/13/15*
18. All findings adopted by the Commission are subject to revision at the discretion of the Commission. *History-New 11/30/95*
19. No model or method shall be determined to be acceptable by the Commission until it has been evaluated by the Commission in accordance with the process and procedures which the Commission considers appropriate for that model or method. *History-New 11/30/95, rev. 5/20/96, rev. 8/18/06*
20. The Commission's determination of acceptability of a specific model or method does not constitute determination of acceptability of other versions or variations of that model or method; however, the Commission shall attempt to accommodate routine updating of acceptable models or methods. *History-New 11/30/95, rev. 5/20/96, rev. 8/18/06*

21. The Commission shall consider the educational needs of its members and from time to time implement educational programs that further Commission members' understanding of the science of modeling. *History-New 8/18/06*

# **COMMISSION STRUCTURE**

## COMMISSION STRUCTURE

### *Oversight*

The Commission was created, pursuant to s. 627.0628, F.S., “to independently exercise the powers and duties specified” in that statute. The Commission is administratively housed within the State Board of Administration of Florida (SBA), and as a cost of administration, the Florida Hurricane Catastrophe Fund (FHCF) provides travel reimbursement, expenses, and staff support. The SBA has no governing authority over the Commission; however, the SBA annually appoints one of the Commission members to serve as Chair, appoints one of the Commission members who is the actuary member of the FHCF Advisory Council, and has final approval authority over the Commission’s budget.

### *Membership and Required Expertise*

Section 627.0628(2)(b), F.S., requires that the Commission consist of twelve members with the following qualifications and expertise:

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 Florida Department of Financial Services, Office of Insurance Regulation who is an actuary responsible for property insurance rate filings and who is appointed by the Director of the Office of Insurance Regulation;
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 which was responsible for at least 1 percent of the aggregate statewide direct written premium for homeowner’s 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.

The licensed professional structural engineer was added by virtue of CS/SB 1770, which was enacted and became law in 2013. This legislation amended the requirements in s. 627.0628(2)(b), F.S., and enhanced the expertise immediately available to the Commission by increasing the membership to provide for the appointment of an additional member with special qualifications and attributes.

### ***Terms of Members***

The Insurance Consumer Advocate, Chief Operating Officer of the FHCF, Executive Director of Citizens Property Insurance Corporation, Director of the Division of Emergency Management, and the actuary member of the FHCF Advisory Council shall serve as a Commission member for as long as the individual holds the position listed.

The member appointed by the Director of the Office of Insurance Regulation shall serve until the end of the term of office of the Director who appointed the member, unless removed earlier by the Director for cause. The five members appointed by the Chief Financial Officer shall serve until the end of the Chief Financial Officer's term of office, unless the Chief Financial Officer releases them earlier for cause (s. 627.0628(2)(c), F.S.).

### ***Officers***

**Officers:** The officers of the Commission shall be a Chair and a Vice Chair.

**Selection:** Annually, the SBA shall appoint one of the Commission members to serve as the Chair (s. 627.0628(2)(d), F.S.). After the Chair is appointed, the Commission shall, by majority roll call vote, select a Vice Chair.

Duties of the Chair and Vice Chair:

- A. The **CHAIR** shall:
  - 1. Preside at all meetings except during committee meetings where other Commission members are designated to act as committee chairs;
  - 2. Conduct a roll call of members at each meeting;

3. Ensure all procedures established by the Commission are followed;
4. Designate one of the Commission members to act in the role of Chair at any meeting where the Chair and Vice Chair cannot attend;
5. Assign members to serve on Committees and appoint Committee Chairs.

B. The **VICE CHAIR** shall:

In the absence or request of the Chair, preside at Commission meetings and have the duties, powers, and prerogatives of the Chair.

***Member Duties and Responsibilities***

The purpose of the Commission is to adopt findings relating to the accuracy or reliability of particular methods, principles, standards, models, or output ranges used to project hurricane losses, flood losses, and probable maximum loss levels. This work is extremely technical and requires specialized expertise. Therefore, the Legislature, in s. 627.0628, F.S., limited membership on the Commission to a careful balance of individuals meeting specific employment, education, and expertise requirements. Thus, each member's contribution cannot be underestimated and each member should make every effort to attend all meetings, in person or by telephone, and be prepared to actively participate. In particular, each member has the following responsibilities and duties:

1. Fully prepare for each Commission meeting and committee meeting where the member is designated as a committee member;
2. Attend and participate at each meeting in person or by telephone;
3. Give notice to SBA staff, in advance if possible, when a member must leave a meeting early or cannot attend at all;
4. Abide by the requirements of Florida's Sunshine Law. A summary of the requirements of the law is outlined in this section;
5. Since it is the SBA's responsibility to fund all Commission activities, direct all communications related directly to Commission activities to SBA staff who are responsible for administrative support of the Commission. The following communications, directly related to Commission activities, shall not take place:
  - a. Commission members shall not contact Professional Team members or modeling organizations directly, except in conjunction with participation in the on-site visit of a Commission member,
  - b. Modeling organizations shall not contact Commission members or Professional Team members directly, except in conjunction with remote participation in a virtual review,

- c. Professional Team members shall not contact Commission members or modeling organizations directly.

A Committee Chair or the Commission Chair may, in conjunction with SBA staff, contact a modeling organization or outside party for the purpose of clarifying or refining input or suggested revisions to the *Hurricane Standards Report of Activities* and *Flood Standards Report of Activities*;

6. Give notice of “special” conflicts of interest where the member, the member’s relative, business associate, or any principal by whom he or she is retained stands to reap a direct financial benefit or suffer a potential loss from the issue being voted on. Financial benefit which is speculative, uncertain, or subject to many contingencies is not a special benefit that would preclude a member from voting. See Attorney General’s Opinion 96-63 (September 4, 1996) and Commission on Ethics Opinion 94-18 (April 21, 1994). If a special conflict of interest arises and the special conflict is apparent prior to the meeting, the member must give advance notice to SBA staff. If the special conflict becomes apparent during a meeting, the member should immediately inform the Commission Chair or Vice Chair. The conflicted member shall recuse himself or herself from any activity of the Commission in the area of the special conflict;
7. Commission members are expected to meet the highest standards of ethical behavior. Commission members may be subject to the Code of Ethics for Public Officers and Employees, ss. 112.311-112.3261, F.S., including, but not limited to, s. 112.313(7), F.S., relating to conflicting employment or contractual relationships; s. 112.3143, F.S., relating to voting conflicts; and s. 112.3145, F.S., relating to disclosure of financial interests. It is understood, given the nature of the expertise held by Commission members, that general conflicts of interest are inherent. The conflicts of interest which are addressed in s. 112.3143, F.S., and the conflicts which would preclude a Commission member from voting on an issue are only those conflicts which are special. Additionally, Commission members should be mindful of situations which may arise that have the potential to give an unfair advantage to any modeling organization or result in a particular Commission member having unique information and being in a position to exercise greater influence than other Commission members.

### ***New Member Orientation and Continuing Education of Existing Members***

As part of the SBA’s administrative support of the Commission, the SBA staff is responsible for new member orientation. The SBA staff may also design programs for continuing education at the request of the Commission. The cost of such programs is subject to approval through the state budgetary process as outlined under ***Budget Consideration***.

### ***On-Site Visits to the Modeling Organization by Commission Members***

The 2005 and 2014 legislative changes to s. 627.0628, F.S., specified that the goal was to enable the Commission to have access to all aspects of hurricane and flood models. Since both a public records exemption and a public meetings exemption are provided in the law, Commission

members are able to review trade secrets in much more depth and able to inquire into the underlying nature of the hurricane and flood models without exposing such trade secret information to modeling organization competitors.

Although reliance on the expertise of the Professional Team continues to be necessary in the Commission's review process, Commission members may request to have greater access to the hurricane and flood models by going to the modeling organization's location for an on-site visit.

The procedure for on-site visits and additional verification review visits requires that the Commission member obtain approval from the Commission and obtain authorization from the SBA for reimbursable travel (due to budget considerations). The deadline for requesting on-site visits, which includes any additional verification review visits, is seven days prior to the Commission meeting to review modeling organization hurricane model or flood model submissions in order for the requests to be placed on the meeting agenda.

Travel arrangements are coordinated through SBA staff and in accordance with the SBA's travel policy. Commission members are responsible for their own transportation arrangements to, from, and during the on-site visits.

The Commission member's on-site visit shall take place at the same time as the Professional Team's on-site or additional verification review. The Commission member's presence shall not disrupt the activities or work of the Professional Team. This procedure will limit Commission members' participation to that of an observer during the Professional Team activities and their review process. The Commission member may ask questions of the modeling organization in meetings separate from those of the Professional Team. Given time and resource constraints, all reasonable attempts will be made to schedule meetings between the modeling organization and Commission members, and the modeling organization should make its best effort to be available to answer the Commission member's questions.

If any notes are taken by a Commission member, they shall be made in an on-site visit workbook provided by SBA staff. The modeling organization shall review the workbooks for any notes deemed by the modeling organization as trade secret information. Any workbook pages containing notes considered by the modeling organization as trade secret information shall be removed from the workbook by the modeling organization and placed in a sealed envelope marked "Contains Content Designated as Trade Secret Information by (Name of Modeling Organization)" with the date, time, and Commission member's signature across the seal. The modeling organization shall specifically identify what notes on a workbook page are deemed as trade secret and shall refrain from designating publicly available information as trade secret. The sealed envelope shall be retained by SBA staff in accordance with Florida Public Records Law in a secure location. SBA staff shall bring the sealed envelope to the Commission closed meeting to discuss trade secrets where it will be unsealed and distributed to the Commission member for use during the closed meeting. At the conclusion of the closed meeting, all notes shall be placed in an envelope labeled "Contains Content Designated as Trade Secret Information by (Name of Modeling Organization)" and sealed. The sealed envelope shall be retained by Commission staff in a secure location until the records retention schedule has been met at which time the sealed envelope shall be destroyed and the modeling organization informed.



It should also be noted that the job of the Professional Team while on-site is to review the hurricane or flood model rather than to educate Commission members. The education of Commission members by the Professional Team is better accomplished in other settings.

Commission members shall refrain from discussing the hurricane or flood model among themselves while on-site and shall be mindful of the requirements of the public meeting laws of Florida. Since Professional Team members have signed contracts with the SBA that contain a confidentiality clause accepted by each modeling organization and are prohibited from discussing such proprietary information, Commission members cannot be included in any activities, meetings, or deliberations of the Professional Team.

**Trade Secret Documents for Review On-Site by Commission Members:** The Professional Team reviews the Audit sections of the *Hurricane Standards Report of Activities* and the *Flood Standards Report of Activities* while on-site, and a Commission member may have additional questions or prefer a more in-depth discussion about a particular audit requirement. In order for the modeling organization to have the necessary personnel and documents available, Commission members shall identify the items from the Audit section of the *Hurricane Standards Report of Activities* or from the Audit section of the *Flood Standards Report of Activities* that they are particularly interested in reviewing on-site. Each Commission member may create a prioritized list of items that should be provided to SBA staff no later than the Commission meeting to review modeling organization hurricane model or flood model submissions. The list will be provided to the modeling organization with the Professional Team pre-visit letter, in preparation for the member's on-site visit.

All items included in the Audit sections are of equal importance since all are required for verification of the hurricane and flood standards. Because the time needed to review the different audit requirements will vary, Commission members should prioritize the items they request to review based upon their expertise and interest. Due to time constraints, it will be the responsibility of the members to allocate their time accordingly while on-site.

### ***Documents Containing Trade Secrets Used in the Design and Construction of Hurricane and Flood Models***

**Material Containing Potential Hurricane or Flood Model Trade Secrets to be Visually Displayed or Discussed during Closed Meetings (Trade Secret Items):** The Commission may develop a list of information, documents, and presentation materials that contain potential trade secrets used in the design or construction of the hurricane or flood model that the Commission wants to review during the closed portion of the Commission meeting to review hurricane or flood models for acceptability in addition to the trade secret items identified in the *Hurricane Standards Report of Activities* and the *Flood Standards Report of Activities*.

The trade secret material shown to the Commission shall be under the control of the modeling organization. This information, by law, shall be confidential and exempt from the State's public records requirements.

## ***Closed Meetings for the Purpose of Discussing Trade Secrets Used in the Design and Construction of Hurricane or Flood Models***

There is an exemption from public meeting requirements for those portions of a Commission meeting where trade secrets, used in the design and construction of hurricane or flood models, are discussed. The closed portion of a Commission meeting where trade secrets are reviewed and discussed will be held prior to the public portion of the Commission meeting to review hurricane or flood models for acceptability. Voting regarding the acceptability of a hurricane or flood model shall only take place during the public portion of the meeting. During any closed meeting, Commission members shall confine their discussions to trade secrets related to that particular hurricane or flood model under consideration. Discussions other than those involving trade secrets shall take place during the public portion of the meeting. Only public information that is absolutely essential to the understanding of the trade secret information may be provided along with the trade secret information during the closed meeting. Any such public information discussed must be discussed during the public portion of the meeting to ensure full access of the public to that information.

In accordance with s. 627.0628(3)(g), F.S., the closed portion of a Commission meeting shall be recorded electronically as per SBA policies and procedures. The recording is exempt from s. 119.07(1), F.S., and s. 24(a), Article 1 of the State Constitution.

**Attendees:** The only authorized attendees of the closed portion of the Commission meeting to review hurricane or flood models for acceptability shall include Commission members, Commission staff, Professional Team members, and modeling organization designated personnel, staff, and consultants.

**Role of Professional Team:** The discussion of trade secrets may involve verbal explanations, review of documents, and various types of demonstrations. Although the Professional Team will be present during the discussion of trade secrets, they should be viewed by the Commission members as a resource to confirm that the information being provided is consistent with the information provided on-site. Questions related to modeling organization trade secrets shall be addressed directly to the modeling organization rather than to the Professional Team members.

**Room Requirements:** Before the closed portion of the Commission meeting to review hurricane or flood models for acceptability begins, the room shall be cleared of all unauthorized persons and all their belongings. No briefcases, cellular phones, laptops, or other electronic devices shall be accessible to the authorized attendees during the closed meeting other than equipment needed by the modeling organization and equipment required by the Commission to accommodate Commission members.

All telephone lines and all microphones shall be checked to ensure that discussions cannot be heard, relayed, or recorded beyond the confines of the room. Personnel outside of the meeting room shall be asked to move to a distance where discussions cannot be inadvertently overheard or visual presentations seen. No telephone calls shall be made or received from the meeting room during the discussions of trade secrets other than those needed to meet the needs of the modeling organization. Authorized attendees needing to make or receive telephone calls shall be required to leave the meeting room to handle such communications. Any notes taken by authorized attendees, other than the modeling organization, shall be collected and given to the modeling organization at

the conclusion of the closed meeting and prior to anyone leaving the meeting room. During the closed meeting, internet access may be available where modeling organizations may choose to provide direct access to the model by electronic means to help answer questions of Commission members.

**Teleconference:** Due to security reasons, a teleconference call-in number shall not be available to authorized attendees. If requested by the modeling organization, Commission staff will contact, from the meeting room, additional modeling organization personnel to allow their participation by phone.

**Breaks:** If a break is taken during a closed meeting, authorized attendees shall not discuss any of the proceedings from the time the meeting doors are open until they are closed following the conclusion of the break. No notes or other recorded information shall be taken out of the meeting room during a break. Other than authorized attendees, no one shall be allowed to enter the meeting room during a break with the exception of building maintenance personnel, food or beverage service personnel, or electronic technicians needed to provide services for the meeting room.

**Transcripts:** The Commission will not record a transcript for the closed portion of a Commission meeting.

**Quorum Requirements:** A quorum of Commission members is not required to conduct the closed portion of the Commission meeting.

**Additional Closed Meetings:** Once the initial closed portion of a Commission meeting has concluded, the public portion of the meeting shall begin. Upon a motion, a second, and a majority vote, the Commission may decide to go back into a closed meeting. If such a decision is made by the Commission, all meeting security requirements previously outlined shall apply.

### ***Commission Meetings***

**Quorum:** A majority of the twelve Commission members (i.e., seven members) is required to constitute a quorum. A quorum is the number of members necessary to transact the official business of the Commission. "Presence" shall be defined as either a physical presence or as participation by any other means that allows the Commission member to communicate simultaneously with those members who are present.

**Voting Abstentions based on Conflict:** For the purpose of determining whether there is a quorum, if a member abstains from voting based on a special conflict of interest (as defined under ***Member Duties and Responsibilities***), that member would still be deemed present for purposes of the quorum requirement (Attorney General's Opinion 75-244; August 29, 1975).

**Temporary Absence:** "If a member in attendance at a meeting is called away and is unable to return to the meeting, the transcript should reflect the point at which ... [the member] left and - if the remaining members constitute a quorum - the meeting should continue." If, however, the member is only temporarily absent, and this member is needed to constitute a quorum, the "appropriate procedure would be to recess the meeting until the member can return or, at least, to postpone a vote on any matter before the body until ... [the member's] return" (Attorney General's Opinion 74-289; September 20, 1974).

**Meeting Notices:** Written notice of a meeting of the Commission shall be provided to each member as soon as possible, and at a minimum, except in the event of an emergency meeting, at least seven days prior to the date scheduled. Section 286.011, F.S., requires public meetings to be noticed, and the notice must contain a time certain, a date, and the location of the meeting. If available, an agenda should be provided. If no agenda is available, it is sufficient if the notice summarizes the subject matter to be covered in the public meeting.

**Public Access:** Any member of the public shall have access to all Commission meetings that do not involve the discussion of trade secrets used in designing and constructing hurricane or flood models. That portion of a Commission meeting where a trade secret is addressed is confidential and exempt pursuant to s. 627.0628(3)(g)2, F.S., and thus will not be open to the public.

**Agendas:** Agendas listing topics planned for discussion shall be furnished to each member prior to the meeting. The agenda is to be used merely as a guide and topics not listed may be raised and discussed and the members may choose not to address an issue or topic listed on the agenda.

**Location:** Meetings shall be in Tallahassee, Florida, unless special circumstances arise.

**Recording:** The SBA staff shall be responsible for ensuring that all Commission meetings are recorded. A transcribed record shall be taken for all public portions of Commission meetings and an electronic recording shall be taken for all closed portions of Commission meetings. Commission meeting records shall be maintained by SBA staff in accordance with SBA policies and procedures. The Commission will not record a transcript for any closed portion of a Commission meeting.

**Voting Requirement:** Except in the case of a special conflict of interest (as defined under *Member Duties and Responsibilities*), no Commission member who is present at any meeting at which an official decision or act is to be taken or adopted by the Commission may abstain from voting (s. 286.012, F.S.).

**Designation of an Acting Chair:** Depending on the circumstances, the Commission Chair or Vice Chair may temporarily appoint any member to act as Chair in those situations where the physical presence of a Chair is desirable to facilitate conducting the meeting.

**Purpose and Conduct of Meetings:** The Commission holds six types of meetings:

1. Committee meetings to review and revise the hurricane and flood standards, disclosures, audit requirements, forms, acceptability process, and other sections of the *Hurricane Standards Report of Activities* and the *Flood Standards Report of Activities*,
2. Commission meetings to adopt revisions to the hurricane and flood standards, disclosures, audit requirements, forms, acceptability process, and other sections of the *Hurricane Standards Report of Activities* and the *Flood Standards Report of Activities*,
3. Commission meetings to review hurricane or flood model submissions,
4. Commission meetings to review hurricane or flood models for acceptability,

5. Commission meetings to consider an appeal by a modeling organization if a hurricane or flood model is not found acceptable by the Commission, and
6. Planning workshops for the purpose of discussing, studying, and educating Commission members on new scientific developments and advances in the fields of meteorology, hydrology, hydraulics, engineering, actuarial science, statistics, and computer/information science. The discussions from the planning workshops will be instrumental in planning for future hurricane and flood standards, disclosures, audit requirements, and forms.

The meetings to review hurricane or flood models for acceptability may involve the discussion of modeling organization trade secrets. The Commission shall conduct the portion of a meeting where trade secrets used in the design and construction of the hurricane or flood model are discussed as a closed meeting. Each type of meeting is discussed below.

### ***Committee Meetings to Review and Revise Hurricane and Flood Standards***

Committee meetings are for the purpose of discussing issues, developing hurricane and flood standards, completing necessary groundwork, and reaching a consensus among those present so when the Commission meets later to formally adopt the hurricane and flood standards, the *Hurricane Standards Report of Activities*, and the *Flood Standards Report of Activities*, most of the issues can be easily resolved with less detail and finalizing work required. Committee meetings provide for an informal workshop environment where Commission members, Professional Team members, SBA staff, modeling organizations, insurers, regulators, and the general public are encouraged to participate and provide input. A working draft of proposed revisions to the hurricane and flood standards, disclosures, audit requirements, forms, acceptability process, and other portions of the *Hurricane Standards Report of Activities* and the *Flood Standards Report of Activities* is created. A public notice is required, but it is not necessary that a quorum be present since all official business requiring a vote will be conducted at Commission meetings.

Committee meetings are also for the purpose of reviewing, determining the scope, and establishing priorities for any ideas, issues, and concepts new or previously presented at Commission meetings, Committee meetings, or workshops. The Committee may make a recommendation to the Commission on those that could be subjects for current consideration or for future inquiries and investigation.

The role of the committee chair is to present the draft of proposed hurricane or flood standards and other relevant documents with the aid of the Professional Team and SBA staff. The role of the other committee members is to thoroughly review the proposed draft and provide input and ideas at the committee meetings. Committee members have the responsibility of preparing in advance and becoming familiar with all the relevant issues. Such members have the responsibility of reading documents, raising questions, forming opinions, and participating in discussions. The role of the other Commission members is to participate, at their option, in all or various committee meetings. In this manner the difficult work will be spread among Commission members and specific expertise will be utilized when reviewing and revising hurricane and flood standards. It is beneficial for each Commission member to be fully prepared to participate as an active committee member and provide quality input and discussion at the committee stage.

Committee meetings are not Commission meetings. Due to quorum requirements, no formal voting shall take place at committee meetings, but a consensus among committee members and others participating is desirable. The committee chair is expected to report issues and bring work products to the Commission at properly scheduled and noticed Commission meetings. It is possible for a committee to meet with one Commission member (the committee chair) and other interested parties (non-Commission members), but such committee meetings shall be publicly noticed and approved by the Commission Chair. Committee meetings work best when Commission members guide the committee meetings and there is broad participation by the public, modeling organizations, regulators, or other interested parties. Although committee meetings can be held with a substantial number of Commission members present, care should be taken to include the public and all interested parties to gain maximum participation and input. Committee chairs should regularly call upon and solicit input from any and all interested parties present.

The recommended way to conduct a committee meeting for hurricane and flood standards is as follows:

1. Standard

- a. Each standard should be taken in order and read in its entirety or presented visually to the members.
- b. The Committee Chair asks if the standard is located in the appropriate grouping of standards or if it should be moved to a more appropriate section.
- c. The Committee Chair asks if the standard is still relevant, whether it should be eliminated, or if modifications should be made. If modifications are suggested, the Committee Chair should ask for proposed wording, if anything needs to be added, or if anything needs to be deleted in the standard.
- d. Any proposed changes to the standard are then read and explained.
- e. The Committee Chair next asks if there are any objections to the proposed changes and if any further changes are needed.
- f. The Committee Chair asks whether there are wording issues associated with the standard, are there any ambiguities, or are there ways to further clarify the standard by better drafting.

2. Purpose

- a. The Committee Chair reads or visually presents the purpose of the standard and asks if the purpose is clear and if any changes are needed.
- b. The Committee Chair asks if there are any objections or comments regarding the wording in the Purpose section.
- c. The Committee Chair asks if there are any wording or drafting issues associated with the purpose.

### 3. Disclosures

- a. The Committee Chair reads or visually presents each disclosure and asks if the disclosure is relevant and located with the appropriate standard.
- b. The Committee Chair asks whether any additions, deletions, or other proposed changes to the disclosures are needed.
- c. The Committee Chair asks if there are any objections to the proposed changes and if any further changes are needed.
- d. The Committee Chair asks whether there are wording issues or additional instructions that need to be addressed to clarify the disclosure requirements.

### 4. Audit

- a. The Committee Chair reads or visually presents the audit requirements and asks if it is clear and will be sufficient to help verify if the modeling organization has met the standard.
- b. The Committee Chair asks whether any additions, deletions, or other proposed changes to the audit requirements are needed.
- c. The Committee Chair asks if there are any objections to the proposed changes and if any further changes are needed.
- d. The Committee Chair asks whether there are wording issues or additional instructions that need to be addressed to clarify the audit requirements.

### 5. Forms

- a. The Committee Chair asks whether the forms are appropriate, relevant, and located in the appropriate grouping of standards.
- b. The Committee Chair asks if there are any proposed changes suggested for the forms and if additional instructions are needed.
- c. The Committee Chair asks if there are any objections to the proposed changes or if additional wording changes are needed for clarification.

### 6. Trade Secret Items

The committee will identify trade secret information, documents, and presentation materials that contain potential trade secrets used in the design or construction of the hurricane or flood models that the Commission wants the modeling organization to visually display or discuss during the closed portion of a Commission meeting to review hurricane or flood models for acceptability.

## 7. Consideration of ideas, issues, concepts, inquiries, and investigations

The committee will discuss, evaluate, and prioritize any ideas, issues, concepts, inquiries, and investigations presented at prior Commission meetings, committee meetings, or workshops. The committee will consider the associated costs and time constraints.

The meeting of the Acceptability Process Committee will proceed differently, but will follow a similar logical pattern as described above. The Acceptability Process Committee will start by reviewing the “Process for Determining the Acceptability of a Computer Simulation Hurricane Model,” or the “Process for Determining the Acceptability of a Computer Simulation Flood Model.” All proposed revisions will be discussed and any modifications will be considered. Comments will be solicited from those participating. Finally, any wording or formatting issues will be discussed.

Following the discussion of the acceptability process, the Acceptability Process Committee will take up other various sections of the *Hurricane Standards Report of Activities* or the *Flood Standards Report of Activities* by considering their appropriateness and relevancy, proposed revisions and any modifications, and wording or formatting issues.

As consensus is built and revisions are agreed to, the SBA staff in conjunction with the Professional Team will note the revisions and modifications and produce the draft documents that will be distributed in advance of the Commission meetings that will be held for the purpose of adopting the hurricane and flood standards and finalizing the *Hurricane Standards Report of Activities* for the next odd-numbered year and the *Flood Standards Report of Activities* every four years.

### ***Commission Meetings to Adopt Hurricane and Flood Standards***

The Commission Chair will open the meeting and ask each committee chair, who presided over the revisions to the hurricane and flood standards, to comment as to the purpose of each hurricane and flood standard and any suggested revisions by the committee under each hurricane and flood standard. This will not only include the hurricane and flood standard, but the purpose, the disclosures, the audit requirements, and the forms. The committee chair, along with the Professional Team and SBA staff, will discuss and comment on revisions to the hurricane and flood standards. The Commission members will ask questions and offer further suggestions if necessary and appropriate. The Commission Chair may also ask for comments from others in attendance including modeling organizations, regulators, insurers, or the general public.

Once the discussion is concluded for a group of hurricane or flood standards, the committee chair should make a motion that the Commission adopt the group of hurricane or flood standards along with the suggested revisions including those associated with the purpose, list of relevant forms, disclosures, audit requirements, and forms. Another committee member should second the motion. The Commission Chair will then ask if there is any further discussion. Once the discussion is completed, the Commission Chair will ask for a roll call vote. Each hurricane and flood standard group shall be voted on separately. At the request of any Commission member, one or more hurricane or flood standards in a group may be designated for a separate vote.



The “Process for Determining the Acceptability of a Computer Simulation Hurricane Model” and the “Process for Determining the Acceptability of a Computer Simulation Flood Model” will each be voted on separately. The Commission Chair will ask the Chair of the Acceptability Process Committee to explain the revisions to the acceptability process. Once this is completed and comments are made by the Professional Team and SBA staff, the committee chair should make a motion that the Commission adopt the acceptability process as amended. Another Acceptability Process Committee member should second the motion. The Commission Chair will ask if there is any further discussion. After recognizing Commission members for discussion, the Commission Chair will ask for a roll call vote.

The final items to be voted on by the Commission include the remaining sections of the *Hurricane Standards Report of Activities* and the *Flood Standards Report of Activities*. If any of these sections do not change, they can be combined and adopted with one roll call vote. The Acceptability Process Committee will be responsible for these recommendations. The committee chair will discuss any revisions and modifications and should make a motion to approve each section separately. Another Acceptability Process Committee member should second the motion. The Commission Chair will recognize Commission members for discussion and questions, and then will ask for a roll call vote.

As a final consideration, the Commission Chair should consider whether it is appropriate to authorize the SBA staff to make any needed editorial changes consistent with the adopted *Hurricane Standards Report of Activities* and the *Flood Standards Report of Activities*. This would be done by a roll call vote after a Commission member makes a motion that is seconded and after discussion.

Once all voting necessary to finalize the *Hurricane Standards Report of Activities* and the *Flood Standards Report of Activities* is completed, the Commission may take up other business or may adjourn.

### ***Commission Meetings to Review Hurricane or Flood Model Submissions***

The purpose of the meeting to review modeling organization hurricane or flood model submissions is to identify any deficiencies in the hurricane or flood model submissions, to create a list of issues to be addressed by each modeling organization, and to determine for a hurricane model submission whether an existing modeling organization is required to submit Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis, prior to the Professional Team on-site review.

Modeling organization hurricane or flood model submissions shall be received by the applicable November 1 deadline. The hurricane or flood model submissions will have been distributed to each Commission member and the Professional Team for their review. The SBA staff will work with the Professional Team to identify any deficiencies or issues. Prior to the meeting, the Commission Chair, working with SBA staff and the Professional Team, may request that the modeling organization meet with the Commission (in person or by conference call) or provide additional information to clarify the hurricane or flood model submission.

**Deficiency:** A deficiency is defined as a lack of required documentation. A list of deficiencies shall be created if the hurricane or flood model submission is incomplete, unclear, or non-responsive. Some common deficiencies include failure to respond to all portions of a standard, disclosure, or form; failure to update to the current *Hurricane Standards Report of Activities* language or *Flood Standards Report of Activities* language; omission of supporting scientific references; errors and contradictory material in the submission; and insufficient detail for review of methodology. Failure to adequately provide a required written response or the necessary public documentation expected by the Commission in the hurricane or flood model submission shall result in a deficiency. If necessary, the Commission will attempt to further clarify its expectations by providing additional comments or instructions with the deficiency so that the modeling organization is fully aware of what is expected and will have a reasonable opportunity to correct the deficiency. The Commission shall determine the appropriate time frame for correcting deficiencies. Failure to correct the deficiency within the time frame specified shall result in the termination of the review process. The Commission Chair has the discretion to extend the time frame for a modeling organization correcting deficiencies if unusual circumstances are involved.

Upon receipt of the revisions to the submission to correct deficiencies, an addendum to the pre-visit letter may be sent to the modeling organization on the nature of the corrections.

**Issue:** Issues are related to the operation and theoretical soundness of the hurricane or flood model. Issues should not require a modeling organization to submit additional public documentation that is not required of all modeling organizations. Issues shall be addressed by the modeling organization with the Professional Team during the on-site review as well as with the Commission when the modeling organization presents the hurricane or flood model to the Commission for acceptability. Should the nature of an issue be such that the Commission feels public documentation is needed, then the documentation shall be added to the disclosure requirements and required of all modeling organizations. Otherwise, some modeling organizations might be put in an awkward position and vulnerable to making more information about their hurricane or flood model public than other modeling organizations thus resulting in a competitive disadvantage. [See Principle #12: *The Commission's review process of models or methods shall not restrict competition in the catastrophe modeling industry or thwart innovation in that industry.*]

In conducting the meeting to review the modeling organization hurricane or flood model submissions, the Commission Chair will take up one modeling organization hurricane or flood model submission at a time as indicated on the agenda for the meeting. The Commission Chair will take up each hurricane or flood standard grouping and consider all the responses provided under the hurricane or flood standard including the modeling organization's response to compliance with the hurricane or flood standard, the information provided in the disclosures, any response provided to the audit requirements, and the completeness of the forms.

The first point of discussion will relate to hurricane or flood model submission deficiencies. The SBA staff working with the Professional Team will have provided a report to the Commission members regarding deficiencies that have been identified and that need to be corrected. The Commission shall review those deficiencies and add, delete, or modify the list as appropriate. Following a discussion of the deficiencies, the Commission will next discuss the issues identified under each grouping of hurricane or flood standards. The SBA staff working with the Professional Team will have provided the Commission members with a list of issues prior to the meeting. The

Commission shall review those issues associated with each grouping of hurricane or flood standards and add, delete, or modify the list as appropriate. For hurricane model submissions only, a third point of discussion will relate to the requirement of Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis, for an existing modeling organization. The SBA staff working with the Professional Team will have provided, prior to the meeting, a recommendation to the Commission for requiring a completed Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis. The Commission shall determine, based on the recommendation and hurricane model revisions disclosed in the hurricane model submission, whether an existing modeling organization shall be required to provide Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis.

Upon review of all hurricane or flood standards, the Commission Chair will ask if there is a motion and a second to continue the review process subject to the correction of the deficiencies and to provide Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis, if required. The motion shall include a specific time frame for correcting any deficiencies in the hurricane or flood model submission and if required for a hurricane model submission, a specific time frame for providing a completed Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis, prior to the Professional Team on-site review. The modeling organization shall resubmit or amend the original hurricane or flood model submission as specified by the Commission in the acceptability process of the *Hurricane Standards Report of Activities* or the *Flood Standards Report of Activities*. The Commission Chair will call for further discussion. After discussion, the Commission Chair will ask for a roll call vote. At any point, the Commission can determine that the modeling organization has not been responsive to the hurricane or flood model submission requirements and vote to terminate the review process.

The Commission Chair will next ask if there is a motion and a second to approve the list of issues to be addressed by the modeling organizations during the review process. The Commission Chair will call for further discussion. After discussion, the Commission Chair will ask for a roll call vote.

The Commission Chair shall provide a letter to each modeling organization listing:

1. Deficiencies identified in the hurricane or flood model submission with the time frame assigned for correcting the deficiencies,
2. Issues to be addressed with the Professional Team during the on-site review and with the Commission during the meeting to review the hurricane or flood model for acceptability, and
3. Inquiries and investigations to be addressed with the Professional Team during the on-site review.

### ***Commission Meetings to Review Hurricane or Flood Models for Acceptability***

The Commission meeting to review a hurricane or flood model for acceptability will begin with the Commission Chair calling upon the modeling organization to provide an overview presentation as required in the acceptability process of the *Hurricane Standards Report of Activities* or the *Flood Standards Report of Activities*. The modeling organization shall make a presentation and Commission members may ask questions during and after the presentation.

The next portion of the meeting will be closed to the public and will involve the discussion of trade secrets used in the design and construction of the hurricane or flood model identified in the *Hurricane Standards Report of Activities* or the *Flood Standards Report of Activities* as trade secret items and by the Professional Team during the on-site or additional verification reviews.

At the public meeting to determine the acceptability of a hurricane or flood model, once a quorum is present, either in person or by telecommunications, all votes shall be by a roll call vote based on the majority vote of those present. No Commission member, who is present at any Commission meeting at which an official decision or act is taken or adopted by the Commission, may abstain from voting except when a special conflict of interest exists (s. 286.012, F.S., s. 112.3143, F.S.).

For those circumstances in which a hurricane or flood standard does not apply to a particular hurricane or flood model, if the Commission votes affirmatively that the hurricane or flood standard does not apply, then such a vote shall constitute a determination by the Commission that the hurricane or flood standard is not applicable.

The hurricane standards are categorized under six groupings:

1. General Hurricane Standards,
2. Meteorological Hurricane Standards,
3. Statistical Hurricane Standards,
4. Vulnerability Hurricane Standards,
5. Actuarial Hurricane Standards, and
6. Computer/Information Hurricane Standards.

The flood standards are categorized under seven groupings:

1. General Flood Standards,
2. Meteorological Flood Standards,
3. Hydrological and Hydraulic Flood Standards,
4. Statistical Flood Standards,
5. Vulnerability Flood Standards,
6. Actuarial Flood Standards, and
7. Computer/Information Flood Standards.

The minimum number of vote tallies from a single vote taken to determine the acceptability of a hurricane or flood model shall be one for each group of hurricane or flood standards. If the Commission determines that the hurricane or flood model meets all hurricane or flood standards in a grouping, the hurricane or flood model is found acceptable with respect to each individual hurricane or flood standard in the grouping. Hurricane or flood standards with subparts denoted

by a notation of A, B, C, etc. are considered one hurricane or flood standard. At the request of any Commission member, one or more hurricane or flood standards in a group may be designated for a separate vote.

Based upon a motion of any member that is duly seconded, the Commission may review and modify the voting requirements for any hurricane or flood model as may be appropriate due to the unique aspects of the hurricane or flood model.

At the start of the second public portion of the meeting, the Commission Chair will first ask the modeling organization to explain corrections made for deficiencies identified in the meeting to review modeling organization hurricane or flood model submissions. The Commission Chair will ask Commission members for questions or comments. Failure to provide the trade secret information required in the *Hurricane Standards Report of Activities* or the *Flood Standards Report of Activities* and the Professional Team report shall result in a deficiency. If the Commission identifies other deficiencies, the Commission shall specify a time frame for correction of those deficiencies that may include a review by one or more Professional Team members. The corresponding standards will not be voted on by the Commission until the deficiencies have been satisfactorily addressed and reviewed by one or more Professional Team members.

The Commission Chair will then announce that the Commission is ready to review the hurricane or flood model for acceptability. The Commission Chair will ask Commission members their preference for reading the hurricane or flood standards by title or in entirety. The Commission Chair will read the first hurricane or flood standard and will call upon the modeling organization to discuss the compliance of the hurricane or flood model with the hurricane or flood standard. The Commission Chair will next call upon the Professional Team to comment after which the Commission Chair will ask Commission members for questions or comments. If there are none, or after all questions have been responded to, the Commission Chair will then proceed to begin reading the next hurricane or flood standard. Once all the hurricane or flood standards in a grouping have been presented and discussed, the Commission Chair will ask the Commission members whether there are any hurricane or flood standards that need to be carved out and voted on separately. If no response is heard, the Commission Chair will ask for a motion to find the hurricane or flood model acceptable under that grouping of hurricane or flood standards. A motion will be made and seconded by Commission members at this time. Prior to voting, the Commission Chair will ask if there is any further discussion. If members have questions or comments, they will be recognized. Once the discussion is completed, the Commission Chair will ask for a roll call vote. Any hurricane or flood standards carved out will be voted on separately in a roll call vote.

The Commission Chair will then move to the next grouping of hurricane or flood standards and begin to read the first hurricane or flood standard in the grouping. The review process will follow as indicated in the paragraph above.

The Commission will have completed its determination of the acceptability of the hurricane or flood model when it has completed voting on all hurricane or flood standards. This does not preclude the Commission from revisiting a previous vote or revising the voting procedure as noted above. Upon conclusion of voting on all the hurricane or flood standards, the Commission Chair will instruct SBA staff to tally the votes. The SBA staff member will indicate whether the hurricane or flood model has been found acceptable by noting that the Commission does or does not find the hurricane or flood model to have met all the hurricane or flood standards. If the Commission finds

the hurricane or flood model acceptable, the Commission Chair will indicate to the modeling organization that the modeling organization will receive a letter as provided in the acceptability process of the *Hurricane Standards Report of Activities* or the *Flood Standards Report of Activities*.

The voting procedure can be changed only if approved by the Commission members, given a quorum is present. This will require a motion, a second, and approval of a majority by roll call vote.

### ***Commission Meetings to Consider an Appeal by a Modeling Organization if a Hurricane or Flood Model is not Found Acceptable by the Commission***

If a hurricane or flood model fails to meet one or more hurricane or flood standards and is not found to be acceptable by the Commission, the modeling organization may file an appeal with the Commission and request a meeting with the Commission in order to provide additional information and data to the Commission to justify that the hurricane or flood model complies with the hurricane or flood standards and other requirements. The appeal process is specified in the acceptability process of the *Hurricane Standards Report of Activities* and the *Flood Standards Report of Activities*.

The purpose of the meeting to consider an appeal by a modeling organization is to review the appeal documentation and determine whether or not to reconsider the hurricane or flood model.

The Commission Chair will call upon the modeling organization to provide a presentation which would include reasons and justification for reconsideration. Commission members may ask questions during and after the presentation. After discussion, the Commission Chair will ask for a motion to reconsider the hurricane or flood model. A motion will be made and seconded by Commission members. Prior to voting, the Commission Chair will ask if there is any further discussion. Once discussion is completed, the Commission Chair will ask for a roll call vote.

If the motion to reconsider the hurricane or flood model is successfully approved by a majority vote, the Commission shall then determine if additional data and information is necessary prior to reconsideration of the hurricane or flood model. The Commission may formulate additional questions and request additional data and information to be responded to by the modeling organization. Such questions, data, and information may include proprietary information, and if so, may be addressed by the modeling organization in a closed session if requested by the modeling organization. If additional data and information is necessary for reconsideration of the hurricane or flood model, the Commission questions, data, and information request shall be provided to the modeling organization in a letter from the Commission Chair no later than ten days after the meeting to consider the appeal request. The Commission may proceed with scheduling a meeting with the modeling organization for reconsideration of the hurricane or flood model.

If the Commission does not specify any follow up questions or identify any additional data or information needed, the Commission may proceed with the reconsideration of the hurricane or flood model. The Commission shall then determine which hurricane or flood standards should be reconsidered. This may include only the hurricane or flood standards that were previously not found acceptable or it may include other hurricane or flood standards that have come into question

as a result of new information and data which cast doubt as to the accuracy or reliability of the hurricane or flood model. The Commission shall vote on which hurricane or flood standards are to be reconsidered prior to reconsideration of the hurricane or flood model. The modeling organization may request more time to prepare for reconsideration if it feels that the nature of the review has become more complex and that it needs additional resources, time, and data to respond. In reconsidering an earlier decision regarding hurricane or flood standards, the Commission shall be guided by new information and data which was not previously provided by the modeling organization. Each hurricane or flood standard will be discussed and voted upon separately in a roll call vote. The Commission Chair will read the title of the first hurricane or flood standard being reconsidered and will call upon the modeling organization to present new information and data and to discuss the compliance of the hurricane or flood model with the hurricane or flood standard. The Commission Chair may call upon the Professional Team to comment after which the Commission Chair will ask Commission members for questions or comments. The Commission Chair will ask for a motion as to whether the hurricane or flood model meets the hurricane or flood standard under reconsideration. A motion will be made and seconded by Commission members at this time. Prior to voting, the Commission Chair will ask if there is any further discussion. If members have questions or comments, they will be recognized. Once the discussion is completed, the Commission Chair will ask for a roll call vote.

The Commission Chair will then move to the next hurricane or flood standard being reconsidered, and the review process will follow as indicated in the paragraph above. The Commission will have completed its reconsideration of acceptability of the hurricane or flood model when it has completed voting on all hurricane or flood standards being reconsidered. This does not preclude the Commission from revisiting a previous vote on reconsideration of a hurricane or flood standard or revising the voting procedure as noted above. Upon conclusion of voting on all hurricane or flood standards being reconsidered, the Commission Chair will instruct SBA staff to tally the votes. The SBA staff member will indicate whether the hurricane or flood model has been found acceptable by noting that the Commission does or does not find the hurricane or flood model to have met all the hurricane or flood standards being reconsidered. If the Commission finds the hurricane or flood model acceptable under the hurricane or flood standards reconsidered, the Commission Chair will indicate to the modeling organization that the modeling organization will receive a letter as provided in the acceptability process of the *Hurricane Standards Report of Activities* or the *Flood Standards Report of Activities*.

The voting and meeting procedure can be changed only if approved by the Commission members, given a quorum is present. This will require a motion, a second, and approval of a majority by roll call vote.

### ***Planning Workshops***

Planning workshops are for the purpose of discussing, studying, and educating Commission members on new scientific developments and advances in the fields of meteorology, hydrology, hydraulics, engineering, actuarial science, statistics, and computer/information science. The discussions from the planning workshops will be instrumental in planning for future hurricane and flood standards, disclosures, audit requirements, and forms.

The planning workshops will be duly noticed and may require a quorum so that an official vote may be taken on actions resulting from the ideas presented and discussed at the workshop.

The Commission Chair will call the meeting to order and will introduce the ideas for discussion as indicated on the meeting agenda and will solicit any other ideas for discussion from Commission members. The ideas introduced will be discussed, prioritized, and evaluated by the Commission. Included in the discussions will be budget considerations, if any, and further study on the ideas if needed.

***Outside Party Input Regarding Hurricane and Flood Standards, Disclosures, Audit Requirements, Forms, or Other Processes Adopted by the Commission***

From time to time, parties other than Commission members, Professional Team members, and SBA staff assigned to the Commission make recommendations for the Commission to consider. For the Commission to fully and adequately consider input from outside parties, the following process and organizational framework is established for reviewing such input.

The Commission has a clearly defined statutory responsibility to act as a panel of experts to provide the most actuarially sophisticated guidelines and standards for projection of hurricane and flood losses possible, given the current state of actuarial science. The Commission's role is also narrowly defined as to its scope and purpose. As such, input provided by outside parties shall be considered by the Commission at its sole discretion. Subjects that go beyond the purview of the Commission's jurisdiction shall be rejected without consideration based on a decision by the Commission Chair. The Commission Chair may bring the matter to a vote by the Commission.

In order to enable the Commission and the appropriate Committees to evaluate recommended changes, the Commission requires that each recommendation be in the form of an amendment to specific language in the hurricane or flood standard, disclosure, audit requirement, form, or process. The specific amendatory language must be accompanied by a brief statement of the problem being addressed by the amendment and an explanation of how the amendment solves the problem. The problem statement, explanation, and amendatory language shall be received by the Commission at least ten business days prior to the committee or Commission meeting at which the outside party wishes the amendment to be considered.

Consideration of any proposed amendment is at the discretion of the committee chair when the input is provided for committee consideration. The proposed amendment may later be accepted or rejected for review by the Commission Chair prior to such input being brought before the Commission for a vote.

While comments and recommendations of a more general nature may be provided by outside parties, such recommendations shall be in the form described above in order to be considered at a committee or Commission meeting called for the purpose of adopting or revising hurricane and flood standards, disclosures, audit requirements, forms, or processes. Nothing in this paragraph prevents a Commission member from proposing alternative language to address an issue raised by an outside party.



Any topics for general discussion shall be addressed to the Commission Chair who will decide, in his or her sole discretion, whether the topic merits discussion by Commission members, when and how the topic will be discussed, and whether or not to accept public comment. The Commission Chair shall reject any topic for discussion that is beyond the scope of the Commission's purview.

**Problem Statement:** A brief statement of the problem being addressed should be provided with all proposed amendatory language.

**Explanation:** The explanation should classify the proposal as general, technical, or editorial and include justification for the modification.

**Amendatory Language:** Proposed amendatory language will assure that all recommended revisions to hurricane and flood standards, disclosures, audit requirements, forms, and processes suggested by outside parties are in a form that allows the Commission and its committee structure to give appropriate consideration to the substance of a particular proposal with minimum time spent resolving ambiguities, drafting questions, and similar issues.

This framework does not restrict the scope of proposals and allows outside parties the flexibility to present the arguments for their proposal in whatever form and at whatever length they desire.

### ***Budget Consideration***

All new projects that have a fiscal impact should be identified prior to January 1 of the calendar year so that appropriate funding can be obtained through the SBA's budgetary review process.

All new projects shall consist of a proposal, an estimated cost, and a time frame for completion. The Commission shall vote on all new proposals for projects. The FHCF will include in its budget the funding for on-going projects and anticipate the potential for new hurricane and flood model submissions or any fiscal impact that revisions to the acceptability process or the hurricane and flood standards might have on the Commission's budget. The Commission's budget is subject to approval by the SBA Trustees for the appropriate fiscal year.

### ***Sunshine Law***

Section 286.011, F.S., aka the "Sunshine Law" or "open meeting law" applies to the Commission.

**Scope of the Sunshine Law:** In any place where two or more members of the Commission are present, there is the potential for violating the Sunshine Law.

Any communication, whether in person, by telephone, computer, etc., concerning any information on which *foreseeable action* may be taken by the Commission is a "meeting" that must meet the requirements of Florida's Sunshine Law if the communication takes place between two or more Commission members except as provided in s. 627.0628(3)(g), F.S.

**Basic Requirements for Public Meetings:** All meetings subject to the Sunshine Law must be:

1. Open to the public,
2. Noticed,
3. Recorded by a court reporter and minutes preserved. The official minutes of the Commission will consist of a verbatim transcript unless special circumstances arise. In addition, SBA staff may prepare a summary of the meeting that will be added to the transcript and together will comprise the minutes of the meeting.

The SBA staff ensures that all scheduled public meetings of the Commission are filed for public notice in the Florida Administrative Register and a transcript is taken and preserved.

**Trade Secret Violations:** s. 688.002, F.S., defines misappropriation as “disclosure or use of a trade secret of another without express or implied consent by a person who at the time of disclosure or use, knew or had reason to know that her or his knowledge of the trade secret was acquired under circumstances giving rise to a duty to maintain its secrecy or limit its use.”

Section 688.004, F.S., provides for damages as a result of a trade secret violation, “a complainant is entitled to recover damages for misappropriation. Damages can include both the actual loss caused by misappropriation and the unjust enrichment caused by misappropriation that is not taken into account in computing actual loss.”

If a trade secret also meets the definition of a trade secret in s. 812.081, F.S., the following penalty provided in s. 812.081, F.S., for violating the confidentiality of trade secrets could still apply:

*“(2) It is unlawful for a person to willfully and without authorization, obtain or use, or endeavor to obtain or use, a trade secret with the intent to either temporarily or permanently:*

*(a) Deprive or withhold from the owner thereof the control or benefit of a trade secret;*  
*or*

*(b) Appropriate a trade secret to his or her own use or to the use of another person not entitled to the trade secret.*

*A person who violates this subsection commits theft of a trade secret, a felony of the third degree, punishable as provided in s. 775.082, s. 775.083, or s. 775.084.*

*(3) A person who traffics in, or endeavors to traffic in, a trade secret that he or she knows or should know was obtained or used without authorization commits trafficking in trade secrets, a felony of the second degree, punishable as provided in s. 775.0082, s. 775.083, or s. 775.084.”*

# **FINDINGS OF THE COMMISSION**

## **FINDINGS OF THE COMMISSION**

### **Concerning Model Accuracy and Reliability**

#### ***Background***

Sections 627.0628(3)(a), (b), and (f), F.S., instructs the Commission to adopt findings from time to time as to the accuracy or reliability of standards and models, among other things, related to hurricane loss projections used in residential property insurance rate filings, flood loss projections used in rate filings for personal lines residential flood insurance coverage, and probable maximum loss calculations. This section also states that the Commission shall revise previously-adopted actuarial methods, principles, standards, models, or output ranges every odd-numbered year for hurricane loss projections and no less than every four years for flood loss projections. The following findings address the accuracy or reliability of the standards that the Commission has adopted since 1996 and the accuracy or reliability of the computer simulation models that the Commission has reviewed. The Commission thus far has reviewed computer simulation models exclusively because these constitute the only widely accepted approach to estimate residential loss costs, personal residential loss costs, and probable maximum loss levels.

The Commission finds that the computer simulation hurricane and flood models that it reviews are stochastic forecasting models. This means that future hurricane and flood events are stochastically generated and the associated hurricane and flood loss costs are accumulated and hurricane and flood probable maximum loss calculations can be made using the applicable model with the consideration of an insurer's individual or unique exposure data. By generating a sufficient body of hypothetical future hurricane and flood events, the sampling uncertainty in the hurricane and flood output ranges owing to the random variate generation process becomes negligible. The Commission finds that an accepted hurricane or flood model will produce accurate and reliable modeled hurricane or flood loss costs and hurricane or flood probable maximum loss levels for the entire state of Florida given the data and research currently available. Hurricane and flood loss costs and hurricane and flood probable maximum loss levels based on the applicable models are based on actuarially sound and theoretically appropriate techniques that also incorporate scientific evidence, findings, and principles from the areas of meteorology, hydrology, hydraulics, engineering, statistics, and computer/information science.

#### ***Accurate and Reliable – Defined***

The Commission finds that the computer simulation hurricane models that have been reviewed by the Commission and found acceptable include appropriate model representations to simulate hurricanes and the induced damage on residential property in Florida. The basic features of the hurricane model construction are reflected in the six sections of hurricane standards established and refined since June of 1996:

1. General Hurricane Standards reflecting the professional status of the hurricane model designers and testers and generic aspects of the hurricane model;

2. Meteorological Hurricane Standards covering all aspects of this infrequent weather phenomenon;
3. Statistical Hurricane Standards addressing the statistical foundation of the hurricane model and the sensitivity and uncertainty assessment of hurricane model outputs as a function of hurricane model inputs;
4. Vulnerability Hurricane Standards assessing the impact of the hurricane winds on residential property;
5. Actuarial Hurricane Standards assessing the damage impact in insurance terms;
6. Computer/Information Hurricane Standards providing the overall design, construction, and execution of the hurricane model.

The Commission finds and recognizes that the scientific fields underlying hurricane models continue to evolve providing further insights into property damage and insurance implications. As a direct consequence, the Commission reviews and revises the hurricane standards comprising its *Hurricane Standards Report of Activities* every odd-numbered year. Every odd-numbered year is defined as every year ending in an odd number (e.g., 2013, 2015, 2017, 2019, 2021). The Commission finds that the hurricane standards adopted every odd-numbered year represent the current state of actuarial science regarding computer simulation hurricane modeling for purposes of producing hurricane loss costs and hurricane probable maximum loss levels for residential property in Florida that are accurate and reliable.

The Commission finds that the computer simulation flood models that will be reviewed by the Commission for acceptability include appropriate model representations to simulate floods and the induced damage on personal residential property in Florida. The basic features of the flood model construction are reflected in the seven sections of flood standards established in June of 2017:

1. General Flood Standards reflecting the professional status of the flood model designers and testers and generic aspects of the flood model;
2. Meteorological Flood Standards covering all aspects of coastal flooding including wind and other meteorological elements that drive storm surge;
3. Hydrological and Hydraulic Flood Standards covering all aspects of inland flooding including riverine, lacustrine, and surface water flooding;
4. Statistical Flood Standards addressing the statistical foundation of the flood model and the sensitivity and uncertainty assessment of flood model outputs as a function of flood model inputs;
5. Vulnerability Flood Standards assessing the impact of the coastal and inland flooding on personal residential property;
6. Actuarial Flood Standards assessing the damage impact in insurance terms;

7. Computer/Information Flood Standards providing the overall design, construction, and execution of the flood model.

The Commission finds and recognizes that the scientific fields underlying flood models continue to evolve providing further insights into property damage and insurance implications. As a direct consequence, the Commission reviews and revises the flood standards comprising its *Flood Standards Report of Activities* no less than every four years. The Commission finds that the flood standards adopted no less than every four years represent the current state of actuarial science regarding computer simulation flood modeling for purposes of producing flood loss costs and flood probable maximum loss levels for personal residential property in Florida that are accurate and reliable.

The words accurate and reliable are used in s. 627.0628, F.S., but are not defined therein. In the context of computer simulation hurricane and flood modeling, accurate means that the hurricane and flood models meet the applicable standards that have been developed to assure scientifically-acceptable hurricane and flood loss cost projections and hurricane and flood probable maximum loss levels. However, accurate cannot necessarily mean that a hurricane or flood model conforms exactly to known facts since that contradicts the nature of the hurricane and flood modeling process. Reliable is defined for computer simulation hurricane and flood models as meaning that the hurricane or flood model will consistently produce statistically similar results upon repeated use without inherent or known bias.

## FINDINGS OF THE COMMISSION

### Concerning Trade Secrets

The Commission finds the following with respect to Principle #10, *The trade secret aspects of models or methods being reviewed by the Commission shall be protected.*

1. Modeling organizations that produce a computer simulation hurricane or flood model may have trade secrets regarding the design and construction of that model.
2. Modeling organizations have been unwilling to reveal those trade secrets to the Commission in the context of the public meetings that the Commission holds because their competitors are part of the audience or can obtain a copy of the publicly available transcript of the meeting.
3. Modeling organizations have been willing to reveal all of their trade secrets if that information can remain confidential and within their control.
4. Since that trade secret information would become publicly available in the context of a meeting in the “Sunshine,” the Commission has authorized:
  - a. A Professional Team to review the hurricane and flood models on-site on behalf of the Commission,
  - b. On-site visits to the modeling organizations by Commission members, and
  - c. Closed meetings for the purpose of discussing trade secrets.
5. The law allows an exception from the public records law for trade secrets used in the design and construction of hurricane and flood models.
6. The Commission may require that the modeling organization provide certain documents for direct review by Commission members or the modeling organization may voluntarily provide documents containing trade secrets for the Commission’s review.
7. The law allows for the discussion of trade secrets to be exempt from public meeting requirements.

## **FINDINGS OF THE COMMISSION**

### **Concerning Land Use and Land Cover Database**

The Commission finds that the hurricane models to be submitted against the 2021 hurricane standards are anticipated to make use of a land use and land cover (LULC) database consistent with National Land Cover Database (NLCD) 2016 or later.



**PROCESS FOR DETERMINING  
THE ACCEPTABILITY OF A  
COMPUTER SIMULATION  
FLOOD MODEL**

## **PROCESS FOR DETERMINING THE ACCEPTABILITY OF A COMPUTER SIMULATION FLOOD MODEL**

Due to the complex and unique nature of flood and hurricane perils, and recognizing that a modeling organization may submit only a flood model or only a hurricane model, the Commission has determined that the review of flood and hurricane models for acceptability shall be independent of each other. Hence, a flood model and a hurricane model shall be submitted separately and reviewed separately. The Commission has determined, if a model is found acceptable or fails under one set of standards applicable to flood or hurricane, it shall have no bearing or impact on the other type of model's acceptability or failure under the respective set of standards. A modeling organization submitting both a flood model and a hurricane model shall have each model reviewed separately and independently under the respective unique set of standards applicable to flood or hurricane.

It should be understood that if a modeling organization submits both a flood model and a hurricane model, and in the course of a review (e.g., internal review, Professional Team on-site review, Commission review) of the flood model or the hurricane model, an error is discovered that is also likely to co-exist in the hurricane model or the flood model, then it is incumbent on the modeling organization to report this error in accordance with section III. Review of the Readiness Notification or section IX. Discovery of Differences in a Model after a Model has been Determined to be Acceptable by the Commission, as appropriate. Consequently, the onus is on the modeling organization to make this correction if it exists, in keeping with the independence of the two model reviews.

This chapter specifies the Commission's process for the determination of acceptability of a computer simulation flood model (model).

The Commission has determined that prior to November 1 of every other odd-numbered year, it will adopt new standards, revise existing flood standards (standards), and if necessary, revise this acceptability process. The effective date of new or revised standards will be November 1 unless otherwise specified by the Commission. The standards and procedures published in the *Flood Standards Report of Activities as of November 1, 2021*, will not be scheduled for revision until 2025.

The Commission has determined that significant revisions to the standards or to the model are those that either change or have potential to change the flood loss costs or flood probable maximum loss levels. On the other hand, any minor revisions to the standards, or any revisions to the model by the modeling organization that do not result in changes to flood loss costs or flood probable maximum loss levels are not considered significant. The Commission may determine in its judgment whether a revision is significant.

The Commission has determined that any modeling organization that desires to have a model reviewed for compliance with the standards adopted by the Commission shall notify the Commission in accordance with the requirements set out below by November 1, 2023.

If any deadline provided for within this chapter falls on a Saturday, Sunday, or on a legal State of Florida or federal holiday, then the actual due date shall be the day immediately following the applicable due date which is not a Saturday, Sunday, or legal State of Florida or federal holiday.

The Commission has further determined that the period between the effective date of new and revised standards and November 1 of the following odd-numbered year (the deadline for notification by the modeling organization) is a reasonable length of time for any modeling organization to comply with the standards adopted by the Commission. If the Commission determines that this time frame is not sufficient, based on the nature of the revisions to the standards or based on other circumstances that might necessitate a longer period of time for compliance, then the Commission will adjust this period of time accordingly. If requested by a modeling organization, the Commission Chair shall have the authority to grant a reasonable extension should the Commission Chair determine that an emergency or unusual situation exists that warrants an extension and is determined to be beyond the control of the modeling organization.

## I. Schedule

The following is an anticipated schedule:

September 2021	Committee meetings
October 2021	Adopt 2021 Standards and the <i>Flood Standards Report of Activities</i>
November 2021	<i>2021 Flood Standards Report of Activities</i> published
November 1, 2023	Deadline for notification by modeling organization
December 2023 – January 2024	Commission meeting to review submissions
January – April 2024	On-site reviews
April – May 2024	Additional verification reviews, if necessary
May – June 2024	Commission meetings to review models for acceptability under 2021 Standards
September 2025	Committee meetings
October 2025	Adopt 2025 Standards and the <i>Flood Standards Report of Activities</i>
November 2025	<i>2025 Flood Standards Report of Activities</i> published

The Commission will endeavor to expedite the review of a model if the Professional Team is able to verify all standards during the initial on-site review.

## II. Notification Requirements

An existing modeling organization is defined as an organization whose model was accepted by the Commission under the most recent set of standards. All other modeling organizations are considered as new.

**A. Notification of Readiness for Review.** Any modeling organization desiring to have its model reviewed for acceptability by the Commission shall notify the Commission Chair in writing by November 1, 2023, that the modeling organization is prepared for review.

The notification shall consist of:

1. A notification letter, which shall include:
  - a. The name and version of the model ready for review and the name and version of each platform, with the primary platform designated, on which the model is implemented;

- b. A reference to the signed Expert Certification Forms GF-1, General Flood Standards, GF-2, Meteorological Flood Standards, GF-3, Hydrological and Hydraulic Flood Standards, GF-4, Statistical Flood Standards, GF-5, Vulnerability Flood Standards, GF-6, Actuarial Flood Standards, GF-7, Computer/Information Flood Standards, and GF-8, Editorial Review. Any caveats to the certifications shall be noted in the letter and accompanied by a detailed explanation;
  - c. A statement that professionals having credentials or experience in the areas of meteorology, hydrology, hydraulics, statistics, structural engineering, actuarial science, and computer/information science have reviewed the model for compliance with the standards; and
  - d. A statement that the model is ready to be reviewed by the Professional Team.
2. A statement of compliance with each standard and each standard subpart. For existing modeling organizations, the material shall be updated as appropriate to reflect compliance with the new or revised standards even if the modeling organization submitted this material as part of a determination of acceptability under the previous set of standards;
3. A general description of any trade secret information, other than that required in the Trade Secret forms, that the modeling organization intends to present to the Professional Team and the Commission.
4. All required disclosure and form information. Eight duplexed, bound copies and a link e-mailed to SBA staff where all required documentation can be downloaded from a single ZIP file. Submission documentation shall be provided in the following manner:
  - a. Form VF-3, Flood Mitigation Measures, Range of Changes in Flood Damage; Form VF-4, Differences in Flood Mitigation Measures; Form AF-2, Total Flood Statewide Loss Costs; Form AF-4, Flood Output Ranges; Form AF-5, Percentage Change in Flood Output Ranges; Form AF-7, Percentage Change in Logical Relationships to Flood Risk; Form AF-8, Flood Probable Maximum Loss for Florida; shall be provided in Excel format;
  - b. Form AF-1, Zero Deductible Personal Residential Standard Flood Loss Costs, and Form AF-3, Personal Residential Standard Flood Losses by ZIP Code, shall be provided in both Excel and PDF format;
  - c. Form HHF-3, Coastal Flood Characteristics by Annual Exceedance Probabilities (Trade Secret Item); Form HHF-5, Inland Flood Characteristics by Annual Exceedance Probabilities (Trade Secret Item); and Form AF-6, Logical Relationships to Flood Risk (Trade Secret Item); if not considered as Trade Secret, shall be provided in Excel format;
  - d. The remaining portions of the submission shall be provided in PDF format;

- e. All data file names shall include the abbreviated name of the modeling organization, the standards year, and the form name (when applicable);
- f. The PDF submission document file shall support highlighting and hyperlinking, and shall be bookmarked by standard, form, and chapter.

5. Format of the Submission:

- a. Table of Contents shall be included;
- b. Materials submitted shall be consecutively numbered from the first page (including cover) using a single numbering system from the beginning to the end of the submission and shall include the date and time in the footnote;
- c. All tables, graphs, and other non-text items shall be consecutively numbered using whole numbers, specifically listed in the Table of Contents, and clearly labeled with abbreviations defined;
- d. State the standard, disclosure, or form in *italics* and give the response directly below in non-italics. The Purpose, Relevant Forms, and Audit portions shall not be restated. The modeling organization response shall include a statement in support of compliance following each standard, including each standard subpart. **The response to the standard shall not be a restatement of the standard**, but shall rather explain how the model meets the requirements of the standard by including (1) a statement in support of compliance with the standard, (2) a reference to applicable disclosures, or (3) a general description of applicable trade secret information that will be shown to the Professional Team during the on-site review and how it supports compliance with the standard.

The disclosures are not designed to require trade secret information. Therefore, the response to a disclosure shall not contain a statement similar to “will be shown to the Professional Team” unless a response to the disclosure has been provided and additional test results and documentation will be available for the Professional Team during the on-site review.

If a standard or disclosure has multiple parts, respond to each part separately;

- e. Graphs shall be accompanied by legends and labels for all elements:
  - 1. Individual elements shall be clearly distinguishable, whether presented in original or copy form;
  - 2. Maps shall use scales with a minimum of seven-increments with white designating zero when applicable. Colors used on maps shall be readable on map backgrounds used. Color schemes shall be selected to facilitate comparison among maps showing similar information. The color legend and associated map shall be comprised of an appropriate number of intervals to yield gradation of color across each map. Relevant geographic boundaries

(e.g., counties, ZIP Codes) shall be provided on maps. When applicable, the minimum and maximum values and their point locations shall be plotted on the maps;

3. For data indexed by latitude and longitude, by county or by ZIP Code, a map with superimposed county and ZIP Code boundaries shall be produced. Additional map specifications are indicated on individual form instructions;
  4. For graphs using a log scale on any axis, provide the axis values for the significant points on the graph;
- f. NA shall be used in cells to signify no exposure;
  - g. All units of measurement for model inputs and outputs shall be clearly identified;
  - h. All model outputs related to flood extent and elevation or depth, flow velocity, flow length, and flood area provided for review shall be in English standard units of measurement, as appropriate;
  - i. All equations should be uniquely numbered within the submission document;
  - j. Unless otherwise specified, windfields generated by the model shall be used for completing relevant forms and tables in the submission;
  - k. All forms, with the exception of those indicated as a Trade Secret Item; Form AF-1, Zero Deductible Personal Residential Standard Flood Loss Costs; and Form AF-3, Personal Residential Standard Flood Losses by ZIP Code, shall be included in a submission appendix. If forms designated as a Trade Secret Item are not considered trade secret, those forms are to be included in a submission appendix. A link to the location of the form shall be provided in the corresponding disclosure;
  - l. Acronyms shall be defined on their first use in the submission. A complete list of all acronyms used in the submission shall be listed and defined in a submission appendix;
  - m. All column headings shall be shown and repeated at the top of each subsequent page for forms and tables.

The modeling organization should contact SBA staff for any needed clarification of submission instructions, especially if the instructions necessitate additional assumptions.

All modifications, adjustments, assumptions, or other criteria that are included in producing the information required by the Commission in the submission shall be disclosed and will be reviewed.

**B. Notification of Unusual Circumstances.** The modeling organization shall notify the Commission Chair in writing, as soon as possible, of any unusual circumstances that may impact the model or the model submission.

### **III. Review of the Readiness Notification**

Once modeling organization submissions are received by the November 1, 2023 deadline, the Commission will hold a meeting to review the submissions as discussed under the “Commission Structure” chapter of the *Flood Standards Report of Activities*.

Prior to the Professional Team on-site review and in accordance with the time frame specified by the Commission, the modeling organization shall submit, in electronic format via e-mail correspondence to SBA staff, corrections for the deficiencies identified during this meeting. In response to the deficiencies identified, only revised pages and forms shall be provided with revision marks as specified under section V. Submission Revisions. If more than ten pages (exclusive of forms in a submission appendix) are impacted by the corrections to the deficiencies, then an entire submission document shall be submitted (eight duplexed, bound copies) along with a link e-mailed to SBA staff where all required documentation can be downloaded from a single ZIP file in accordance with the time frame specified by the Commission. All revised file names shall include the revision date, the abbreviated name of the modeling organization, the standards year, and the form name (when applicable) in the file name.

If, in addition to responding to the deficiencies specifically, the modeling organization opts to make further minor corrections elsewhere in their submission, it may do so and shall provide an annotated list of the additional revisions along with the corrections to the deficiencies.

Failure of the modeling organization to correct any deficiencies within the time frame specified shall result in the termination of the review process. The modeling organization will be notified in writing that the review process has been terminated. Upon termination of the review process, the modeling organization shall be required to wait until after the next revision or review of the standards before requesting the Commission to review the model.

In the event that a modeling organization realizes the initial submission or the model has material errors and needs revision prior to the scheduled on-site review, the modeling organization shall immediately notify the Commission Chair in writing. The notification shall detail the nature of the errors and revisions to the submission or the model, why it occurred, what is needed or has been done to correct the problem, the time frame needed for making the corrections, and any other relevant documentation necessary to describe both the errors and the corrections.

The Commission Chair shall (1) review the notification and inform the Commission members as soon as possible, and (2) assess, with at least three Professional Team members, the severity of the error, and (3) determine whether to postpone the scheduled on-site review pending consideration of potential deficiencies and the overall schedule of on-site reviews.



If it is determined to proceed with the originally-scheduled on-site review, the modeling organization shall submit revised documentation no less than fourteen days prior to the scheduled on-site review by the Professional Team. If the modeling organization cannot correct the problems and submit revised documentation fourteen days prior to the scheduled on-site review, then all associated standards shall not be verified during the scheduled on-site review.

#### **IV. Professional Team On-Site Review**

If a determination has been made that a modeling organization is ready for an on-site review, SBA staff will schedule the on-site review by the Professional Team as discussed under the “On-Site Review of a Computer Simulation Flood Model by the Professional Team” chapter of the *Flood Standards Report of Activities*.

Trade secret items that are to be presented during the closed meeting portion of the Commission meeting to review models for acceptability shall be presented to the Professional Team for review.

There are two possible outcomes of the on-site review regarding auditing for compliance with the standards.

1. The Professional Team determines that, in its opinion, the model is likely to comply with the standards, and so reports to the Commission.
2. The Professional Team determines that, in its opinion, the model is unlikely to comply with the requirements in one or more standards.
  - a. The Professional Team may react to possible corrections proposed by the modeling organization but will not tell the modeling organization how to correct the non-compliance. If the problems can be remedied while the Professional Team is on-site, the Professional Team will review the corrective actions taken, including revisions to the original November 1 submission, before determining verification of a standard.
  - b. If the problems cannot be corrected while the Professional Team is on-site, then the modeling organization shall have seven days from the final day of the on-site review to notify the Commission Chair in writing that it will be ready for an additional verification review within thirty days of the notification. The modeling organization shall submit all revised documentation as specified under section V. Submission Revisions, within thirty days of the notification.

SBA staff will assemble the Professional Team or an appropriate subset of the Professional Team for only one additional verification review to ensure that the corrections have been incorporated into the current, running version of the model.

- c. If a discrepancy in the model or model submission is discovered by the modeling organization after the Professional Team has completed its on-site review, then the modeling organization shall without delay notify the Commission Chair in writing describing the discrepancies, request an additional verification review, and indicate

when it will be ready for the review. The modeling organization shall submit all revised documentation as specified under section V. Submission Revisions.

If an additional verification review has not been conducted, SBA staff will assemble the Professional Team or an appropriate subset of the Professional Team for an additional verification review to ensure that the corrections have been incorporated into the current, running version of the model.

If an additional verification review has been previously conducted, the Commission Chair shall place the modeling organization's request for another additional verification review on the agenda for a special or regularly scheduled Commission meeting.

- d. If any problem necessitates the re-generation of the flood output ranges in Form AF-4, Flood Output Ranges, the modeling organization shall submit revised flood output ranges in Form AF-4, Flood Output Ranges, to be received by the Commission no less than fourteen days prior to the initial date of the on-site review or additional verification review. If this is not the case, then Flood Standard AF-6, Flood Loss Outputs and Logical Relationships to Risk, (along with other related standards depending on the nature of the revision) shall not be verified during the initial on-site review or additional verification review.

In the event that (1) Form AF-4, Flood Output Ranges, was modified after the initial submission and prior to the on-site review, or (2) an additional verification review is required and Form AF-4, Flood Output Ranges, must be re-generated, or (3) an error was discovered in Form AF-4, Flood Output Ranges, by the modeling organization after the Professional Team has completed its on-site review and an additional verification review, the modeling organization shall provide a newly completed Form AF-5, Percentage Change in Flood Output Ranges using the initial submission of Form AF-4, Flood Output Ranges, as the baseline for computing the percentage changes.

In the event that (1) Form AF-6, Logical Relationships to Flood Risk (Trade Secret Item), was modified after the initial submission and prior to the on-site review, or (2) an additional verification review is required and Form AF-6, Logical Relationships to Flood Risk (Trade Secret Item), must be re-generated, or (3) an error was discovered in Form AF-6, Logical Relationships to Flood Risk (Trade Secret Item), by the modeling organization after the Professional Team has completed its on-site review and an additional verification review, the modeling organization shall provide a newly completed Form AF-7, Percentage Change in Logical Relationships to Flood Risk, using the initial submission of Form AF-6, Logical Relationships to Flood Risk (Trade Secret Item), as the baseline for computing the percentage changes.

- e. If the modeling organization disagrees with the Professional Team as to likelihood of compliance, the modeling organization has two options:

1. It can proceed to the scheduled Commission meeting to review models for acceptability under the 2021 Flood Standards and present its arguments to the Commission to determine acceptability, or
2. It can withdraw its request for review. Such a withdrawal shall result in the modeling organization waiting until after the next revision or review of the standards before requesting the Commission review its model.

## **V. Submission Revisions**

Revised documentation shall include a distinct notification letter. The revision date shall be included on the submission cover page, the Model Identification page, and in each revised page footnote. All revised file names submitted shall include the revision date, the abbreviated name of the modeling organization, the standards year, and the form name (when applicable) in the file name.

Revisions shall be noted with revision marks, i.e., words stricken are deletions (~~deletions~~) and words underlined are additions (additions). If revision marks are provided in color, material deleted and stricken shall be in red, and material added and underlined shall be in blue.

The Professional Team and the Commission Chair will review the new material upon receipt for deficiencies. The Commission Chair shall notify the modeling organization of any deficiencies and the time frame for correction. An additional verification review will not be held until all deficiencies have been addressed. The Professional Team may provide to SBA staff a second pre-visit letter to be sent to the modeling organization outlining specific issues to be addressed during the additional verification review.

If an additional verification review is requested, revised documentation shall be received within thirty days of the request.

Complete final revised documentation shall be received no less than ten days prior to the Commission meeting to review the model for acceptability. The modeling organization shall e-mail to SBA staff a link where complete final revised documentation with and without revision marks can be downloaded from a single ZIP file. If more than ten pages are revised (exclusive of forms in a submission appendix), eight duplexed, bound copies of all required documentation with revision marks for all revisions made to the original submission shall be provided. If ten pages or fewer (exclusive of forms in a submission appendix) are revised, only eight duplexed, bound copies of the revised pages and forms (if revised) shall be submitted. The format of the revised documentation shall be as specified under subsection A. Notification of Readiness for Review, Items 3 and 4 of the section II. Notification Requirements.

A note will be posted on the Commission website with instructions for obtaining initial submission documents. Final submission documents for a model that has been found acceptable by the Commission are posted on the Commission website ([www.sbafla.com/methodology](http://www.sbafla.com/methodology)).

## VI. Review by the Commission

- A. **General Review of a Model.** For any modeling organization seeking the Commission's determination of acceptability, the Commission may request a meeting with the modeling organization prior to the Commission's review of the model's compliance with the standards. The meeting would provide for a general discussion about the model or its readiness for review and would also provide an opportunity for the Commission and the modeling organization to address any other issues. This meeting may be conducted concurrently with the meeting to determine acceptability. If trade secrets used in the design and construction of the model are discussed, such discussions shall be held in a closed meeting.
- B. **Meeting to Determine Acceptability.** The Commission shall meet at a properly noticed public meeting to determine the acceptability of a model once the modeling organization has provided all required material and the Professional Team has concluded its on-site review or any additional verification review. If the Commission Chair determines that more preparation time is needed by Commission members, the Commission Chair may reschedule the meeting date to review a model for acceptability, taking into consideration public notice requirements, the availability of a quorum of Commission members, the availability of a meeting room, and the availability of the particular modeling organization.

All materials shall be reviewed by the Professional Team prior to presentation to the Commission.

If the Commission determines that meeting one standard makes it impossible to meet a second standard, the conflict shall be resolved by the Commission, and the Commission shall determine which standard shall prevail. If at the meeting a unique or unusual situation arises, the Commission shall determine the appropriate course of action to address that situation, using its sound discretion and adhering to the legislative findings and intent as expressed in s. 627.0628(1), F.S.

Each modeling organization's model will be reviewed independently of any other modeling organization's model currently accepted or presently applying for review.

Trade secrets used in the design and construction of the model shall be discussed during a closed meeting prior to the Commission voting on the acceptability of the model. No voting regarding the acceptability of a model shall occur during a closed meeting.

### 1. Modeling Organization Presentation

All modeling organizations shall make a presentation to the Commission with respect to the model as used for personal residential ratemaking purposes in Florida. The presentation shall use a medium that is readable by all Commission members. The modeling organization presentation is for the purpose of helping the Commission understand outstanding issues, how the modeling organization has resolved various issues, and to explain the basis as to how the model meets the standards. Various issues may relate to:

- a. Informational needs of the Commission as provided in the disclosures and forms,
- b. The theoretical soundness of the model,
- c. Use of reasonable assumptions, and
- d. Other related aspects dealing with accuracy and reliability.

For a new model, the modeling organization shall give a detailed overview presentation to the Commission (approximately one hour) explaining how the model is designed to be theoretically sound, meets the criteria of being accurate and reliable, and indicate which parts of the model are considered proprietary.

For an existing model, the modeling organization shall present a general, high level overview of the model (no more than 20 minutes). This presentation should concentrate on the theoretical basis for the model, highlight the measures taken to ensure the model is accurate and reliable, and indicate which parts of the model are considered proprietary.

Modeling organization personnel shall distribute nineteen hard copies of the overview presentation to the Commission and Professional Team members at the start of the meeting.

If, due to special circumstances, the meeting is held virtually, the modeling organization shall provide nineteen hard copies of the overview presentation to SBA staff to be received no less than two business days prior to the meeting.

Following the overview presentation, the Commission will hold a closed meeting where trade secrets used in the design and construction of the model will be discussed and reviewed. Modeling organizations that do not utilize the trade secret session shall cover the prescribed material during the public meeting portion.

## 2. Closed Meeting Portion

During the closed meeting where trade secrets used in the design and construction of the model are discussed, the modeling organization shall present temporal evolution of coastal flood characteristics (Flood Standard MF-4, Flood Characteristics (Outputs), Audit 8), temporal evolution of inland flood characteristics, if applicable (Flood Standard HHF-2, Flood Characteristics (Outputs), Audit 10), Form HHF-3, Coastal Flood Characteristics by Annual Exceedance Probabilities (Trade Secret Item), Form HHF-5, Inland Flood Characteristics by Annual Exceedance Probabilities (Trade Secret Item), Form AF-6, Logical Relationships to Flood Risk (Trade Secret Item), and trade secret items identified and recommended by the Professional Team during the on-site and additional verification reviews to be shown to the Commission which will be documented in the Professional Team's report to the Commission.

The modeling organization shall discuss if and how the model addresses the impacts of the claims environment, the legal environment, and litigation effects on modeled losses (see Flood Standard AF-4, Modeled Flood Loss Cost and Flood Probable Maximum Loss Level Considerations, Audit 1).

The modeling organization shall provide a detailed discussion of Form AF-6, Logical Relationships to Flood Risk (Trade Secret Item), in support of acceptability of Flood Standard AF-6, Flood Loss Outputs and Logical Relationships to Risk.

Modeling organization personnel shall distribute nineteen hard copies, numbered 1 through 19, of the modeling organization's prepared closed meeting presentation and the trade secret forms to the Commission and Professional Team members at the start of the closed meeting. The trade secret forms shall be printed separately from the presentation. Modeling organization personnel shall collect the hard copies at the conclusion of the closed meeting and prior to anyone leaving the meeting room. If the meeting is held virtually, due to special circumstances, the modeling organization is not required to provide hard copies of the prepared closed meeting presentation or the trade secret forms.

All material presented in the closed meeting shall be complete, e.g., all axes on graphs labeled.

Items that the modeling organization is precluded from releasing due to third party contracts may be excluded.

In order to meet the public meeting notice requirements for the following public meeting portion, two hours shall be scheduled for the closed meeting.

### 3. Public Meeting Portion

At the conclusion of the closed meeting, the Commission will resume the public meeting to continue the review of the model for acceptability. The modeling organization presentation for this portion of the meeting shall:

- a. Provide an explanation of corrections made for deficiencies noted by the Commission,
- b. Provide an explanation of revisions to the currently accepted model and their effect on flood loss costs and flood probable maximum loss levels, and
- c. Provide an explanation of how the model meets the standards:
  1. Each standard number and title shall be stated;
  2. Explanation of how each standard was met, exhibiting appropriate disclosures or forms that support compliance; asserting that a standard has been met without providing substantive evidence is not acceptable;

3. If relevant and non-proprietary, material not provided in the submission which was presented to the Professional Team during the on-site review for verification; and
4. Any non-trade secret information that can be provided in order to facilitate a general understanding of the trade secret information presented to the Commission during the closed meeting.

Two hours shall be scheduled for review of a new model not previously submitted and one and a half hours shall be scheduled for review of an existing model during a public meeting.

Modeling organization personnel shall distribute nineteen hard copies of the modeling organization's prepared public meeting presentation to the Commission and Professional Team members at the start of the public meeting. If the meeting is held virtually, due to special circumstances, the modeling organization shall provide nineteen hard copies of the prepared public meeting presentation to SBA staff to be received no less than two business days prior to the meeting.

All materials presented to the Commission during the public portions of the meeting to determine acceptability shall be provided to SBA staff in electronic format.

- C. **Acceptability and Notification.** To be determined acceptable, the model shall have been found acceptable for all standards. If the model fails to be found acceptable by a majority vote for any one standard, the model shall not be found acceptable. The modeling organization shall have an opportunity to appeal the Commission's decision as specified under section VII. Appeal Process to be Used by a Modeling Organization if a Model is Not Found to be Acceptable by the Commission.

Once the Commission has determined that a model is acceptable in accordance with the procedures in the acceptability process and that all required documentation as specified in the acceptability process has been provided to the Commission, the Commission Chair shall provide the modeling organization with a letter confirming the Commission's action.

The letter shall be in the following format.

Date

(Name and Address of Modeling Organization)

Dear \_\_\_\_\_:

This will confirm the finding of the Florida Commission on Hurricane Loss Projection Methodology on (date), that the (name of modeling organization) model has been determined acceptable for projecting flood loss costs and flood probable maximum loss levels for personal residential rate filings. The determination of acceptability expires on November 1, 2028.

The Commission has determined that the (model name and version identification) on the (platform identification) (*primary platform*) and on the (additional platform identifications) (*functionally equivalent platform*) limited to the specific options acceptable for use in a Florida rate filing identified in Flood Standard AF-1, Flood Model Input Data and Output Reports, Disclosure 6, and as selected in the input form provided in Disclosure 4, and reported in the output form provided in Disclosure 5:

- a. complies with the flood standards adopted by the Commission on (date of adoption), and
- b. is sufficiently accurate and reliable for projecting flood loss costs and flood probable maximum loss levels for personal residential property in Florida.

On behalf of the Commission, I congratulate you and your colleagues. We appreciate your participation and input in this process.

Sincerely,

(Name), Chair

A copy of the letter shall be provided to the Commissioner of the Office of Insurance Regulation.

## **VII. Appeal Process to be Used by a Modeling Organization if a Model is Not Found to be Acceptable by the Commission**

If a model is not found to be acceptable by the Commission, the modeling organization shall have up to thirty days to file a written appeal of the Commission's finding. The appeal shall specify the reasons for the appeal, identify the specific standard or standards in question, provide appropriate data and information to justify its position, and may request a follow up reconsideration meeting with the Commission to present any relevant or new information and data to the Commission in either a public or closed meeting format.

Within sixty days of receiving the appeal, the Commission shall hold a public meeting for the purpose of reviewing the appeal documentation, formulate additional questions to be responded to by the modeling organization, and request additional data and information if necessary. If the Commission determines additional data and information is necessary for reconsideration of the model, the Commission's questions, data, and information request shall be provided to the modeling organization in a letter from the Commission Chair no later than ten days after the meeting to consider the appeal request. The modeling organization shall respond to the Commission within ten days of receiving the Commission Chair's letter. Any proprietary responses, data, or information shall be noted by the modeling organization indicating the response will be discussed in a closed session with the Commission.

The Commission will meet at a properly noticed public meeting to reconsider the acceptability of the model under the standards established by the Commission. If the Commission Chair determines that more preparation time is needed by Commission members, the Commission Chair may reschedule the meeting date to reconsider the model



for acceptability, taking into consideration public notice requirements, the availability of a quorum of Commission members, the availability of a meeting room, and the availability of the modeling organization.

Once the Commission has completed its reconsideration of acceptability and determined that the model has met all the standards being reconsidered and that all required documentation as specified in the acceptability process has been provided to the Commission, the Commission Chair shall provide the modeling organization with a letter confirming the Commission's action as specified under subsection C. Acceptability and Notification of section VI. Review by the Commission.

If the model fails to be found acceptable by a majority vote for any one standard, the model shall not be found acceptable and the appeal of the modeling organization shall have failed. In this regard, the findings of the Commission shall be final. The modeling organization shall be required to wait until after the next revision or review of the standards before requesting the Commission to review its model.

#### **VIII. Discovery of Editorial Errors or Discrepancies in a Submission after a Model has been Determined to be Acceptable by the Commission**

If editorial errors or discrepancies are discovered in a currently accepted model submission, the modeling organization shall immediately notify the Commission Chair in writing. The notification shall include an errata detailing the nature of the editorial errors or discrepancies and the corresponding revisions to the submission.

The Commission Chair, in consultation with at least three Professional Team members, shall verify the corrections to the currently accepted model submission. Once the Commission Chair determines that the documentation and explanations provided by the modeling organization are sufficient, no further review by the Commission will be necessary. The Commission Chair shall provide a letter to the modeling organization acknowledging the notification of editorial errors or discrepancies and noting that the Commission accepts the modeling organization's errata and revisions to the currently accepted submission.

#### **IX. Discovery of Differences in a Model after a Model has been Determined to be Acceptable by the Commission**

If the modeling organization discovers any differences between the model as found acceptable by the Commission and the model as used by its clients, the modeling organization shall without delay notify the Commission in writing describing the differences and the impact on flood loss costs and flood probable maximum loss levels. The notification shall be accompanied by Form VF-3, Flood Mitigation Measures, Range of Changes in Flood Damage, Form AF-1, Zero Deductible Personal Residential Standard Flood Loss Costs, Form AF-4, Flood Output Ranges, and Form AF-8, Flood Probable Maximum Loss for Florida. Additionally, the modeling organization shall state the level of the differences based on the classification scheme below as either Type I, Type II, or Type III differences.

For purposes of complying with this requirement, a difference is anything that results in a model not being exactly the same as the model found acceptable by the Commission under

the standards as adopted in this *Flood Standards Report of Activities*, but does not include interim model updates as addressed in section X. Interim Model Updates after a Model has been Determined to be Acceptable by the Commission, section XI. Interim Catastrophe Model or Platform Updates after the Florida Flood Model has been Determined to be Acceptable by the Commission, and model updates as addressed in section XIII. Model Update for Consistency of Hurricane and Flood Models after the Model has been Determined to be Acceptable by the Commission, or other developmental revisions to the model that are of the nature that would be appropriately reviewed according to the standards and procedures in the next *Flood Standards Report of Activities* scheduled for publication in 2025.

Upon receipt of the modeling organization's notification and documentation as specified above, the Commission Chair shall consult with at least three Professional Team members in order to investigate, determine, and verify the impact of the differences as reported by the modeling organization.

Differences in flood loss costs or flood probable maximum loss levels within spreadsheets shall be computed without explicit rounding or truncation of floating-point values prior to generating the documentation specified above. The type of differences noted shall be classified as falling into one of the following categories:

Type I: The model is not the exact same model as found acceptable, but there are no differences in flood loss costs for any five-digit ZIP Code area and there are no differences in flood probable maximum loss levels for any return period.

Type II: There are differences in one or more flood loss costs for a five-digit ZIP Code area, but such differences do not exceed  $\pm 1\%$  and there are changes in flood probable maximum loss levels for one or more return periods, but such differences do not occur at the rounded third significant digit of the flood probable maximum loss number.

Type III: There are differences in one or more flood loss costs for a five-digit ZIP Code area or there are changes in flood probable maximum loss levels for one or more return periods that exceed the thresholds set in Type II.

**A. Type I Differences.**

1. The Commission Chair, in consultation with at least three Professional Team members, shall verify the impact of the differences as reported by the modeling organization, and identify any additional documentation needed by the Commission. In its investigation and review of the issue, the Commission shall focus solely on the need for documentation explaining and describing the differences and ensuring that there is no impact on flood loss costs and flood probable maximum loss levels. The modeling organization's response related to differences noted at the Type I level shall only involve providing adequate documentation and shall not involve any further revisions to the model. The modeling organization shall submit an addendum to the submission for the currently accepted model thereby documenting the reasons, causes, and explanations for the differences. The addendum shall also encompass a discussion of why flood loss costs and flood probable maximum loss levels remain valid and have not changed from the currently accepted model.

2. If the Commission Chair determines that the documentation and explanations provided by the modeling organization are sufficient, no further review is necessary by the Commission. The Commission Chair shall provide a letter to the modeling organization acknowledging the notification of differences and noting that the Commission accepts the modeling organization's addendum to its previous submission. The letter shall note that a change in the model version identification is not required and that the model's acceptability shall expire as originally provided for in section XIV. Expiration of a Model Found Acceptable, unless additional differences are discovered prior to expiration.
3. If the Commission Chair determines that a new model version identification may be needed or that complexity of the reported differences needs to be addressed by the Commission at a special or regularly scheduled meeting, the Commission Chair shall provide the Commission with detailed recommendations, such as the need for additional documentation or the need for further investigations, the potential need for a revised model version identification, or other appropriate recommendations given the circumstances. Additionally, the Commission Chair shall propose what would constitute adequate documentation and when such documentation shall be provided to the Commission.

At the Commission meeting, the Commission Vice Chair or, if not available to chair the meeting, a Committee Chair appointed by the Commission Chair, shall preside at the meeting. The Commission Chair shall make a motion for approval of the recommendations which shall require a second. The Commission shall then vote on the recommendations of the Commission Chair, and any other alternative recommendations or amendments that are raised in the form of a motion that has been duly made and seconded by another Commission member.

If backup documentation required is of a proprietary nature involving trade secrets, the Commission shall discuss only such items in a closed session. All votes shall be taken in a public meeting.

4. The acceptability of the model shall not be suspended on the basis of Type I differences as long as appropriate documentation is provided to the Commission in a timely fashion. No additional actions or revisions to the model shall be required by the modeling organization with respect to Type I differences.
5. If the modeling organization fails to provide documentation that the Commission deems satisfactory within a time frame specified by the Commission, the acceptability of the model shall be suspended pending submission of the necessary documentation. The Commission Chair shall notify the modeling organization by letter of such suspension. Once the documentation is provided by the modeling organization, the Commission Chair shall review the documentation with at least three Professional Team members, and if the Commission Chair determines that the documentation is appropriate, shall send a letter to the modeling organization indicating that the documentation is acceptable and the suspension is lifted.

## **B. Type II Differences.**

1. The Commission Chair, in consultation with at least three Professional Team members, shall determine whether the modeling organization has already revised the model to address the differences to conform to the standards or is capable of addressing the differences within fourteen days after notifying the Commission of the discovery of Type II differences. If the model has been revised or can be revised within the fourteen-day time frame, the modeling organization shall submit an addendum to the submission for the currently accepted model thereby documenting the revisions, explaining the reasons for the differences, and providing any necessary backup documentation. If trade secret information is involved, the modeling organization shall include this fact in its notification to the Commission.
2. The Commission Chair shall place the modeling organization's notification on the agenda for a special or regularly scheduled meeting of the Commission. The scheduling of the Commission meeting shall depend on the nature of the differences and the time frame for appropriate revisions to be made. The Commission Chair shall provide Commission members with a copy of the modeling organization's notification and report the status related to the modeling organization's revision plan if on-going actions are required.
3. If the modeling organization has not made the necessary revisions to the model to conform to the standards, the Commission Chair shall provide in advance of the meeting a proposed plan of action for the Commission's consideration. The Commission Vice Chair or, if not available to chair the meeting, a Committee Chair appointed by the Commission Chair, shall preside at the meeting. The Commission shall consider the Commission Chair's proposal and, upon the proposal being moved and seconded, vote on the Commission Chair's proposed plan of action, and any other alternative recommendations or amendments that are raised in the form of a motion that has been duly made and seconded by another Commission member. All plans of action shall include specific time frames including deadlines and the required documentation regarding the necessary revisions to conform to the standards.
4. Once the modeling organization has made the appropriate revisions within the Commission's specified time frames, as verified by the Commission Chair in consultation with at least three Professional Team members, the Commission Chair shall call a special meeting or include an agenda item on the Commission's next regularly scheduled meeting for the purpose of reviewing the revisions to the model needed in order for the model to comply with the standards. The Commission shall review the model as it deems necessary and may go into a closed session for discussion of trade secrets. The Commission shall conduct a minimum of seven votes (one for each grouping of standards) with the option of any member being allowed to request one or more standards in a group be designated for a separate vote (without the requirement for a second to such motion).

The basic process adopted in the *Flood Standards Report of Activities*, chapter "Process for Determining the Acceptability of a Computer Simulation Flood Model"

under subsections A. General Review of a Model, B. Meeting to Determine Acceptability, and C. Acceptability and Notification in section VI. Review by the Commission, will be followed. The notification letter regarding the acceptability of the model shall be revised to acknowledge the type of differences discovered and the revisions from the original model related to the currently accepted model version. The new model version identification as assigned by the modeling organization shall be noted, and the revised model shall supersede the currently accepted model. The acceptability of the revised model shall expire at the end of the current cycle as provided for in section XIV. Expiration of a Model Found Acceptable, unless additional differences are discovered prior to expiration.

5. If the modeling organization fails to make the appropriate revisions within the Commission's specified time frame, the model shall be suspended until the appropriate revisions are made to conform the model such that it meets the standards. The Commission Chair shall send a letter to the modeling organization indicating that the acceptability of the model has been suspended until the Commission votes on the acceptability of the revised model and a new model version identification has been assigned by the modeling organization. Once the Commission has determined acceptability of the revised model, the revised model shall supersede the currently accepted model. The acceptability of the revised model shall expire at the end of the current cycle as provided for in section XIV. Expiration of a Model Found Acceptable, unless additional differences are discovered prior to expiration.

**C. Type III Differences.**

1. The acceptability of the model shall be suspended upon receipt of the notification of Type III differences or at any time during a Commission review where the magnitude of such differences is discovered and can be documented. The Commission Chair shall send the modeling organization a letter indicating that the acceptability of the model by the Commission has been suspended immediately upon such notification or discovery and shall remain suspended until the Commission investigates and takes action regarding the modeling organization's steps necessary to address the differences in order to bring the model in compliance with the standards as adopted in this *Flood Standards Report of Activities*.
2. The Commission Chair, in consultation with at least three Professional Team members, shall determine whether the modeling organization has already revised the model to address the differences necessary to conform the model to the standards or is capable of addressing the differences within fourteen days of notifying the Commission or the discovery of the Type III differences by the Professional Team or Commission. If the model has been revised or can be revised within the fourteen-day time frame, the modeling organization shall submit an addendum to the submission for the currently accepted model thereby documenting the revisions, explaining the reasons for the differences, and providing any necessary backup documentation. If trade secret information is involved, the modeling organization shall so indicate in its notification to the Commission.

3. The Commission Chair shall place the modeling organization's notification or the discovery by the Professional Team or Commission on the agenda for a special or regularly scheduled meeting of the Commission. The scheduling of the Commission meeting shall depend on the nature of the differences and the time frame for appropriate revisions to be made. The Commission Chair shall provide Commission members with a copy of the modeling organization's notification and report the status related to the modeling organization's revision plan if on-going actions are required.
4. If the modeling organization has not made any revisions to the model to conform to the standards, the Commission Chair shall provide in advance of the meeting a proposed plan of action for the Commission's consideration. The Commission Vice Chair or, if not available to chair the meeting, a Committee Chair appointed by the Commission Chair, shall preside at the meeting. The Commission shall consider the Commission

Chair's proposal and, upon the proposal being moved and seconded, vote on the Commission Chair's proposed plan of action, and any other alternative recommendations or amendments that are raised in the form of a motion that has been duly made and seconded by another Commission member. All plans of action shall include specific time frames including deadlines and documentation regarding the needed revisions for the modeling organization in order for the model to conform to the standards.

5. If the modeling organization has already revised the model or once the modeling organization has made the appropriate revisions within the Commission's specified time frames, as verified by the Commission Chair in consultation with at least three Professional Team members, the Commission Chair shall call a special meeting or include an agenda item on the Commission's next regularly scheduled meeting for the purpose of reviewing the revisions to the model needed in order for the model to comply with the standards. The Commission shall review the model as it deems necessary and may go into a closed session for discussion of trade secrets. The Commission shall conduct a minimum of seven votes (one for each grouping of standards) with the option of any member being allowed to request one or more standards in a group be designated for a separate vote (without the requirement for a second to such motion).

The basic process adopted in the *Flood Standards Report of Activities*, chapter "Process for Determining the Acceptability of a Computer Simulation Flood Model" under subsections A. General Review of a Model, B. Meeting to Determine Acceptability, and C. Acceptability and Notification in section VI. Review by the Commission, will be followed. The notification letter regarding the acceptability of the model shall be revised to acknowledge the type of differences discovered and the revisions from the original submission related to the currently accepted model version. The new model version identification as assigned by the modeling organization shall be noted, and the revised model shall supersede the currently accepted model. The acceptability of the revised model shall expire at the end of the current cycle as provided for in section XIV. Expiration of a Model Found Acceptable, unless additional differences are discovered prior to expiration.

6. If the modeling organization fails to make the appropriate revisions within sixty days of the Commission being notified or the date where the Commission discovered the Type III differences, the acceptability of the model shall be withdrawn subject to the appeal process as specified in section VII. Appeal Process to be Used by a Modeling Organization if a Model is Not Found to be Acceptable by the Commission. If there is no appeal or the appeal is unsuccessful, the modeling organization shall be required to wait until the next review cycle as determined by time frames established in the next *Flood Standards Report of Activities* scheduled for publication in 2025.

**X. Interim Model Updates after a Model has been Determined to be Acceptable by the Commission**

If a modeling organization makes interim updates to the model where (1) the model update scope and utility is unrelated to Florida flood loss costs or Florida flood probable maximum loss levels and does not include the Florida flood model component, and (2) there are no changes to the Florida flood loss costs or Florida flood probable maximum loss levels, the modeling organization shall notify the Commission Chair detailing the nature of the interim updates and the effect on the modeled results.

The notification shall also include Form VF-3, Flood Mitigation Measures, Range of Changes in Flood Damage, Form AF-1, Zero Deductible Personal Residential Standard Flood Loss Costs, Form AF-4, Flood Output Ranges, and Form AF-8, Flood Probable Maximum Loss for Florida, completed for the current accepted model and the proposed updated version of the model, and a percentage change comparison between the two versions to demonstrate no change. The proposed updated model shall be clearly identified with a new and unique model version identification under the modeling organization's model revision policy.

Depending on the nature of the interim updates, the Commission Chair in consultation with the Professional Team may recommend that the Professional Team conduct an on-site review or a virtual review provided the modeling organization is in agreement and can provide access to full modeling material.

If a modeling organization updates geographic location data within the model, the modeling organization shall also provide maps showing ZIP Code centroids (current and updated) for the entire state of Florida. The modeling organization shall provide a sorted list of all ZIP Code centroid movements of one mile or more, the top ten movements (if fewer than ten move at least one mile), and a list of new and retired ZIP Codes. The corresponding primary county for each ZIP Code listed shall be provided. The modeling organization shall provide a list of all ZIP Code related databases used by the model and describe the impact to these databases due to the updated ZIP Codes (including roughness factors, building construction, and ZIP Code specific flood vulnerability functions).

In situations involving other data updates as indicated in the modeling organization submission in response to Flood Standard GF-1, Scope of the Flood Model and Its Implementation, Disclosure 9, the modeling organization shall describe the impact of the data updates on Florida flood loss costs and Florida flood probable maximum loss levels and indicate why such interim data updates are considered necessary. The modeling organization

shall provide a list of all databases used by the model related to the data updates and describe the impact to these databases due to the updates. The Commission shall not consider other interim data updates unless such possible updates have been disclosed by the modeling organization in the submission response to Flood Standard GF-1, Scope of the Flood Model and Its Implementation, Disclosure 9.

If backup documentation required is of a proprietary nature involving trade secrets, the Commission shall discuss only such items in a closed session. If trade secret information is involved, the modeling organization shall include this fact in its notification to the Commission.

The Commission Chair shall review the notification and inform the Commission members as soon as possible, and assess, with at least three Professional Team members, the regression test results. If there is no change in the underlying acceptable model and no change in the modeled results, the Commission Chair shall send an updated acceptability notification letter to the modeling organization denoting that the interim model updates do not produce significant differences in Florida flood loss costs and Florida flood probable maximum loss levels from the currently accepted model and the same expiration date shall apply as for the currently accepted model. As applicable, the new model version identification or the same version identification with a distinction made for the interim data updates as assigned by the modeling organization shall be noted.

If the Commission Chair, in consultation with at least three Professional Team members, determines there is a change in the underlying acceptable model or a change in the modeled results, then the Commission Chair shall send a letter to the modeling organization as soon as practical notifying the modeling organization of a pending review by the Commission. The Commission Chair shall determine the need for a special meeting or whether the issue can be addressed at the next regularly scheduled meeting of the Commission. The purpose of the special Commission meeting shall be to review the interim model updates and any other aspect of the model which might have changed in order to ensure that the model continues to comply with the standards. The Commission shall conduct a minimum of seven votes (one for each grouping of standards) with the option of any member being allowed to request one or more standards in a group be designed for a separate vote (without the requirement for a second to such motion).

The basic process adopted in the *Flood Standards Report of Activities*, chapter “Process for Determining the Acceptability of a Computer Simulation Flood Model” under subsections A. General Review of a Model, B. Meeting to Determine Acceptability, and C. Acceptability and Notification in section VI. Review by the Commission, will be followed. The notification letter regarding the acceptability of the model shall be revised to acknowledge the interim model updates to the currently accepted model. The new model identification as assigned by the modeling organization shall be noted. Once the Commission has determined acceptability of the updated model, the revised model shall supersede the currently accepted model. The acceptability of the revised model shall expire at the end of the current cycle as provided for in section XIV. Expiration of a Model Found Acceptable.

If the proposed interim model updates are not found to be acceptable by the Commission, the Commission Chair shall send a letter to the modeling organization noting such and that



the currently accepted model shall continue to be acceptable and expires as originally provided for in section XIV. Expiration of a Model Found Acceptable.

The appeal process as specified in section VII. Appeal Process to be Used by a Modeling Organization if a Model is Not Found to be Acceptable by the Commission, shall not be applicable. This will require the modeling organization to make any contemplated interim model updates for the Commission's consideration in the next review cycle as determined by time frames established in the next *Flood Standards Report of Activities* scheduled for publication in 2025.

#### **XI. Interim Catastrophe Model or Platform Updates after the Florida Flood Model has been Determined to be Acceptable by the Commission**

If a modeling organization makes interim updates to the catastrophe model (including the flood model) or platform that have no bearing on the currently accepted Florida flood model but the flood model version identification or flood model platform names and identifications are to be changed, then the following procedure applies.

1. The modeling organization shall notify the Commission Chair detailing the nature of the interim update to the catastrophe model. The letter shall include:
  - a. The proposed name and version of the updated model and primary platform;
  - b. A statement that the interim update has been duly tested and has no impact on the currently accepted Florida flood model;
  - c. A description of the changes in the catastrophe model;
  - d. A description of the platform update, if applicable;
  - e. A description of any other internal testing;
  - f. An acknowledgement that the completed forms will be provided upon request of the Commission Chair; and
  - g. A completed Interim Model or Platform Update Certification Form.
2. The Commission Chair, in consultation with at least two Professional Team members, shall review the interim update letter and Interim Model or Platform Update Certification Form. If the Commission Chair concurs with the modeling organization that the proposed interim update appears functionally equivalent to the currently accepted Florida flood model based on the certifications by the modeling organization, then the Commission Chair shall send a letter notifying the status of the interim update and that the same expiration date shall apply as for the currently accepted Florida flood model. A copy of the Commission letter and Interim Model or Platform Update Certification Form shall be provided to the Commissioner of the Office of Insurance Regulation.

3. In the event that the Commission Chair, in consultation with at least two Professional Team members, does not concur with the modeling organization that the proposed interim update appears functionally equivalent to the currently accepted Florida flood model, the Commission Chair shall request the modeling organization to submit the completed forms for review by the Professional Team as in section X. Interim Model Updates after a Model has been Determined to be Acceptable by the Commission.
4. The Commission reserves the right to review any and all interim updates in detail even if the review of the interim update letter and Interim Model or Platform Update Certification Form was found favorable.

## **XII. Review and Acceptance Criteria for Functionally Equivalent Model Platforms**

If a modeling organization has designed its model to operate on two or more platforms, the Commission may find the model as run on the various platforms acceptable under the following circumstances and procedures.

1. The various model platforms shall be submitted for review at one time by the designated submission deadline and shall be capable of being reviewed concurrently by the Commission, including the Professional Team's on-site review, such that all platforms can be reviewed as to their functional equivalence.
2. Functional equivalence shall be recognized as long as no flood loss costs differ with regard to any platform at the rounded third decimal place (thus there should be no changes in the published Form VF-3, Flood Mitigation Measures, Range of Changes in Flood Damage, Form AF-1, Zero Deductible Personal Residential Standard Flood Loss Costs, and Form AF-4, Flood Output Ranges), and flood probable maximum loss does not differ by more than  $\pm 1\%$  for any flood probable maximum loss level (Form AF-8, Flood Probable Maximum Loss for Florida).
3. The model as implemented on the various platforms shall have the same model version identification with a notation to designate the specific model platform(s). The modeling organization shall specify which platform is the primary platform and which platform(s) are the functionally equivalent platform(s). This information shall be disclosed in the modeling organization submission in response to Flood Standard GF-1, Scope of the Flood Model and Its Implementation, Disclosure 1.
4. The modeling organization shall not be allowed to make separate submissions during a review cycle and any difference between model platforms shall be required to be fully described in the modeling organization's original submission.
5. The only differences in modeled results shall be demonstrated to be solely due to the nature of the model platform(s) or any other technological constraint that would account for no more than the designated variations noted above.

Once the Commission has determined functional equivalence of the model platform(s), the Commission Chair shall send an acceptability notification letter to the modeling organization designating specifically which model platform(s) were found to be functionally equivalent and acceptable by the Commission.

### **XIII. Model Update for Consistency of Hurricane and Flood Models after the Model has been Determined to be Acceptable by the Commission**

If the modeling organization proposes to update a currently accepted hurricane or flood model as a result of changes to the other model, the modeling organization shall notify the Commission Chair in writing. The notification shall detail the nature of the proposed updates, the effect on the modeled results (i.e., the impact on flood loss costs and flood probable maximum loss levels), and include all submission materials that are impacted. If trade secret information is involved, the modeling organization shall include this fact in the notification to the Commission.

Depending on the nature of the updates, the Commission Chair in consultation with at least three Professional Team members, will review the notification and materials provided to determine whether to process the proposed updates immediately or defer until the next scheduled review cycle. Depending on the nature of the update, the Commission Chair may recommend that the Professional Team conduct an on-site review or a virtual review provided the modeling organization is in agreement and can provide access to full modeling material.

If the Commission Chair, in consultation with at least three Professional Team members, determines that the documentation and explanations provided by the modeling organization are sufficient, no further review is necessary by the Commission. The Commission Chair shall provide an updated acceptability notification letter to the modeling organization acknowledging the update notification and noting that the model update produces minor differences in flood loss costs and flood probable maximum loss levels from the current accepted model, that the Commission accepts the modeling organization's addendum to its previous submission, and that the same expiration date shall apply as for the current accepted model.

If the Commission Chair, in consultation with at least three Professional Team members, determines there are significant differences in the underlying acceptable model or there are significant differences in the modeled results, then the Commission Chair shall send a letter to the modeling organization as soon as practical notifying the modeling organization of a pending review by the Commission. The Commission Chair shall determine the need for a special meeting or whether the issue can be addressed at the next regularly scheduled meeting of the Commission. The purpose of the special Commission meeting shall be to review the model update and any other aspect of the model which might have changed in order to ensure that the model continues to comply with the standards. The Commission shall conduct a minimum of seven votes (one for each grouping of standards) with the option of any member being allowed to request one or more standards in a group be designated for a separate vote (without the requirement for a second to such motion).

The basic process adopted in the *Flood Standards Report of Activities*, chapter "Process for Determining the Acceptability of a Computer Simulation Flood Model" in subsections A. General Review of a Model, B. Meeting to Determine Acceptability, and C. Acceptability and Notification under section VI. Review by the Commission, will be followed.

The notification letter regarding the acceptability of the model shall be revised to acknowledge the model update to the currently accepted model. The new model identification as assigned by the modeling organization shall be noted. Once the Commission has determined acceptability of the revised model, the revised model shall supersede the currently accepted model. The acceptability of the revised model shall expire at the end of the current cycle as provided for in section XIV. Expiration of a Model Found Acceptable.

If the proposed model update is not found to be acceptable by the Commission, the Commission Chair shall send a letter to the modeling organization noting such and that the model currently found acceptable by the Commission shall continue to be acceptable and expires as originally provided for in section XIV. Expiration of a Model Found Acceptable.

The appeal process as specified in section VII. Appeal Process to be Used by a Modeling Organization if a Model is Not Found to be Acceptable by the Commission shall not be applicable. This will require the modeling organization to make any contemplated model update for the Commission's consideration in the next review cycle as determined by time frames established in the next *Flood Standards Report of Activities* scheduled for publication in 2025.

#### **XIV. Expiration of a Model Found Acceptable**

The determination of acceptability of a model found acceptable under the standards contained in the *Flood Standards Report of Activities as of November 1, 2021*, expires on November 1, 2028.

## Interim Model or Platform Update Certification Form

Name of Catastrophe Model: \_\_\_\_\_

Name of Currently Accepted Florida Flood Model: \_\_\_\_\_

Currently Accepted Florida Flood Model Version Identification: \_\_\_\_\_

Currently Accepted Florida Flood Model Primary Platform Name and Identification: \_\_\_\_\_

Proposed Name of Flood Model: \_\_\_\_\_

Proposed Flood Model Version Identification: \_\_\_\_\_

Proposed Flood Model Primary Platform Name and Identification: \_\_\_\_\_

We hereby certify that the aforementioned interim model or platform update has been reviewed and conclude that there are no differences other than as described in the interim update letter from the currently accepted Florida flood model and as certified in this form. Hence, we deem this interim model or platform update to be functionally equivalent to the currently accepted Florida flood model as given above.

Further we hereby certify that:

1. The interim model or platform update meets all the standards for which the current Florida flood model was found acceptable;
2. The interim update has been duly tested and has no impact on the currently accepted Florida flood model;
3. Form VF-3, Flood Mitigation Measures, Range of Changes in Flood Damage; Form AF-1, Zero Deductible Personal Residential Standard Flood Loss Costs; Form AF-4, Flood Output Ranges; and Form AF-8, Flood Probable Maximum Loss for Florida, have been generated and agree with their counterparts in the currently acceptable Florida flood model;
4. Our review was completed in accordance with the professional standards and code of ethical conduct for our respective professions; and
5. In expressing our opinion, we have not been influenced by any other party in order to bias or prejudice our opinion.

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Catastrophe Model Senior Officer

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Professional Credentials and Title

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Signature

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Date

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Actuary

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Professional Credentials

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Signature

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Date

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Engineer

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Professional Credentials

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Signature

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Date

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Statistician

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Professional Credentials

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Signature

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Date

**ON-SITE REVIEW  
OF A COMPUTER SIMULATION  
FLOOD MODEL BY THE  
PROFESSIONAL TEAM**

# **ON-SITE REVIEW OF A COMPUTER SIMULATION FLOOD MODEL BY THE PROFESSIONAL TEAM**

## ***General Purpose***

The purpose of the on-site review is to evaluate the compliance of the flood model with the flood standards. The on-site review is conducted in conjunction with the chapter “Process for Determining the Acceptability of a Computer Simulation Flood Model.” It is not intended to provide a preliminary peer review of the flood model. The goal of the Professional Team’s efforts is to provide the Commission with a clear and thorough report of the flood model as required in the acceptability process, subject to non-disclosure conditions. All modifications, adjustments, assumptions, or other criteria that were included in producing the information required by the Commission in the flood model submission shall be disclosed to the Professional Team to be reviewed.

The Professional Team will begin the review with a briefing to modeling organization personnel to discuss the review schedule and to describe the subsequent review process.

The on-site review by the Professional Team involves the following:

1. Due diligence review of information submitted by the modeling organization. For existing modeling organizations, the due diligence review concentrates on (1) any changes in the disclosures and forms from the currently accepted flood model, and (2) selected parts of the flood model that have not been updated.
2. On-site tests of the flood model under the control and supervision of the Professional Team. The objective is to observe the flood model in operation and the results it produces during a real time run. This is necessary in order to avoid the possibility that the modeling organization could recalibrate the flood model solely for producing desirable results.
3. Verification that information provided by the modeling organization in the disclosures and forms is valid and is an accurate and fairly complete description of the flood model.
4. Review for compliance with the flood standards.
5. Review of trade secret data and information.

Feedback regarding compliance of the flood model with the flood standards will be provided to the modeling organization throughout the review process.

## ***Preparation for On-Site Review***

The Professional Team assists the Commission and SBA staff in determining if a modeling organization is ready for an on-site review.



The Professional Team assists the modeling organization in preparing for the on-site review by providing to SBA staff a detailed pre-visit letter (to be sent to the modeling organization) outlining specific issues to be addressed by the modeling organization unique to the flood model submission. The Professional Team makes every effort to identify substantial issues with the flood model or the flood model submission to allow the modeling organization adequate time to prepare for the on-site review. As the Professional Team continues to prepare for the review, it may discover issues not originally covered in the pre-visit letter prior to the on-site review. Such issues may be addressed in an addendum to the pre-visit letter or will be introduced at the opening briefing of the on-site review. The discovery of errors in the flood model by the Professional Team is a possible outcome of the review. It is the responsibility of the modeling organization to assure the validity and correctness of the flood model and the flood model submission.

**Telephone Conference Call:** After the Commission has determined the modeling organization is ready to continue in the review process and prior to the on-site review, at the request of the Commission or the modeling organization, SBA staff will arrange a telephone conference call between the modeling organization and the Professional Team or a subset of the Professional Team. The purpose of the call is to review the pre-visit letter, material, data files, and personnel that need to be on-site during the review. This does not preclude the Professional Team from asking for additional information during the on-site review that was not discussed during the conference call or included in the pre-visit letter. The call allows the modeling organization and the Professional Team the opportunity to clarify any concerns or to ask questions regarding the upcoming on-site review. This call is the only scheduled opportunity for the modeling organization to clarify any questions directly with the Professional Team prior to the on-site review.

**Scheduling:** SBA staff is responsible for scheduling on-site review dates. Each modeling organization will be notified at least two months prior to the scheduled review. The actual length of the review may vary depending on the preparedness of the modeling organization and the depth of the inquiry needed for the Professional Team to obtain an understanding of the flood model. The Commission expects the modeling organization to be well-prepared for a review by the Professional Team. In particular, it is suggested that a modeling organization conduct a detailed self-audit to assure that it is ready for the Professional Team review.

**Presentation of Materials:** The modeling organization shall have all necessary materials and data on-site for review. All material referenced in the flood model submission as “will be shown to the Professional Team” and all material that the modeling organization intends to present to the Commission, including trade secret data and information, shall be presented to the Professional Team during the on-site review.

The modeling organization shall provide upon arrival of the Professional Team, and **before the review can officially commence**, seven printed copies of:

1. The modeling organization’s presentations,
2. The tables required in Flood Standard CIF-1, Flood Model Documentation, Audit 7,
3. All figures with scales for the  $x$ - and  $y$ -axes labeled that are not so labeled in the flood model submission. The figures should be labeled with the same figure number as given in the flood model submission,

4. Form HHF-3, Coastal Flood Characteristics by Annual Exceedance Probabilities (Trade Secret Item), for the flood model under review and for the currently accepted flood model,
5. Form HHF-5, Inland Flood Characteristics by Annual Exceedance Probabilities (Trade Secret Item), for the flood model under review and for the currently accepted flood model, and
6. Form AF-6, Logical Relationships to Flood Risk (Trade Secret Item), for the flood model under review and for the currently accepted flood model, all eight worksheets, graphical summaries to demonstrate the sensitivity for each Notional Set, color-coded contour or high-resolution map of the flood loss costs for slab foundation owners frame buildings (Notional Set 6), and scatter plot of the flood loss costs (y-axis) against distance to closest coast (x-axis) for slab foundation owners frame buildings (Notional Set 6).

The modeling organization's presentations shall begin with new or extensively updated material related to the flood model from the currently accepted flood model followed by a review of each flood standard commencing with pre-visit letter responses followed by responses to the audit items for each flood standard.

The modeling organization shall also provide electronic spreadsheets of all forms. Spreadsheets containing numbers shall be populated with the maximum precision allowed in the flood model implementation. This procedure shall hold even if the generation of some forms specify a limited number of decimal places.

The electronic files shall be provided to designated Professional Team members, in a medium as specified by the modeling organization, to be received no less than one business day prior to the start of the on-site review. The Professional Team shall only review and process the electronic files utilizing the trade secret data and information directly on the electronic storage medium as specified or provided by the modeling organization, and shall not copy, duplicate, or store any electronic trade secret data and information to any other medium including personal computers or other devices.

Access to critical scientific and technical literature or materials referenced in the flood model submission or during the on-site review shall be available on-site in hard copy or electronic form for the Professional Team.

The Professional Team shall be provided access to internet connections through the Professional Team members' personal computers for reference work that may be required during the on-site review.

The modeling organization shall be prepared to have available for the Professional Team's consideration, all insurance claims data received, and be prepared to describe any processes used to develop or validate the flood model that incorporates this data.

The modeling organization shall be prepared to provide for the Professional Team's review, all engineering data (e.g., post-event site investigations, laboratory or field-testing results), and be prepared to describe any processes used to develop or validate the flood model that incorporates this data.

## ***Remote Review***

If government-mandated travel-related restrictions are imposed at the time of the on-site review, then the review shall be held remotely and shall abide by the on-site review process as detailed above. For other unique scenarios that would limit or restrict travel, the Commission shall consider holding the on-site review remotely. For situations unique to a remote review, the following procedures shall apply.

A test session shall be conducted between 5 and 10 business days prior to the start of the remote review, to familiarize participants with the functionality of the software to be used during the remote review, if deemed necessary by SBA staff or requested by the modeling organization. This test session shall include, at a minimum, members of the modeling organization team, the Professional Team, SBA staff, and any Commission members who will be participating in the remote review.

Physical hard copy documents provided by a modeling organization to the Professional Team containing trade secret data and information shall be clearly designated on each page as trade secret through watermarks, footnotes, stamping, or other means as appropriate.

Removable drives provided by a modeling organization to the Professional Team containing electronic trade secret data and information shall be clearly labeled to reflect their proprietary nature. In addition to the removable drives, the modeling organization may provide electronic trade secret data and information on another electronic storage location as specified by the modeling organization. The Professional Team shall only review and process the electronic files utilizing the trade secret data and information directly on the removable drive or other electronic storage medium as specified or provided by the modeling organization, and shall not copy, duplicate, or store any electronic trade secret data and information to any other medium including personal computers or other devices.

The modeling organization shall provide all necessary materials and data for review, whether in physical hard copy, electronic format, or virtually, as agreed upon with the Professional Team and SBA staff. All materials and data provided by the modeling organization directly to a Professional Team or Commission member shall not be reproduced, recorded, copied, or duplicated in any manner by a Professional Team or Commission member.

The modeling organization shall provide to each Professional Team member, as designated by SBA staff, one set of physical hard copy materials and the required electronic data (via USB flash drive or another electronic storage medium as specified or provided by the modeling organization) to be received no less than one business day prior to the start of the remote review. The objective is for Professional Team members to receive the required materials prior to the start of the remote review to facilitate officially commencing the review on time, rather than to start the remote review one business day earlier.

The modeling organization shall provide to each Commission member approved to attend the on-site review that is being held remotely, one set of physical hard copy materials to be received no less than one business day prior to the start of the remote review.

Within one business day after completion of the remote review, Professional Team members shall ship to the modeling organization via overnight delivery all physical and electronic materials provided and made available by the modeling organization (the set of physical hard copy materials and the removable drives) and the remote review workbook provided by SBA staff.

Within one business day after completion of the remote review, Commission members participating in the remote review shall ship to the modeling organization via overnight delivery all physical hard copy materials provided and made available by the modeling organization and the remote review workbook provided by SBA staff.

Professional Team and Commission members shall thoroughly review all physical hard copy and electronic storage locations that were utilized during the remote review to ensure that all materials provided by the modeling organization are being returned or destroyed and that no record, copy, duplicate, derivative, or compilation of the information is within their possession. Each Professional Team and Commission member shall provide a written confirmation to the Commission Chair via email to SBA staff stating that (1) a comprehensive review has been performed of all physical hard copy and electronic storage locations utilized during the remote review process, (2) all materials and information provided by the modeling organization in support of the remote review have been shipped to the modeling organization via overnight delivery or destroyed, and (3) verifies that the materials and data provided by the modeling organization have not been reproduced, recorded, copied, or duplicated in any manner or stored on any medium including personal computers or other devices. SBA staff shall provide a copy of each written confirmation to the modeling organization.

### ***Professional Team Report***

After completing its review of the flood standards the Professional Team will conduct an exit briefing with the modeling organization. During this briefing, the Professional Team will provide a preliminary draft of the Professional Team report. If the on-site review is held remotely, a preliminary draft of the Professional Team report will be emailed by SBA staff to the modeling organization. The email shall include the SBA disclosure, “This communication may contain confidential, proprietary, and/or privileged information. It is intended solely for the use of the addressee. If you are not the intended recipient, you are strictly prohibited from disclosing, copying, distributing or using any of this information. If you received this communication in error, please contact the sender immediately and destroy the material in its entirety, whether electronic or hard copy. Additionally, please note that Florida has a very broad public records law. This communication (including your email address, any attachments and other email contents) may be subject to disclosure to the public and media.”

The modeling organization has the right to expunge any trade secret information. The modeling organization will also have the opportunity to check for any factual errors. The Professional Team will consider modeling organization suggestions for changes in its draft to correct factual errors. If the modeling organization and the Professional Team dispute a particular item as a factual error, then the report would adopt the phrasing, “In the opinion of the Professional Team, ...”

Any information within the preliminary draft of the Professional Team report deemed proprietary by the modeling organization shall be noted and expunged from the final Professional Team report. If there is a disagreement between the modeling organization and the Professional Team over the proprietary nature of the expunged information, then the expunged information shall be placed in a sealed envelope labeled “Contains Content Designated as Trade Secret Information by (Name of Modeling Organization)” with the date, time, and Professional Team leader’s signature across the seal. If the on-site review is held remotely, SBA staff shall print and place the expunged information in a sealed envelope labeled “Contains Content Designated as Trade Secret Information by (Name of Modeling Organization).”

The sealed envelope shall be retained by SBA staff in accordance with Florida Public Records Law in a secure location. SBA staff shall bring the sealed envelope to the Commission closed meeting to discuss trade secrets where it will be unsealed and distributed for use during the closed meeting. At the conclusion of the closed meeting, the information shall be placed in an envelope labeled “Contains Content Designated as Trade Secret Information by (Name of Modeling Organization)” and sealed. The sealed envelope shall be retained by SBA staff in a secure location until the records retention schedule has been met at which time the sealed envelope shall be destroyed and the modeling organization informed.

The Professional Team report will include:

1. A list of participants,
2. A summary of significant revisions in the flood model under review from the currently accepted flood model,
3. Any changes made to the flood model submission that were reviewed by the Professional Team during the on-site review. These changes shall be provided to the Commission in the revised flood model submission at least ten days prior to the Commission meeting to review the flood model for acceptability,
4. A verification that any deficiencies identified by the Commission have been resolved,
5. A copy of the pre-visit letter,
6. A verification of compliance with the flood standards,
7. A description of material reviewed in support of compliance with the flood standards,
8. A list of trade secret data and information that the Professional Team recommends be presented to the Commission during the closed meeting portion of the Commission meeting to review flood models for acceptability, and
9. A statement indicating where proprietary information has been removed, if applicable.

After leaving the modeling organization’s premises, the Professional Team, in coordination with SBA staff, will finalize its report and provide it to Commission members in advance of the meeting to review the flood model for acceptability. Any disparate opinions among Professional Team

members concerning compliance with the flood standards will be duly noted and explained in the final report.

### *Additional Verification Review*

It is possible that a subset of the flood standards or changes made to the flood disclosures, forms, and trade secret data and information may require further review by the Professional Team or a subset of the Professional Team. In such cases, SBA staff will arrange an additional verification review, in accordance with the acceptability process, to verify those flood standards.

Non-trade secret materials shall be received by SBA staff within thirty days of the request for an additional verification review, but no later than seven days prior to the additional verification review.

Trade secret materials shall be provided to designated Professional Team members, in a medium as specified by the modeling organization, to be received no less than one business day prior to the start of the additional verification review. Additional materials may be requested on-site by the Professional Team in order to verify the flood standards.

If an additional verification review is held remotely, the same procedures shall apply as during the initial verification review. The modeling organization shall provide to each Professional Team member, as designated by SBA staff, one set of physical hard copy materials prepared for the additional verification review, along with the physical hard copy materials, the electronic data, and the remote review workbook from the initial verification review, to be received no less than one business day prior to the start of the remote additional verification review. New or revised electronic data shall be added to the electronic data (via USB flash drive or another electronic storage medium as specified or provided by the modeling organization) utilized during the initial verification review.

If a Commission member approved to attend the on-site review elects to attend the remote additional verification review, then the modeling organization shall provide to the Commission member one set of physical hard copy materials prepared for the additional verification review, along with the physical hard copy materials and the remote review workbook from the initial verification review, to be received no less than one business day prior to the start of the remote additional verification review.

Within one business day after completion of the remote additional verification review, Professional Team members shall ship to the modeling organization via overnight delivery all physical and electronic materials provided by the modeling organization (the set of physical hard copy materials from the initial and the additional verification reviews and the removable drives) and the remote review workbooks.

Within one business day after completion of the remote additional verification review, participating Commission members shall ship to the modeling organization via overnight delivery all physical hard copy materials provided by the modeling organization from the initial and the additional verification reviews and the remote review workbooks.

Professional Team and Commission members shall thoroughly review all physical hard copy and electronic storage locations that were utilized during the remote additional verification review to ensure that all materials provided by the modeling organization are being returned or destroyed and that no record, copy, duplicate, derivative, or compilation of the information is within their possession. Each Professional Team and Commission member shall provide a written confirmation to the Commission Chair via email to SBA staff stating that (1) a comprehensive review has been performed of all physical hard copy and electronic storage locations utilized during the remote additional verification review process, (2) all materials and information provided by the modeling organization in support of the remote additional verification review have been shipped to the modeling organization via overnight delivery or destroyed, and (3) verifies that the materials and data provided by the modeling organization have not been reproduced, recorded, copied, or duplicated in any manner or stored on any medium including personal computers or other devices. SBA staff shall provide a copy of each written confirmation to the modeling organization.

### ***Trade Secret Data and Information***

While on-site or during a remote review, the Professional Team members are expected to have access to trade secret data and information. It is the responsibility of the modeling organization to identify to all Professional Team members what is a trade secret and is not to be made public.

All written documentation provided by the modeling organization to the Commission is considered a public document with the exception of documents provided during the closed meeting where trade secrets used in the design and construction of the flood model are discussed.

The modeling organization shall provide any additional information directly to the Commission rather than give it to Professional Team members to be brought back with them. Documents that the modeling organization indicates are trade secret that are viewed by Professional Team members are not public documents.

Professional Team members, Commission members, and SBA staff shall restrict any note taking to a workbook provided by SBA staff or on the hard copy materials provided by the modeling organization. The modeling organization shall review the workbooks for notes the modeling organization deems as trade secret information. Any workbook pages containing notes considered by the modeling organization as trade secret information shall be removed from the workbook by the modeling organization and placed in a sealed envelope provided by SBA staff labeled “Contains Content Designated as Trade Secret Information by (Name of Modeling Organization)” with the date, time, and Professional Team leader’s signature across the seal. The modeling organization shall specifically identify what notes on a workbook page are deemed as trade secret and shall refrain from designating publicly available information as trade secret. The sealed envelope shall be retained by SBA staff in accordance with Florida Public Records Law in a secure location. SBA staff shall bring the sealed envelope to the Commission trade secret closed meeting where it will be unsealed and distributed for use during the closed meeting. At the end of the closed meeting, the notes shall be placed in an envelope labeled “Contains Content Designated as Trade Secret Information by (Name of Modeling Organization)” and sealed. The sealed envelope shall be retained by SBA staff in a secure location until the retention schedule has been met at which time the sealed envelope shall be destroyed and the modeling organization informed.

The removable drives shall be kept by the modeling organization and returned to the Professional Team member during the closed meeting to discuss trade secrets. At the conclusion of the closed meeting, the removable drives shall be returned to the modeling organization.

Trade secrets of the modeling organization learned by a Professional Team member shall not be discussed with Commission members.

Professional Team members shall agree to respect the trade secret nature of the flood model and not use trade secret information in any way detrimental to the interest of the modeling organization.

Professional Team members shall not discuss other flood and hurricane models being evaluated while they are on-site reviewing a particular flood model.

During a remote review, Professional Team members, Commission members, and SBA staff shall restrict any note taking to a workbook prepared and provided by SBA staff or on the hard copy materials provided by the modeling organization. At the completion of the remote review, the workbooks shall be shipped to the modeling organization with the materials provided in advance of the remote review by the modeling organization. The modeling organization shall review the remote review workbooks for notes the modeling organization deems as trade secret information.

SBA staff shall send an envelope to the modeling organization labeled, “Contains Content Designated as Trade Secret Information by (Name of Modeling Organization).” Any workbook pages containing notes considered by the modeling organization as trade secret information shall be removed from the workbook by the modeling organization and placed in the envelope provided by SBA staff. The modeling organization shall specifically identify what notes on a workbook page are deemed as trade secret and shall refrain from designating publicly available information as trade secret. The modeling organization shall seal the envelope and return the sealed envelope and the remote review workbooks to SBA staff. If an additional verification review is held remotely, it will not be necessary for the modeling organization to review the remote review workbooks until after completion of the additional verification review.

### ***On-Site Review Results***

The Professional Team will present the results of the on-site review to the Commission and answer questions related to their review.

The job of the Professional Team is to verify information and make observations. It is not part of the Professional Team’s responsibilities to opine or draw conclusions about the appropriateness of a particular flood model or a component part of a flood model.

Refer to the chapter “Process for Determining the Acceptability of a Computer Simulation Flood Model” for additional information regarding the on-site review.



# PROFESSIONAL TEAM

## *Composition and Selection of the Professional Team*

A team of professional individuals, known as the Professional Team, conducts on-site reviews of modeling organizations seeking a determination of acceptability by the Commission. The Professional Team consists of individuals having professional credentials in the following disciplines with each area represented by one or more individuals:

- Meteorology
- Hydrology and Hydraulics
- Statistics
- Coastal Engineering
- Actuarial Science
- Computer/Information Science.

SBA staff selects the Professional Team members, and the SBA enters into contracts with each individual selected.

Selection of the Professional Team members is an aggressive recruiting process to seek out qualified individuals who are capable of working closely with the Commission and who are available during specified time frames in order that the Commission can meet its deadline(s). Consideration is given to the following factors:

- Professional credentials, qualifications, and specialized experience
- Reasonableness of fees
- Availability and commitment to the Commission
- References
- Lack of conflicts of interest.

## *Responsibilities of the Professional Team*

**Team Leader:** SBA staff designates one member of the Professional Team as the team leader. The team leader is responsible for coordinating the activities of the Professional Team and overseeing the development of reports to the Commission.

### **Team Members:**

1. Participate in preparations and discussions with the Commission and SBA staff prior to the on-site review.
2. Study, review, and develop an understanding of responses and materials provided to the Commission by the modeling organizations.
3. Participate with the Commission and SBA staff in developing, reviewing, and revising flood model tests and evaluations.

4. While on-site, verify, evaluate, and observe the techniques and assumptions used in the flood model for each member's area of expertise.
5. Identify and observe how various assumptions affect the flood model so as to identify to the Commission various sensitive components and aspects of the flood model.
6. Discuss the flood model with the modeling organization's professional staff to gain a clear understanding and confidence in the operation of the flood model and its description as provided to the Commission.
7. Participate in the administration of on-site tests.
8. Participate in the preparation of written reports and presentations to the Commission.

### ***Responsibilities of SBA Staff***

The Professional Team reports to designated SBA staff. SBA staff supervises the Professional Team and coordinates their pre-on-site planning activities, on-site reviews and activities, and post-on-site activities.

These responsibilities include:

1. Setting up meetings with Professional Team members individually and as a group. These meetings include conference calls and other meetings depending on circumstances and needs of the Commission.
2. Coordinating and scheduling on-site reviews.
3. Working with the Commission and Professional Team members in developing, reviewing, and revising flood model tests and evaluations.
4. Overseeing the supervision and administration of specified on-site tests and evaluations.
5. Working with the modeling organization to determine which professionals with the modeling organization should be available during the on-site review.
6. Briefing and de-briefing the Professional Team members prior to, during, and after the on-site review.
7. Coordinating the preparation of written reports and presentations to the Commission.
8. Coordinating the reimbursement of expenses per s. 112.061, F.S., for Professional Team members, Commission members, and SBA staff.

**2021 FLOOD STANDARDS,  
DISCLOSURES, AUDIT  
REQUIREMENTS, AND FORMS**

# Florida Commission on Hurricane Loss Projection Methodology

## Flood Model Identification

Name of Flood Model: \_\_\_\_\_

Flood Model Version Identification: \_\_\_\_\_

Flood Model Platform Names and Identifications with Primary Flood Model  
Platform and Identification Listed First: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Interim Flood Model Update Version Identification: \_\_\_\_\_

\_\_\_\_\_

Interim Data Update Designation: \_\_\_\_\_

Name of Modeling Organization: \_\_\_\_\_

Street Address: \_\_\_\_\_

City, State, ZIP Code: \_\_\_\_\_

Mailing Address, if different from above: \_\_\_\_\_

\_\_\_\_\_

Contact Person: \_\_\_\_\_

Phone Number: \_\_\_\_\_

E-mail Address: \_\_\_\_\_

Date: \_\_\_\_\_

## Flood Model Submission Data

The following input data will be made available to modeling organizations.

### Input Data

Name	Description
NotionalInput21 Flood.xlsx	Notional structures and location grids for Form AF-1, Zero Deductible Personal Residential Standard Flood Loss Costs and Form AF-6, Logical Relationships to Flood Risk (Trade Secret Item)
VFEventFormsInput21.xlsx	Sample personal residential exposure data for 26 stillwater flood depths and 8 reference structures defined in Forms VF-1, Coastal Flood with Damaging Wave Action and VF-2, Inland Flood by Flood Depth
2021FormAF1.xlsx	Standard flood loss cost data format for Form AF-1, Zero Deductible Personal Residential Standard Flood Loss Costs
2021FormAF3.xlsx	Standard flood losses data format for Form AF-3, Personal Residential Standard Flood Losses by ZIP Code
2021FormAF4.xlsx	Flood output ranges format for Form AF-4, Flood Output Ranges
2021FormAF5.xlsx	Percentage change in average flood loss cost output range data format for Form AF-5, Percentage Change in Flood Output Ranges
2021FormAF6.xlsx	Logical relationship to flood risk exhibits format for Form AF-6, Logical Relationships to Flood Risk (Trade Secret Item)
2021FormAF7.xlsx	Percentage change in logical relationship to flood risk exhibits format for Form AF-7, Percentage Change in Logical Relationships to Flood Risk

Output is to be provided in specified output files as listed below. XXX denotes the abbreviated name of the modeling organization.

### Output Data

Name	Description
XXX21FormVF3.xlsx	Output data from Form VF-3, Flood Mitigation Measures, Range of Changes in Flood Damage
XXX21FormVF4.xlsx	Output data from Form VF-4, Differences in Flood Mitigation Measures
XXX21FormAF1.xlsx and XXX21FormAF1.pdf	Underlying flood loss cost data from Form AF-1, Zero Deductible Personal Residential Standard Flood Loss Costs
XXX21FormAF2.xlsx	Output data from Form AF-2, Total Flood Statewide Loss Costs
XXX21FormAF3.xlsx and XXX21FormAF3.pdf	Output data from Form AF-3, Personal Residential Standard Flood Losses by ZIP Code
XXX21FormAF4.xlsx	Flood output range exhibits from Form AF-4, Flood Output Ranges

Name	Description
XXX21FormAF5.xlsx	Output data from Form AF-5, Percentage Change in Flood Output Ranges
XXX21FormAF6.xlsx	Output data from Form AF-6, Logical Relationships to Flood Risk (Trade Secret Item)
XXX21FormAF7.xlsx	Output data from Form AF-7, Percentage Change in Logical Relationships to Flood Risk
XXX21FormAF8.xlsx	Output data from Form AF-8, Flood Probable Maximum Loss for Florida

The modeling organization is to run various scenario flood events through the flood model on the input exposure data. The referenced output forms are to be completed and flood loss files provided in Excel and PDF format as specified.

Forms designated as a Trade Secret Item are to be provided if not considered as Trade Secret.

The file names should include the abbreviated name of the modeling organization, the flood standards year, and the form name. Revised files should also include the revision date.

## Notional Set 1 – Deductible Sensitivity

Name	Policy Form/Occupancy	Construction	Year Built	Number of Stories	Building Limit (A)	Personal Property Limit (B)	Event Deductible
Frame Owners	Owners	Frame	1989	1	100,000	40,000	0%
Frame Owners	Owners	Frame	1989	1	100,000	40,000	\$1,000
Frame Owners	Owners	Frame	1989	1	100,000	40,000	\$1,500
Frame Owners	Owners	Frame	1989	1	100,000	40,000	2% A
Frame Owners	Owners	Frame	1989	1	100,000	40,000	5% A
Frame Owners	Owners	Frame	1989	1	100,000	40,000	10% A
Masonry Owners	Owners	Masonry	1989	1	100,000	40,000	0
Masonry Owners	Owners	Masonry	1989	1	100,000	40,000	\$1,000
Masonry Owners	Owners	Masonry	1989	1	100,000	40,000	\$1,500
Masonry Owners	Owners	Masonry	1989	1	100,000	40,000	2% A
Masonry Owners	Owners	Masonry	1989	1	100,000	40,000	5% A
Masonry Owners	Owners	Masonry	1989	1	100,000	40,000	10% A
Manufactured Homes	Manufactured Homes	Manufactured Homes	1989	1	50,000	25,000	0%
Manufactured Homes	Manufactured Homes	Manufactured Homes	1989	1	50,000	25,000	\$1,000
Manufactured Homes	Manufactured Homes	Manufactured Homes	1989	1	50,000	25,000	\$1,500
Manufactured Homes	Manufactured Homes	Manufactured Homes	1989	1	50,000	25,000	2% A
Manufactured Homes	Manufactured Homes	Manufactured Homes	1989	1	50,000	25,000	5% A
Manufactured Homes	Manufactured Homes	Manufactured Homes	1989	1	50,000	25,000	10% A
Frame Renters	Renters	Frame	1989	1	-	50,000	0
Frame Renters	Renters	Frame	1989	1	-	50,000	\$1,000
Frame Renters	Renters	Frame	1989	1	-	50,000	\$1,500
Frame Renters	Renters	Frame	1989	1	-	50,000	2% B
Frame Renters	Renters	Frame	1989	1	-	50,000	5% B
Frame Renters	Renters	Frame	1989	1	-	50,000	10% B
Masonry Renters	Renters	Masonry	1989	1	-	50,000	0%
Masonry Renters	Renters	Masonry	1989	1	-	50,000	\$1,000
Masonry Renters	Renters	Masonry	1989	1	-	50,000	\$1,500
Masonry Renters	Renters	Masonry	1989	1	-	50,000	2% A
Masonry Renters	Renters	Masonry	1989	1	-	50,000	5% A
Masonry Renters	Renters	Masonry	1989	1	-	50,000	10% A
Frame Condo Unit	Condo Unit	Frame	1989	3	10% B	50,000	0
Frame Condo Unit	Condo Unit	Frame	1989	3	10% B	50,000	\$1,000
Frame Condo Unit	Condo Unit	Frame	1989	3	10% B	50,000	\$1,500
Frame Condo Unit	Condo Unit	Frame	1989	3	10% B	50,000	2% B
Frame Condo Unit	Condo Unit	Frame	1989	3	10% B	50,000	5% B
Frame Condo Unit	Condo Unit	Frame	1989	3	10% B	50,000	10% B
Masonry Condo Unit	Condo Unit	Masonry	1989	3	10% B	50,000	0%
Masonry Condo Unit	Condo Unit	Masonry	1989	3	10% B	50,000	\$1,000
Masonry Condo Unit	Condo Unit	Masonry	1989	3	10% B	50,000	\$1,500
Masonry Condo Unit	Condo Unit	Masonry	1989	3	10% B	50,000	2% B
Masonry Condo Unit	Condo Unit	Masonry	1989	3	10% B	50,000	5% B
Masonry Condo Unit	Condo Unit	Masonry	1989	3	10% B	50,000	10% B

## Notional Set 2 – Policy Form Sensitivity

Name	Policy Form/Occupancy	Construction	Year Built	Number of Stories	Building Limit (A)	Personal Property Limit (B)	Deductible
Frame Owners	Owners	Frame	1989	1	100,000	40,000	0%
Masonry Owners	Owners	Masonry	1989	1	100,000	40,000	0%
Manufactured Homes	Owners	Manufactured Homes	1989	1	50,000	25,000	0%
Frame Renters	Renters	Frame	1989	1	-	50,000	0%
Masonry Renters	Renters	Masonry	1989	1	-	50,000	0%
Frame Condo Unit	Condo Unit	Frame	1989	3	10% B	50,000	0%
Masonry Condo Unit	Condo Unit	Masonry	1989	3	10% B	50,000	0%

## Notional Set 3 – Construction Sensitivity

Name	Policy Form/Occupancy	Construction	Year Built	Number of Stories	Building Limit (A)	Personal Property Limit (B)	Deductible
Frame Owners	Owners	Frame	1989	1	100,000	40,000	0%
Masonry Owners	Owners	Masonry	1989	1	100,000	40,000	0%
Manufactured Homes	Manufactured Homes	Manufactured Homes	1989	1	50,000	25,000	0%

## Notional Set 4 – Coverage Sensitivity

Name	Policy Form/Occupancy	Construction	Year Built	Number of Stories	Building Limit (A)	Personal Property Limit (B)	Time Element	Deductible
Frame Owners	Owners	Frame	1989	1	100,000	40,000	20% A	0%
Masonry Owners	Owners	Masonry	1989	1	100,000	40,000	20% A	0%
Manufactured Homes	Manufactured Homes	Manufactured Homes	1989	1	50,000	25,000	20% A	0%
Frame Renters	Renters	Frame	1989	1	-	50,000	40% B	0%
Masonry Renters	Renters	Masonry	1989	1	-	50,000	40% B	0%
Frame Condo Unit	Condo Unit	Frame	1989	3	10% B	50,000	40% B	0%
Masonry Condo Unit	Condo Unit	Masonry	1989	3	10% B	50,000	40% B	0%



## Notional Set 5 – Year Built Sensitivity

Name	Policy Form/Occupancy	Construction	Year Built	Number of Stories	Building Limit (A)	Personal Property Limit (B)	Deductible
Frame Owners	Owners	Frame	1960	1	100,000	40,000	0%
Frame Owners	Owners	Frame	1981	1	100,000	40,000	0%
Frame Owners	Owners	Frame	2012	1	100,000	40,000	0%
Frame Owners	Owners	Frame	2018	1	100,000	40,000	0%
Masonry Owners	Owners	Masonry	1960	1	100,000	40,000	0%
Masonry Owners	Owners	Masonry	1981	1	100,000	40,000	0%
Masonry Owners	Owners	Masonry	2012	1	100,000	40,000	0%
Masonry Owners	Owners	Masonry	2018	1	100,000	40,000	0%
Manufactured Homes	Manufactured Homes	Manufactured Homes	1974	1	50,000	25,000	0%
Manufactured Homes	Manufactured Homes	Manufactured Homes	1992	1	50,000	25,000	0%
Manufactured Homes	Manufactured Homes	Manufactured Homes	2004	1	50,000	25,000	0%
Manufactured Homes	Manufactured Homes	Manufactured Homes	2012	1	50,000	25,000	0%
Frame Renters	Renters	Frame	1960	1	-	50,000	0%
Frame Renters	Renters	Frame	1981	1	-	50,000	0%
Frame Renters	Renters	Frame	2012	1	-	50,000	0%
Frame Renters	Renters	Frame	2018	1	-	50,000	0%
Masonry Renters	Renters	Masonry	1960	1	-	50,000	0%
Masonry Renters	Renters	Masonry	1981	1	-	50,000	0%
Masonry Renters	Renters	Masonry	2012	1	-	50,000	0%
Masonry Renters	Renters	Masonry	2018	1	-	50,000	0%
Frame Condo Unit	Condo Unit	Frame	1960	3	10% B	50,000	0%
Frame Condo Unit	Condo Unit	Frame	1981	3	10% B	50,000	0%
Frame Condo Unit	Condo Unit	Frame	2012	3	10% B	50,000	0%
Frame Condo Unit	Condo Unit	Frame	2018	3	10% B	50,000	0%
Masonry Condo Unit	Condo Unit	Masonry	1960	3	10% B	50,000	0%
Masonry Condo Unit	Condo Unit	Masonry	1981	3	10% B	50,000	0%
Masonry Condo Unit	Condo Unit	Masonry	2012	3	10% B	50,000	0%
Masonry Condo Unit	Condo Unit	Masonry	2018	3	10% B	50,000	0%

## Notional Set 6 – Foundation Type Sensitivity

Name	Policy Form/Occupancy	Construction	Year Built	Number of Stories	Building Limit (A)	Personal Property Limit (B)	Deductible	Foundation Type
Basement	Owners	Frame	1981	1	100,000	40,000	0%	1 Story Basement
Slab Foundation	Owners	Frame	1981	1	100,000	40,000	0%	Slab-on-Grade
Elevate 1	Owners	Frame	1981	1	100,000	40,000	0%	Elevated with Closed Area
Elevate 2	Owners	Frame	1981	1	100,000	40,000	0%	Elevated with BreakAway Wall
Elevate 3	Owners	Frame	1981	1	100,000	40,000	0%	Elevated with Open Area
Weak	Manufactured Homes	Manufactured Homes	1974	1	50,000	25,000	0%	Untied Foundation
Medium	Manufactured Homes	Manufactured Homes	1992	1	50,000	25,000	0%	Unknown
Strong	Manufactured Homes	Manufactured Homes	2004	1	50,000	25,000	0%	Tied Foundation

## Notional Set 7 – Number of Stories Sensitivity

Name	Policy Form/Occupancy	Construction	Year Built	Number of Stories	Building Limit (A)	Personal Property Limit (B)	Deductible
Frame Owners	Owners	Frame	1981	1	100,000	40,000	0%
Frame Owners	Owners	Frame	1981	2	100,000	40,000	0%
Masonry Owners	Owners	Masonry	1981	1	100,000	40,000	0%
Masonry Owners	Owners	Masonry	1981	2	100,000	40,000	0%
Frame Renters	Renters	Frame	1981	1	-	50,000	0%
Frame Renters	Renters	Frame	1981	2	-	50,000	0%
Masonry Renters	Renters	Masonry	1981	1	-	50,000	0%
Masonry Renters	Renters	Masonry	1981	2	-	50,000	0%

## Notional Set 8 – Lowest Floor Elevation of Residential Structure Sensitivity

Name	Policy Form/Occupancy	Construction	Year Built	Number of Stories	Building Limit (A)	Personal Property Limit (B)	Deductible	First Floor Height Above Ground
Frame Owners	Owners	Frame	1981	1	100,000	40,000	0%	2 ft
Frame Owners	Owners	Frame	1981	1	100,000	40,000	0%	4 ft
Frame Owners	Owners	Frame	1981	1	100,000	40,000	0%	6 ft
Frame Owners	Owners	Frame	1981	1	100,000	40,000	0%	8 ft
Masonry Owners	Owners	Masonry	1981	1	100,000	40,000	0%	2 ft
Masonry Owners	Owners	Masonry	1981	1	100,000	40,000	0%	4 ft
Masonry Owners	Owners	Masonry	1981	1	100,000	40,000	0%	6 ft
Masonry Owners	Owners	Masonry	1981	1	100,000	40,000	0%	8 ft
Manufactured Homes	Manufactured Homes	Manufactured Homes	2004	1	50,000	25,000	0%	2 ft
Manufactured Homes	Manufactured Homes	Manufactured Homes	2004	1	50,000	25,000	0%	4 ft
Manufactured Homes	Manufactured Homes	Manufactured Homes	2004	1	50,000	25,000	0%	6 ft
Manufactured Homes	Manufactured Homes	Manufactured Homes	2004	1	50,000	25,000	0%	8 ft
Frame Renters	Renters	Frame	1981	1	-	50,000	0%	2 ft
Frame Renters	Renters	Frame	1981	1	-	50,000	0%	4 ft
Frame Renters	Renters	Frame	1981	1	-	50,000	0%	6 ft
Frame Renters	Renters	Frame	1981	1	-	50,000	0%	8 ft
Masonry Renters	Renters	Masonry	1981	1	-	50,000	0%	2 ft
Masonry Renters	Renters	Masonry	1981	1	-	50,000	0%	4 ft
Masonry Renters	Renters	Masonry	1981	1	-	50,000	0%	6 ft
Masonry Renters	Renters	Masonry	1981	1	-	50,000	0%	8 ft
Frame Condo Unit	Condo Unit	Frame	1981	3	10% B	50,000	0%	2 ft
Frame Condo Unit	Condo Unit	Frame	1981	3	10% B	50,000	0%	4 ft
Frame Condo Unit	Condo Unit	Frame	1981	3	10% B	50,000	0%	6 ft
Frame Condo Unit	Condo Unit	Frame	1981	3	10% B	50,000	0%	8 ft
Masonry Condo Unit	Condo Unit	Masonry	1981	3	10% B	50,000	0%	2 ft
Masonry Condo Unit	Condo Unit	Masonry	1981	3	10% B	50,000	0%	4 ft
Masonry Condo Unit	Condo Unit	Masonry	1981	3	10% B	50,000	0%	6 ft
Masonry Condo Unit	Condo Unit	Masonry	1981	3	10% B	50,000	0%	8 ft

## Comparison of 2021 Flood Standards to 2017 Flood Standards

Flood Standard	Title	Comments
<b><i>General</i></b>		
GF-1	Scope of the Flood Model and Its Implementation	Significant Revision
GF-2	Qualifications of Modeling Organization Personnel and Consultants Engaged in Development of the Flood Model	Significant Revision
GF-3	Insured Exposure Location	Significant Revision
GF-4	Independence of Flood Model Components	
GF-5	Editorial Compliance	
<b><i>Meteorological</i></b>		
MF-1	Flood Event Data Sources	Significant Revision
MF-2	Flood Parameters (Inputs)	Significant Revision
MF-3	Wind and Pressure Fields for Storm Surge	Significant Revision
MF-4	Flood Characteristics (Outputs)	Significant Revision
MF-5	Flood Probability Distributions	
<b><i>Hydrological and Hydraulic</i></b>		
HHF-1	Flood Parameters (Inputs)	Significant Revision
HHF-2	Flood Characteristics (Outputs)	Significant Revision
HHF-3	Modeling of Major Flood Control Measures	
HHF-4	Logical Relationships Among Flood Parameters and Characteristics	Significant Revision
<b><i>Statistical</i></b>		
SF-1	Modeled Results and Goodness-of-Fit	Significant Revision
SF-2	Sensitivity Analysis for Flood Model Output	
SF-3	Uncertainty Analysis for Hurricane Model Output	
SF-4	Flood Model Loss Cost Convergence by Geographic Zone	
SF-5	Replication of Known Flood Losses	
<b><i>Vulnerability</i></b>		
VF-1	Derivation of Personal Residential Structure Flood Vulnerability Functions	Significant Revision
VF-2	Derivation of Personal Residential Contents Flood Vulnerability Functions	Significant Revision
VF-3	Derivation of Personal Residential Time Element Flood Vulnerability Functions	Significant Revision
VF-4	Flood Mitigation Measures	Significant Revision
<b><i>Actuarial</i></b>		
AF-1	Flood Model Input Data and Output Reports	Significant Revision
AF-2	Flood Events Resulting in Modeled Flood Losses	Significant Revision
AF-3	Flood Coverages	Significant Revision
AF-4	Modeled Flood Loss Cost and Flood Probable Maximum Loss Level Considerations	Significant Revision
AF-5	Flood Policy Conditions	Significant Revision
AF-6	Flood Loss Outputs and Logical Relationships to Risk	Significant Revision
<b><i>Computer/Information</i></b>		
CIF-1	Flood Model Documentation	Significant Revision
CIF-2	Flood Model Requirements	Significant Revision
CIF-3	Flood Model Architecture and Component Design	Significant Revision
CIF-4	Flood Model Implementation	Significant Revision
CIF-5	Flood Model Verification	Significant Revision
CIF-6	Human-Computer Interaction	New Standard
CIF-7	Flood Model Maintenance and Revision	Significant Revision
CIF-8	Flood Model Security	Significant Revision

Note: Significant revisions are those that include new or revised standard requirements, disclosures, forms, or audit items.

## GENERAL FLOOD STANDARDS

### **GF-1 Scope of the Flood Model and Its Implementation\***

*(\*Significant Revision)*

- 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. A documented process shall be maintained to assure continual agreement and correct correspondence of databases, data files, and computer source code to presentation materials, scientific and technical literature, and modeling organization documents.**
- C. All software, data, and flowcharts (1) located within the flood model, (2) used to validate the flood model, (3) used to project modeled flood loss costs and flood probable maximum loss levels, and (4) used to create forms required by the Commission in the Flood Standards Report of Activities shall fall within the scope of the Computer/Information Flood Standards and shall be located in centralized, model-level file areas.**
- D. Differences between historical and modeled flood losses shall be reasonable, given available flood loss data.**
- E. Vintage of data, code, and scientific and technical literature used shall be justifiable.**

**Purpose:** This standard yields 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 Forms:** GF-1, General Flood Standards Expert Certification  
HHF-2, Coastal Flood Characteristics by Annual Exceedance Probability  
HHF-3, Coastal Flood Characteristics by Annual Exceedance Probabilities (Trade Secret Item)  
HHF-4, Inland Flood Characteristics by Annual Exceedance Probability  
HHF-5, Inland Flood Characteristics by Annual Exceedance Probabilities (Trade Secret Item)  
SF-2, Examples of Flood Loss Exceedance Estimates (Coastal and Inland Combined)

- 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, Percentage Change in Flood Output Ranges
- AF-6, Logical Relationships to Flood Risk (Trade Secret Item)
- AF-7, Percentage Change in Logical Relationships to Flood Risk
- AF-8, Flood Probable Maximum Loss for Florida

## 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 identifying the primary platform and the distinguishing aspects of each platform.
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 flood 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 components, the hydrology and hydraulic 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 diagram defining the network organization in which the flood model is designed and operates.
5. Provide detailed information on the flood model implementation on more than one platform, if applicable. In particular, submit Forms VF-3, Flood Mitigation Measures, Range of Changes in Flood Damage; AF-1, Zero Deductible Personal Residential Standard Flood Loss Costs; AF-4, Flood Output Ranges; and AF-8, Flood Probable Maximum Loss for Florida, from each platform including additional calculations showing no differences.
6. Provide a comprehensive list of complete references pertinent to the submission by flood standard grouping using professional citation standards.
7. 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.
8. Provide the following information related to changes in the flood model from the currently accepted flood model to the initial submission this year.
  - A. Flood model changes:

1. A summary description of changes that 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 the modeling-organization-specified, predetermined, and comprehensive exposure dataset for:
1. All changes combined, and
  2. Each individual flood model component 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.
- D. Color-coded map 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 all flood model component changes combined.
9. 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 *Flood Standards Report of Activities*.

## **Audit**

1. Automated procedures used to create forms will be reviewed.
2. All primary scientific and technical literature that describes 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.
3. Compliance with the process prescribed in Flood Standard GF-1.B in all stages of the flood modeling process will be reviewed.
4. Items specified in Flood Standard GF-1.C will be reviewed as part of the Computer/Information Flood Standards.
5. Maps, databases, and data files relevant to the modeling organization's submission will be reviewed.

6. Justification for the differences in modeled versus historical flood losses will be reviewed, recognizing that flood loss data may be limited to internal or proprietary datasets.
7. Justification for the vintage of data, code, and scientific and technical literature used will be reviewed.
8. 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.
9. 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. For any modifications to Form AF-4, Flood Output Ranges, since the initial submission, a newly completed Form AF-5, Percentage Change in Flood Output Ranges, with:
    1. The initial submission as the baseline for computing the percentage changes, and
    2. Any intermediate revisions as the baseline for computing the percentage changes.
  - D. 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, between:
    1. The currently accepted flood model and the revised flood model,
    2. The initial submission and the revised submission, and
    3. Any intermediate revisions and the revised submission.

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

*(\*Significant Revision)*

- 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 flood 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 currently licensed Professional Engineer, with experience in coastal and inland flooding), meteorology (advanced degree), statistics (advanced degree or equivalent experience), structural engineering (currently licensed Professional Engineer, with experience in the effects of coastal and inland flooding on buildings), actuarial science (Associate or Fellow of Casualty Actuarial Society or Society of Actuaries), and computer/information science (advanced degree or equivalent experience and certifications). These individuals shall certify Expert Certification Forms GF-1 through GF-7 as applicable.**

Purpose: Professional disciplines with requisite experience necessary to develop the flood model are 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-2, Meteorological Flood Standards Expert Certification  
GF-3, Hydrological and Hydraulic Flood Standards Expert Certification  
GF-4, Statistical Flood Standards Expert Certification  
GF-5, Vulnerability Flood Standards Expert Certification  
GF-6, Actuarial Flood Standards Expert Certification  
GF-7, Computer/Information Flood Standards Expert Certification

### **Disclosures**

#### **1. Modeling 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 modeling 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
  - 2. Hydrology and Hydraulics
  - 3. Statistics
  - 4. Vulnerability
  - 5. Actuarial Science
  - 6. 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
  - 2. Hydrology and Hydraulics
  - 3. Statistics
  - 4. Vulnerability
  - 5. Actuarial Science
  - 6. Computer/Information Science
- B. Provide documentation of independent peer reviews directly relevant to the modeling organization responses to the 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 modeling 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-2, Meteorological Flood Standards Expert Certification. Provide a link to the location of the form [insert hyperlink here].
  7. Provide a completed Form GF-3, Hydrological and Hydraulic Flood Standards Expert Certification. Provide a link to the location of the form [insert hyperlink here].
  8. Provide a completed Form GF-4, Statistical Flood Standards Expert Certification. Provide a link to the location of the form [insert hyperlink here].
  9. Provide a completed Form GF-5, Vulnerability Flood Standards Expert Certification. Provide a link to the location of the form [insert hyperlink here].
  10. Provide a completed Form GF-6, Actuarial Flood Standards Expert Certification. Provide a link to the location of the form [insert hyperlink here].
  11. Provide a completed Form GF-7, 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-2, Meteorological Flood Standards Expert Certification, GF-3, Hydrological and Hydraulic Flood Standards Expert Certification, GF-4, Statistical Flood Standards Expert Certification, GF-5, Vulnerability Flood Standards Expert Certification, GF-6, Actuarial Flood Standards Expert Certification, GF-7, 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\***

*(\*Significant Revision)*

- A. ZIP Codes used in the flood model shall not differ from the United States Postal Service publication date by more than 48 months at the date of submission of the flood model. ZIP Code information shall originate from the United States Postal Service.**
- B. Horizontal location information used by the modeling organization shall be verified by the modeling organization for accuracy and timeliness and linked to the personal residential structure where available. The publication date of the horizontal location data shall be no more than 48 months prior to the date of submission of the flood model. The horizontal location information data source shall be documented and updated.**
- C. If any flood model components are dependent on databases pertaining to location, a logical process shall be maintained for ensuring these components are consistent with the horizontal location database updates.**
- D. Geocoding methodology shall be justified.**
- E. Use and conversion of horizontal and vertical projections and datum references shall be consistent and 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. Appropriate methods must be used when converting location information to latitude-longitude, when associating the elevation, and when aggregating results to the ZIP Code level.

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

### **Disclosures**

1. List the current location databases used by the flood model and the flood model components to which they relate. Provide the effective dates corresponding to the location databases.
2. Describe in detail how invalid ZIP Codes, parcels, addresses, and other location information are handled.
3. Describe any methods used for subdividing or disaggregating the location input data 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 between 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 location databases are updated.
8. Describe in detail the methods by which ground elevation data at the insured exposure location (e.g., building) is associated with the location databases and how this associated data is used in the flood model.
9. For each parameter used in the flood model, provide the horizontal and vertical projections and datum references, if applicable. If any horizontal or vertical datum conversions are required, provide conversion factors and describe the conversion methodology used.

### **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. The process for geocoding 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 and hydraulics, vulnerability, and actuarial components of the flood model shall each be theoretically sound without compensation for potential bias from other components.***

**Purpose:** The primary components of the flood model ought to be individually sound and operate independently. In other words, the flood model should not allow adjustments to one component to compensate for deficiencies in other components (compensation which could inflate or reduce flood loss costs and flood probable maximum loss levels). A flood model would not meet this standard if an artificial calibration or 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 flood standards, the interrelationship of the flood model components as a whole must be reasonable, logical, and justifiable.

**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 flood model 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-8, Editorial Review Expert Certification, that the flood model submission has been personally reviewed and is editorially correct.***

**Purpose:** A quality control process with regard to creating, maintaining, and reviewing all documentation associated with the flood model is to be maintained.

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

**Relevant Forms:** GF-1, General Flood Standards Expert Certification  
GF-2, Meteorological Flood Standards Expert Certification  
GF-3, Hydrological and Hydraulic Flood Standards Expert Certification  
GF-4, Statistical Flood Standards Expert Certification  
GF-5, Vulnerability Flood Standards Expert Certification  
GF-6, Actuarial Flood Standards Expert Certification  
GF-7, Computer/Information Flood Standards Expert Certification  
GF-8, Editorial Review Expert Certification

### Disclosures

1. Describe the process used for document control of the flood model 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 the Expert Certification Forms GF-1 through GF-7 to ensure that the information contained under each set of flood standards is accurate and complete.
3. Provide a completed Form GF-8, Editorial Review Expert Certification. Provide a link to the location of the form [insert hyperlink here].

### Audit

1. An assessment that the person who has reviewed the flood model submission has experience in reviewing technical documentation and that such person is familiar with the flood model submission requirements as set forth in the *Flood Standards Report of Activities as of November 1, 2021* will be made.
2. Attestation that the flood model 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 flood model submission has been reviewed by the signatories on the Expert Certification Forms GF-1 through GF-7 for accuracy and completeness will be assessed.
4. The modification history for flood model submission documentation will be reviewed.
5. A flowchart defining the process for form creation will be reviewed.
6. Form GF-8, 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 submission for compliance with the General Flood Standards (GF-1–GF-5) 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 2021 Flood Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify that:

1. The flood model meets the General Flood Standards (GF-1–GF-5);
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 are 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 should 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-2: Meteorological Flood Standards Expert Certification

Purpose: This form identifies the signatory or signatories who have reviewed the current submission for compliance with the Meteorological Flood Standards (MF-1–MF-5) 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 2021 Flood Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify that:

1. The flood model meets the Meteorological Flood Standards (MF-1–MF-5);
2. The disclosures and forms related to the Meteorological 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 are 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 should 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-2, Meteorological Flood Standards Expert Certification, in a submission appendix.

## Form GF-3: Hydrological and Hydraulic Flood Standards Expert Certification

Purpose: This form identifies the signatory or signatories who have reviewed the current submission for compliance with the Hydrological and Hydraulic Flood Standards (HHF-1–HHF-4) 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 2021 Flood Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify that:

1. The flood model meets the Hydrological and Hydraulic Flood Standards (HHF-1–HHF-4);
2. The disclosures and forms related to the Hydrological and Hydraulic 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)  
State: \_\_\_\_\_ Expiration Date: \_\_\_\_\_  
Professional License Type: \_\_\_\_\_

\_\_\_\_\_  
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 are 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 should 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, Hydrological and Hydraulic Flood Standards Expert Certification, in a submission appendix.

## Form GF-4: Statistical Flood Standards Expert Certification

Purpose: This form identifies the signatory or signatories who have reviewed the current submission for compliance with the Statistical Flood Standards (SF-1–SF-5) 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 2021 Flood Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify that:

1. The flood model meets the Statistical Flood Standards (SF-1–SF-5);
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 are 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 should 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, Statistical Flood Standards Expert Certification, in a submission appendix.

## Form GF-5: Vulnerability Flood Standards Expert Certification

Purpose: This form identifies the signatory or signatories who have reviewed the current submission for compliance with the Vulnerability Flood Standards (VF-1–VF-4) 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 2021 Flood Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify that:

1. The flood model meets the Vulnerability Flood Standards (VF-1–VF-4);
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)  
State: \_\_\_\_\_ Expiration Date: \_\_\_\_\_  
Professional License Type: \_\_\_\_\_

\_\_\_\_\_  
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 are 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 should 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, Vulnerability Flood Standards Expert Certification, in a submission appendix.

## Form GF-6: Actuarial Flood Standards Expert Certification

Purpose: This form identifies the signatory or signatories who have reviewed the current submission for compliance with the Actuarial Flood Standards (AF-1–AF-6) 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 2021 Flood Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify that:

1. The flood model meets the Actuarial Flood Standards (AF-1–AF-6);
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 are 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 should be added as necessary with the following format:

Signature (revisions to submission)	Date
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Note: A facsimile or any properly reproduced signature will be acceptable to meet this requirement.

Include Form GF-6, Actuarial Flood Standards Expert Certification, in a submission appendix.

## Form GF-7: Computer/Information Flood Standards Expert Certification

**Purpose:** This form identifies the signatory or signatories who have reviewed the current submission for compliance with the Computer/Information Flood Standards (CIF-1–CIF-8) 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 2021 Flood Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify that:

1. The flood model meets the Computer/Information Flood Standards (CIF-1–CIF-8);
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 are 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 should 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, Computer/Information Flood Standards Expert Certification, in a submission appendix.

## Form GF-8: Editorial Review Expert Certification

Purpose: This form identifies the signatory or signatories who have reviewed the current submission for compliance with the 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 Flood Loss Model” adopted by the Florida Commission on Hurricane Loss Projection Methodology in its *Flood Standards Report of Activities as of November 1, 2021*, and hereby certify that:

1. The flood model submission is in compliance with the Notification Requirements and General Flood Standard GF-5, Editorial Compliance;
2. The disclosures and forms related to each flood 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, charts or graphs, inaccurate citations, 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 are 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 should be added as necessary with the following format:

_____ Signature (revisions to submission)	_____ Date
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Note: A facsimile or any properly reproduced signature will be acceptable to meet this requirement.

Include Form GF-8, Editorial Review Expert Certification, in a submission appendix.

## METEOROLOGICAL FLOOD STANDARDS

### MF-1 Flood Event Data Sources\*

(\*Significant Revision)

- A. The modeling of floods in Florida shall involve meteorological, hydrological, hydraulic, and other relevant data sources required to model coastal and inland flooding.**
- B. The flood model shall incorporate relevant data sources in order to account for meteorological, hydrological, and hydraulic events and circumstances occurring either inside or outside of Florida that result in, or contribute to, flooding in Florida.**
- C. Coastal and inland flood model calibration and validation shall be justified based upon historical data consistent with peer reviewed or publicly developed data sources.**
- D. Any trends, weighting, or partitioning shall be justified and consistent with current scientific and technical literature.**

Purpose: Storm tide is the dominant source of coastal flooding, and precipitation is the dominant source of inland flooding. The modeling of coastal flooding requires consideration of wind and other meteorological elements that drive storm surge, which combines with astronomical tide to form storm tide. The phenomena to be represented include surge, tides, waves, and related processes, as well as the propagation of coastal flood waters over land.

The modeling of inland flooding requires consideration of precipitation. Inland flooding includes riverine, lacustrine, and surface water flooding.

It is important 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.

This standard is applicable to both coastal and inland flooding.

Relevant Forms: GF-2, Meteorological Flood Standards Expert Certification  
GF-3, Hydrological and Hydraulic Flood Standards Expert Certification  
HHF-2, Coastal Flood Characteristics by Annual Exceedance Probability  
HHF-3, Coastal Flood Characteristics by Annual Exceedance Probabilities (Trade Secret Item)  
HHF-4, Inland Flood Characteristics by Annual Exceedance Probability  
HHF-5, Inland Flood Characteristics by Annual Exceedance Probabilities (Trade Secret Item)  
AF-2, Total Flood Statewide Loss Costs  
AF-3, Personal Residential Standard Flood Loss Costs by ZIP Code



## **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 how historical sea-level rise is treated in the flood model validation. If sea-level rise is not used in flood model validation, justify its omission.
4. Describe if and how future projected sea-level rise is treated in the flood model.
5. Describe any assumptions or calculations used in the flood model relating to future conditions (e.g., changes in precipitation patterns, changes in storm frequency or severity).
6. Describe if and how historical changes in topography, bathymetry, and land use land cover are treated in the flood model validation.
7. If precipitation is explicitly modeled for either inland or coastal flooding, then describe the underlying data and how they are used as inputs to the flood model.
8. Provide citations to all data sources used to develop and support bottom friction for storm surge modeling, including publicly developed or peer reviewed information.
9. 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.

## **Audit**

1. The modeling organization's data sources will be reviewed.
2. Changes to the modeling organization's data sources from the currently accepted flood model will be reviewed.
3. Justification for any modification, partitioning, or adjustment to historical data and the impact on flood model parameters and characteristics will be reviewed.
4. The method and process used for calibration and validation of the flood model, including adjustments to input parameters, will be reviewed.
5. Any treatment of projected changes in sea level, precipitation, and storm characteristics will be reviewed.

## **MF-2 Flood Parameters (Inputs)\***

*(\*Significant Revision)*

- 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 current scientific and technical literature.**
- B. Differences in the treatment of flood parameters between historical and stochastic events shall be justified.**
- C. Grid cell size(s) used in the flood model shall be justified.**

Purpose: Flood parameters are inputs to the flood model and are needed by the flood model to define or determine the nature, severity, and physical characteristics associated with coastal and inland flooding.

Relevant Forms: GF-2, Meteorological Flood Standards Expert Certification  
GF-3, Hydrological and Hydraulic Flood Standards 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 the flood model.
2. For coastal and inland flood model components, describe the dependencies among flood 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 the flood 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. If there is explicit modeling of precipitation-driven flooding, then describe how rainfall extent, duration, and rate are modeled. If the effects of precipitation are implicitly incorporated into the flood model, describe the method and implementation.
7. For coastal flood analyses, describe how the coastline is segmented (or partitioned) in determining the parameters for flood frequency used in the flood model.

8. For coastal flooding, describe how astronomical tides are incorporated and combined with storm surge to obtain storm tide.
9. Describe if and how any flood parameters change or evolve during an individual flood life cycle (e.g., astronomical tide, representation of Manning's roughness varying with flood depth).
10. For coastal modeling, describe any wave assumptions, calculations or proxies and their impact on flood elevations.
11. Provide the source, resolution, datum, and accuracy of the topography and bathymetry throughout the flood model domain.
12. Describe the grid geometry used in the coastal flood model.
13. Describe if and how flood model parameters are based on or depend on National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM) or other Flood Insurance Study (FIS) data.

## **Audit**

1. All flood parameters used in the flood model will be reviewed.
2. For explicit representation of precipitation, data sources, calibration, and evaluation will be reviewed.
3. For implicit representation of precipitation, justification, data sources, method, and implementation will be reviewed.
4. 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, and
  - c. The dependencies between the coastal and inland flooding analyses.
5. Scientific and technical literature cited in Flood Standard GF-1, Scope of the Flood Model and Its Implementation, may be reviewed to determine applicability.
6. The initial and boundary conditions for coastal flood events will be reviewed.
7. The basis or dependence of flood model parameters on NFIP FIRM or other FIS data will be reviewed.

## **MF-3 Wind and Pressure Fields for Storm Surge\***

*(\*Significant Revision)*

- A. Modeling of wind and pressure fields shall be employed to drive storm surge models due to tropical cyclones.**
- B. The wind and pressure fields shall be based on current scientific and technical literature or developed using scientifically defensible methods.**
- C. Physically-based simulation of atmosphere-ocean interactions resulting in storm surge shall be conducted over a sufficiently large domain that storm surge height has converged.**
- D. 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.

Relevant Forms: GF-2, Meteorological Flood Standards Expert Certification  
AF-2, Total Flood Statewide Loss Costs  
AF-3, Personal Residential Standard Flood Losses by ZIP Code

### **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. Provide the historical data used to estimate parameters and to develop stochastic storm sets.
3. Provide a tangential (*y*-axis) versus radial (*x*-axis) plot of the average or default wind and pressure fields for tropical cyclones used in the flood model, and justify the choice of the wind and pressure fields used. Provide such plots for non-tropical cyclones, if non-tropical cyclones are modeled explicitly. If the wind and pressure fields represent a modification from the currently accepted flood model, plot the previous and modified wind and pressure fields on the same figure using consistent axes. Describe variations between the previous and modified wind and pressure fields with references to historical tropical cyclones.
4. If wind and pressure fields are modeled above the surface and translated to the surface to drive storm surge, then describe this translation; e.g., via planetary boundary layer models or empirical surface wind reduction factors and inflow angles. Discuss the associated uncertainties.

5. If applicable, describe how the inverse barometer effect is modeled.
6. Describe how storm translation is accounted for when computing surface wind and pressure fields.
7. Describe how storm surge due to non-tropical cyclones is accounted for in the flood model. If it is not accounted for, explain why.
8. Describe and justify the averaging time of the windspeeds used to drive the storm surge model.
9. For methods in which storm surge is produced by physically-based simulation of atmosphere-ocean interactions and where the methodology has not been documented in the scientific and technical literature, describe the process for verifying convergence of storm surge height as a function of domain size. State the convergence criteria.

### **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. 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 current scientific and technical literature will be reviewed.
6. The uncertainties 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 current scientific and technical literature.

## **MF-4 Flood Characteristics (Outputs)\***

*(\*Significant Revision)*

- A. Flood extent and elevation or depth generated by the flood model shall be consistent with observed historical floods affecting Florida.**
- B. Methods for deriving flood extent and elevation or depth shall be scientifically defensible and technically sound.**
- C. Methods for modeling or approximating 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:** Flood characteristics are outputs of the coastal and inland flood models, such as flood extent and elevation or depth. In addition to providing input to other flood model components, flood characteristics are used for flood model evaluation and calibration by comparison to observations. Flood characteristics should be determined using scientifically sound information and methods, and they must be representative of historical floods in Florida. Differences between flood model characteristics and relevant historical Florida flood data must be documented and justified.

**Relevant Forms:** GF-2, Meteorological Flood Standards Expert Certification  
GF-3, Hydrological and Hydraulic Flood Standards Expert Certification  
HHF-1, Historical Event Flood Extent and Elevation or Depth Validation Maps  
HHF-2, Coastal Flood Characteristics by Annual Exceedance Probability  
HHF-3, Coastal Flood Characteristics by Annual Exceedance Probabilities (Trade Secret Item)

### **Disclosures**

1. Demonstrate that the coastal flood model component incorporates flood parameters necessary for simulating storm-tide-related flood damage in Florida. Provide justification for validation using any historical events not specified in Form HHF-1, Historical Event Flood Extent and Elevation or Depth Validation Maps.
2. For coastal flooding, describe how the presence, size, and transformation of waves are modeled or approximated.
3. For coastal modeling, describe if and how the flood model accounts for flood velocity, flood duration, flood-induced erosion, floodborne debris, salinity, and contaminated floodwaters.
4. For coastal flood waters, describe the factors that affect inland propagation and how they are modeled.

5. Describe if and how inland flood affects the inland propagation of coastal flood. Describe if and how coastal flood propagation affects inland flood.
6. Describe if and how the coincidence and interaction of inland and coastal flooding is modeled.
7. Provide a flowchart illustrating how the characteristics of each flood model component are utilized in other components of the flood model.
8. Describe and justify the appropriateness of the databases and methods used for the calibration and validation of flood extent and elevation or depth.
9. 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.
10. Describe the effects of storm size, bathymetry, and windspeed on storm surge height and its variation along the coast for the coastal flood model.
11. Describe the effects of windspeed, depth, fetch, and wind duration on locally generated wave heights or wave proxies for the coastal flood model.
12. Describe if and how model flood characteristics are based on or depend on NFIP FIRM or other FIS data.
13. Provide a completed Form HHF-2, Coastal Flood Characteristics by Annual Exceedance Probability. Provide a link to the location of the form [insert hyperlink here].
14. Provide a completed Form HHF-3, Coastal Flood Characteristics by Annual Exceedance Probabilities (Trade Secret Item), if not considered as Trade Secret. 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 flooding will be reviewed.
2. The inland propagation of coastal flood and the effect of coastal flood propagation on inland flood will be reviewed.
3. Any modeling-organization-specific research performed to calculate the flood extent and elevation or depth and wave conditions will be reviewed, along with the associated databases.
4. Historical data used as the basis for the flood model flood extent and elevation or depth will be reviewed. Historical data used as the basis for the flood model flood velocity, as available, will be reviewed.

5. 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.
6. Consistency of the flood model stochastic flood extent and elevation or depth with reference to the historical flood databases will be reviewed. Consistency of the flood model stochastic flood velocity, as available, with reference to the historical flood databases will be reviewed.
7. Form HHHF-2, Coastal Flood Characteristics by Annual Exceedance Probability, and Form HHHF-3, Coastal Flood Characteristics by Annual Exceedance Probabilities (Trade Secret Item), will be reviewed.
8. Modeled frequencies will be compared with the observed spatial distribution of flood frequencies across Florida using methods documented in current scientific and technical literature. The comparison of modeled to historical statewide and regional coastal flood frequencies as provided in Form HHHF-2, Coastal Flood Characteristics by Annual Exceedance Probability, and Form HHHF-3, Coastal Flood Characteristics by Annual Exceedance Probabilities (Trade Secret Item), will be reviewed.
9. Comparison of 0.01 and 0.002 annual exceedance probability flood extents produced by the flood model with those from the Federal Emergency Management Agency (FEMA) will be reviewed.
10. Temporal evolution of coastal 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.)
11. Comparisons of the flood flow calculated in the flood model with records from United States Geological Survey (USGS) or Florida Water Management District (FWMD) gauging stations will be reviewed.
12. Calculation of relevant characteristics in the flood model, such as flood extent, elevation or depth, and waves, will be reviewed. The methods by which each flood model component utilizes the characteristics of other flood model components will be reviewed.
13. The modeled coincidence and interaction of inland and coastal flooding will be reviewed. If it is not modeled, justification will be reviewed.
14. The basis or dependence of modeled flood characteristics on NFIP FIRM or other FIS data will be reviewed.



## MF-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 the 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:** The probabilities of flood occurrence, flood extent and elevation or depth, vary geographically across Florida. Meteorological phenomena affecting coastal flood probabilities are tropical cyclone and non-tropical cyclone surge, waves driven by the cyclones, and tides. The phenomena affecting inland flood probabilities are precipitation in Florida and precipitation in adjacent states (e.g., the Chattahoochee River watershed in North Georgia contributing to Apalachicola River flooding). The determination of flood probability distributions may employ explicit modeling of all these phenomena. Alternatively, the effects of non-tropical surge, waves, tides, and precipitation may be treated implicitly, if the approach is scientifically justifiable. Regardless of the modeling approach, the probability distributions of flood parameters and characteristics should be consistent with documentation in official meteorological, hydrological, and hydraulic databases and with historical floods affecting Florida.

**Relevant Forms:** GF-2, Meteorological Flood Standards Expert Certification  
GF-3, Hydrological and Hydraulic Flood Standards Expert Certification  
HHF-2, Coastal Flood Characteristics by Annual Exceedance Probability  
HHF-3, Coastal Flood Characteristics by Annual Exceedance Probabilities (Trade Secret Item)  
SF-1, Distributions of Stochastic Flood Parameters (Coastal, Inland)

### Disclosures

1. Describe how non-tropical and tropical event coastal storm tide flood probability distributions are combined, if applicable. Provide an example demonstrating the process.
2. Provide the rationale for each of the probability distributions used for relevant flood parameters and characteristics.

3. Demonstrate that simulated flood 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 or to develop flood databases will be reviewed.
4. Form SF-1, Distributions of Stochastic Flood Parameters (Coastal, Inland), will be reviewed.
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.

## HYDROLOGICAL AND HYDRAULIC FLOOD STANDARDS

### HHF-1 Flood Parameters (Inputs)\*

(\*Significant Revision)

- A. Treatment of land use and land cover (LULC) effects shall be consistent with current scientific and technical literature. Any LULC database used shall be consistent with the National Land Cover Database (NLCD) 2016 or later. Use of alternate datasets shall be justified.**
- B. Treatment of soil effects on inland flooding shall be consistent with current scientific and technical literature.**
- C. Treatment of watersheds and hydrologic basins shall be consistent with current scientific and technical literature.**
- D. Treatment of hydraulic systems, including conveyance, storage, and hydraulic structures, shall be consistent with current scientific and technical literature.**

Purpose: Inland flooding includes riverine, lacustrine, and surface water flooding.

Flood parameters are inputs to the flood model and are needed by the flood model to determine the nature, severity, and physical characteristics associated with inland flooding. The appropriate use and consideration of flood parameters in the calculation of inland flood directly impacts the predicted flood damage. The effects of LULC and soil type are necessary considerations in the evaluation of other hydrologic parameters, such as infiltration, and in the calculation of rainfall runoff, which influences inland flooding. The effects of watersheds, hydrologic basins, and hydraulic systems are necessary for calculating other hydraulic parameters, such as flood flow and depth.

Relevant Forms: GF-3, Hydrological and Hydraulic Flood Standards Expert Certification  
SF-1, Distributions of Stochastic Flood Parameters (Coastal, Inland)

### Disclosures

1. For inland flood analyses associated with riverine and lacustrine flooding,
  - a. Describe how the rivers, lakes, and associated floodplains are segmented (or partitioned) in determining the parameters for flood frequency used in the flood model,
  - b. Describe how the interaction between riverine and lacustrine components are represented in the flood model, and

- c. If groundwater is accounted for in the flood model, describe how the interaction between groundwater and inland flooding is represented.
2. 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.
3. Describe any assumptions or calculations used in the inland flood model relating to initial and boundary conditions (e.g., groundwater levels, lake levels, river flows and discharge locations, tides, river confluences, soil moisture).
4. Document the sensitivity of the flood model results to assumptions for values of initial and boundary conditions, including soil moisture, lake level, and tide height if relevant.
5. Describe the source and representation of topography in the flood model. Describe the horizontal resolution and the vertical accuracy of the topographic representation. Identify the horizontal and vertical datum of the topographic information. Describe any modeling organization modifications to the topographic representation. Describe the sensitivity of simulated floods to uncertainties in the topographic representation.
6. Provide the grid resolution or other area partitioning used to model the inland flood extent and depth and how the hydrological and hydraulic characteristics are determined on these scales.
7. Describe any assumptions or calculations used in the inland flood model relating to flood-induced erosion or topographic changes.
8. Provide citations to all data sources used to develop and support the land-use evaluation methodology, including publicly-developed or peer-reviewed information.
9. Provide the collection and publication dates of the LULC and soil data used in the flood model, and justify the applicability and timeliness of the data for Florida.
10. Describe the methodology used to convert LULC information into a spatial distribution of hydrological parameters, including roughness coefficients, throughout the flood model domain.
11. Describe the methods used to account for soil infiltration and percolation rates and soil moisture conditions in the inland flood model, if applicable. Provide citations to all data sources used to develop and support the soil infiltration and percolation rates and soil moisture conditions methodology, including publicly-developed or peer-reviewed information. Justify the selection of antecedent soil conditions.
12. Describe the methods used to develop watershed and hydrologic basin boundaries, and the hydrologic connectivity in the flood model, or any assumptions used in lieu of representing watersheds and hydrologic basins in the flood model.

13. Describe the methods used to develop the hydraulic network (e.g., riverine, lacustrine) in the flood model, the treatment of hydraulic structures (e.g., bridges, culverts) within the hydraulic network, and any assumptions used in lieu of the physical representation of hydraulic structures in the flood model.
14. Characterize the hydrologic and hydraulic mathematical models used, and the corresponding sources and citations.
15. Describe if and how flood model parameters are based on or depend on NFIP FIRM or other FIS data.

## **Audit**

1. The initial and boundary conditions for flood events will be reviewed.
2. The topographic representation will be reviewed.
3. Any modeling-organization-specific methodology used to incorporate LULC information into the flood model will be reviewed.
4. 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.
5. The watershed and hydraulic basin boundaries in the flood model, and the methods for developing these boundaries, or any equivalent assumptions, will be reviewed.
6. The hydraulic network and treatment of hydraulic structures in the flood model will be reviewed.
7. The hydrologic and hydraulic mathematical models used will be reviewed.
8. Any modeling-organization-specific research performed to develop hydrologic and hydraulic equations used in the flood model, and the variables and constants used in these equations, will be reviewed.
9. The input files for the hydrologic and hydraulic components of the inland flood model will be reviewed.
10. The relationships between time steps used in the hydrologic and hydraulic components of the flood model will be reviewed, if applicable.
11. The basis or dependence of flood parameters on NFIP FIRM or other FIS data will be reviewed, if relevant.

## **HHF-2 Flood Characteristics (Outputs)\***

*(\*Significant Revision)*

- A. Flood extent and elevation or 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. Modeled flood characteristics shall be sufficient for the calculation of flood damage.**

**Purpose:** The extent and depth of inland flooding predicted by the flood model are fundamental factors in assessing flood damage to buildings. Variations in the extent or depth can significantly change the estimated damage. Flood characteristics other than extent and depth can also be used to determine flood damage. While the data for historical flood events may be limited, the comparison of predicted characteristics to available historical information should be made and can help inform the methods and approaches to calculating flood damage.

**Relevant Forms:** GF-2, Meteorological Flood Standards Expert Certification  
GF-3, Hydrological and Hydraulic Flood Standards Expert Certification  
HHF-1, Historical Event Flood Extent and Elevation or Depth Validation Maps  
HHF-4, Inland Flood Characteristics by Annual Exceedance Probability  
HHF-5, Inland Flood Characteristics by Annual Exceedance Probabilities (Trade Secret Item)

### **Disclosures**

1. Provide comparisons of the modeled and historical flood extents and elevations or depths for the storm events listed in Form HHF-1, Historical Event Flood Extent and Elevation or Depth Validation Maps. For any storms where sufficient data are not available, the modeling organization may substitute an alternate historical storm of their choosing. Describe how each substituted storm provides similar coastal and inland flooding characteristics to the storm being replaced.
2. Demonstrate that the inland flood model component incorporates flood parameters necessary for simulating inland flood damage and accommodates the varied geographic, geologic, hydrologic, hydraulic, and LULC conditions in Florida. Provide justification for validation using any historical events not specified in Form HHF-1, Historical Event Flood Extent and Elevation or Depth Validation Maps.

3. For each of the storm events in Form HHH-1, Historical Event Flood Extent and Elevation or Depth Validation Maps, resulting in inland flooding, provide a comparison of the modeled flood flow to recorded flow data from selected USGS or FWMD gauging stations. Provide the rationale for gauging station selections.
4. Identify all hydrological and hydraulic variables that affect the flood extent, elevation, depth, and other flood characteristics. Provide the units of these variables.
5. For inland flood modeling, describe if and how the flood model accounts for flood velocity, flood duration, flood-induced erosion, floodborne debris, and contaminated floodwaters.
6. Describe the effect of any assumptions or calculations relating to initial and boundary conditions on the flood characteristics.
7. Describe and justify the appropriateness of the databases and methods used for the calibration and validation of flood extent and elevation or depth.
8. 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.
9. Identify whether flood characteristics are based on or depend on NFIP FIRM or other FIS data.
10. Provide a completed Form HHH-1, Historical Event Flood Extent and Elevation or Depth Validation Maps. Provide a link to the location of the form [insert hyperlink here].
11. Provide a completed Form HHH-4, Inland Flood Characteristics by Annual Exceedance Probability. Provide a link to the location of the form [insert hyperlink here].
12. Provide a completed Form HHH-5, Inland Flood Characteristics by Annual Exceedance Probabilities (Trade Secret Item), if not considered as Trade Secret. 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 inland flooding will be reviewed.
2. Any modeling-organization-specific research performed to calculate the inland flood extent and elevation or depth will be reviewed along with the associated databases.
3. Any modeling-organization-specific research performed to derive the hydrological characteristics associated with the topography, LULC distributions, soil conditions, watersheds, and hydrologic basins for the flood extent and elevation or depth will be reviewed.
4. Historical data used as the basis for the flood model flood extent and elevation or depth will be reviewed. Historical data used as the basis for the flood model flood flow and velocity, if applicable, will be reviewed.

5. The comparison of the calculated characteristics with historical inland flood events will be reviewed. The selected locations and corresponding storm events will be reviewed to verify sufficient representation of the varied geographic areas.
6. Consistency of the flood model stochastic flood extent and elevation or depth with reference to the historical flood databases will be reviewed. Consistency of the flood model stochastic flood flow and velocity, if applicable, with reference to the historical flood databases will be reviewed.
7. Form HHF-1, Historical Event Flood Extent and Elevation or Depth Validation Maps, will be reviewed.
8. For the historical flood events given in Form HHF-1, Historical Event Flood Extent and Elevation or Depth Validation Maps, the flood characteristics, including temporal and spatial variations contributing to modeled flood damage, will be reviewed.
9. Form HHF-4, Inland Flood Characteristics by Annual Exceedance Probability, and Form HHF-5, Inland Flood Characteristics by Annual Exceedance Probabilities (Trade Secret Item), will be reviewed.
10. Modeled frequencies will be compared with the observed spatial distribution of flood frequencies across Florida using methods documented in current scientific and technical literature. The comparison of modeled to historical statewide and regional inland flood frequencies as provided in Form HHF-4, Inland Flood Characteristics by Annual Exceedance Probability, and Form HHF-5, Inland Flood Characteristics by Annual Exceedance Probabilities (Trade Secret Item), will be reviewed.
11. Comparison of 0.01 and 0.002 annual exceedance probability flood extents produced by the flood model, including both inland and coastal flood, with the flood extents from FEMA will be reviewed.
12. The basis or dependence of flood characteristics on NFIP FIRM or other FIS data will be reviewed, if relevant.
13. Temporal evolution of inland flood characteristics will be reviewed, if applicable. (Trade Secret Item to be provided during the closed meeting portion of the Commission meeting to review the flood model for acceptability.)
14. Calculation of relevant characteristics in the inland flood model, such as flood extent and elevation or depth, will be reviewed. The methods by which each flood model component utilizes the characteristics of other flood model components will be reviewed.
15. The selected time steps representing peak flood extents and elevations or depths referenced in Flood Standard HHF-1, Flood Parameters (Inputs), Disclosure 14, will be reviewed, if applicable. Any assumptions used to account for peak flood extents and elevations or depths for flood events with shorter durations than the selected time steps will be reviewed.



## HHF-3 Modeling of Major Flood Control Measures

- A. The flood model's treatment of major flood control measures and their performance shall be consistent with available information and current state-of-the-science.***
- B. The modeling organization shall have a documented procedure for reviewing and updating information about major flood control measures and if justified, shall update the flood model flood control databases.***
- C. Treatment of the potential failure of major flood control measures shall be based upon current scientific and technical literature, empirical studies, or engineering analyses.***

Purpose: Major 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. The presence of major flood control measures can reduce the flood damage to buildings. The failure of major flood control measures during a flooding event can cause damage to buildings equal to or in excess of the damage that would occur if the measures were not present. The evaluation of impacts of major flood control measures may include considering dams, levees, and floodwalls, and the associated location, dimensions, strength, and performance thereof.

Relevant Form: GF-3, Hydrological and Hydraulic Flood Standards Expert Certification

### Disclosures

1. List the major flood control measures incorporated in the flood model and the sources of all data employed.
2. Describe the methodology to account for major 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 major flood control measures that require human intervention are incorporated into the flood model.
4. 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.
5. Provide an example of the flood extent and elevation or depth showing the potential impact of a major flood control measure failure.

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

## HHF-4 Logical Relationships Among Flood Parameters and Characteristics\*

(\*Significant Revision)

- A. At a specific location, water surface elevation shall increase with increasing terrain roughness at that location, all other factors held constant.**
- B. Rate of discharge shall increase with increase in steepness in the topography, all other factors held constant.**
- C. Rate of discharge shall increase with increase in imperviousness of LULC, all other factors held constant.**
- D. Inland flood extent and depth associated with riverine and lacustrine flooding shall increase with increasing discharge, all other factors held constant.**
- E. The coincidence of storm tide and inland flooding shall not decrease the flood extent and depth, all other factors held constant.**

Purpose: The parameters used in the inland flood model and the resulting characteristics calculated by the flood model, such as rate of discharge, and flood extent, elevation, and depth, are related through logical relationships. Consideration and evaluation of these logical relationships can help inform the methods and approaches to calculate flood damage and identify errors in the calculations.

Relevant Form: GF-3, Hydrological and Hydraulic Flood Standards 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 identified in *Figure 1*. Discuss how the flood characteristics exhibit logical relationships.
2. 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.

Figure 1

## State of Florida by Region



## Form HHF-1: Historical Coastal and Inland Event Flood Extent and Elevation or Depth Validation Maps

**Purpose:** While the data for historical flood events may be limited, the comparison of predicted characteristics to available historical information should be made and can help inform the methods and approaches to calculating flood damage. This form illustrates the flood model's ability to simulate historical flood events driven by both surge and inland rain.

A. Provide color-coded contour or high-resolution maps with appropriate base map data illustrating modeled coastal and inland flood extents and elevations or 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 in Panhandle (July 2013)  
Hurricane Matthew (2016)  
Hurricane Irma (2017)  
Hurricane Michael (2018)

For any storms where sufficient data are not available, the modeling organization may substitute an alternate historical storm of their choosing.

- B. Plot the locations and values associated with validation points (e.g., maximum flood elevations or depths from observations such as gauge data, high-water marks) on each contour or high-resolution map for the historical events.
- C. Provide scatter plots of simulated versus observed elevation or depth at the validation points.
- D. Indicate the resolution of the flood model elevation or depth grid used on each contour or high-resolution map.
- E. Demonstrate the consistency of the modeled flood extent and elevation or depth with observed flood extent and elevation or depth for each historical event.
- F. 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 major flood control measures.
- G. 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.
- H. Include Form HHF-1, Historical Event Flood Extent and Elevation or Depth Validation Maps, in a submission appendix.

## Form HHF-2: Coastal Flood Characteristics by Annual Exceedance Probability

**Purpose:** The graphical and visual depiction of flood characteristics predicted by the flood model can better inform the evaluation of the flood model results. This form illustrates the simulations of key coastal flood characteristics at a range of locations for an annual exceedance probability.

- A. Define one study area subject to coastal flooding within each of the five Florida geographic regions identified in *Figure 1*. The extent of each study area is to be determined by the modeling organization and should be large enough to encompass at least one county. The modeling organization is to create the underlying grid for this form.
- B. Provide, for each study area, color-coded contour or high-resolution maps showing the modeled flood extent and elevation or depth corresponding to 0.01 annual exceedance probability. Flood extent and elevation or depth should incorporate waves or wave proxies, if modeled. For locations subject to both coastal and inland flooding, this information should reflect only coastal flooding.
- C. Include Form HHF-2, Coastal Flood Characteristics by Annual Exceedance Probability, in a submission appendix.

Figure 1

## State of Florida by Region



## **Form HHF-3: Coastal Flood Characteristics by Annual Exceedance Probabilities (Trade Secret Item)**

**Purpose:** The graphical and visual depiction of flood characteristics predicted by the flood model can better inform the evaluation of the flood model results. This form illustrates the simulations of key coastal flood characteristics at a range of locations and annual exceedance probabilities.

- A. Provide, for each study area defined in Form HHF-2, Coastal Flood Characteristics by Annual Exceedance Probability, the following information. For locations subject to both coastal and inland flooding, this information should reflect only coastal flooding.
1. Study area color-coded contour or high-resolution maps showing modeled flood extent and elevation or depth corresponding to the 0.1, 0.02, 0.01, and 0.002 annual exceedance probabilities. Flood extent and elevation or depth should incorporate waves or wave proxies, if modeled.
  2. Study area color-coded contour or high-resolutions maps showing modeled flood extent corresponding to the 0.01 and 0.002 annual exceedance probabilities, compared with the NFIP flood extents.
  3. Graphs and tables showing flood model results at 10 or more locations within the study area and representative of the range of flood conditions in the study area. The following flood characteristics should be included for the 0.1, 0.02, 0.01, and 0.002 annual exceedance probabilities:
    - a. Stillwater flood elevations,
    - b. Coastal wave heights or wave proxies,
    - c. If the flood vulnerability model requires explicit representation of flood-induced erosion effects, the erosion depth (original ground elevation minus eroded ground elevation),
    - d. If the flood vulnerability model requires explicit representation of flow velocity effects, the flow velocities, and
    - e. If the flood vulnerability model requires explicit representation of flood inundation duration effects, the duration of flood inundation.



## Form HHF-4: Inland Flood Characteristics by Annual Exceedance Probability

**Purpose:** The graphical and visual depiction of flood characteristics predicted by the flood model can better inform the evaluation of the flood model results. This form illustrates the simulations of key inland flood characteristics at a range of locations for an annual exceedance probability.

- A. Define one study area subject to inland flooding within each of the five Florida geographic regions identified in *Figure 1*. The extent of each study area is to be determined by the modeling organization and should be large enough to encompass at least one county. The modeling organization is to create the underlying grid for this form.
- B. Provide, for each study area, color-coded contour or high-resolution maps showing the modeled flood extent and elevation or depth corresponding to the 0.01 annual exceedance probability. Flood extent and elevation or depth should incorporate the effects of flood-induced erosion, if modeled. For locations subject to both inland and coastal flooding, this information should reflect only inland flooding.
- C. Include Form HHF-4, Inland Flood Characteristics by Annual Exceedance Probability, in a submission appendix.

Figure 1

## State of Florida by Region



## **Form HHF-5: Inland Flood Characteristics by Annual Exceedance Probabilities (Trade Secret Item)**

**Purpose:** The graphical and visual depiction of flood characteristics predicted by the flood model can better inform the evaluation of the flood model results. This form illustrates the simulations of key inland flood characteristics at a range of locations and annual exceedance probabilities.

A. Provide, for each study area defined in Form HHF-4, Inland Flood Characteristics by Annual Exceedance Probability, the following information. For locations subject to both inland and coastal flooding, this information should reflect only inland flooding.

1. Study area color-coded contour or high-resolution maps showing modeled flood extent and elevation or depth corresponding to the 0.1, 0.02, 0.01, and 0.002 annual exceedance probabilities. Flood extent and elevation or depth should incorporate the effects of flood-induced erosion, if modeled.
2. Study area color-coded contour or high-resolutions maps showing modeled flood extent corresponding to the 0.01 and 0.002 annual exceedance probabilities, compared with the NFIP flood extents.
3. Graphs and tables, based on the underlying gridded data, showing flood model results at 10 or more locations within the study area and representative of the range of flood conditions in the study area. The following flood characteristics should be included for the 0.1 0.02, 0.01, and 0.002 annual exceedance probabilities:
  - a. Flood elevations,
  - a. Flood depths,
  - b. If the flood vulnerability model requires explicit representation of flood-induced erosion effects, the erosion depth (original ground elevation minus eroded ground elevation),
  - c. If the flood vulnerability model requires explicit representation of flow velocity effects, the flow and flow velocities, and
  - d. If the flood vulnerability model requires explicit representation of flood inundation duration effects, the duration of flood inundation.

B. Provide color-coded contour or high-resolution maps for areas surrounding the following five locations, showing modeled flood extent and elevation or depth corresponding to the 0.1, 0.02, 0.01, 0.002 annual exceedance probabilities.

1. Panama City Beach (The Glades, 30.18685/-85.81320)

2. Fernandina Beach (Egans Creek, 30.63935/-81.44037)
3. Winter Park (Chain of Lakes, 28.62245/-81.34538)
4. Key West (District 5, 24.55319/-81.78150)
5. Naples (Golden Gate Estates, 26.263814/-81.564169)

The extent of each area is to be determined by the modeling organization and should be sufficient to determine inland flooding conditions for the location. For locations subject to both inland and coastal flooding, this information should reflect only inland flooding. Flood extent and elevation or depth should incorporate the effects of flood-induced erosion, if modeled.

## STATISTICAL FLOOD STANDARDS

### SF-1 Modeled Results and Goodness-of-Fit\*

(\*Significant Revision)

- A. The use of historical data in developing the flood model shall be supported by rigorous methods published in current scientific and technical literature.**
- B. Modeled results and historical observations shall reflect statistical agreement using current 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.

Relevant Forms: GF-4, Statistical Flood Standards Expert Certification  
HHF-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)  
AF-8, Flood Probable Maximum Loss for Florida

### 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 evaluations applied along with appropriate metrics. Describe whether the fitted distributions provide a reasonable agreement with available historical data. Provide a link to the location of the form [insert hyperlink here].
2. Describe the insurance flood claims data used for validation and verification of the flood model.
3. Provide an assessment of uncertainty in flood probable maximum loss levels and in flood loss costs for flood output ranges using confidence intervals or other scientific characterizations of uncertainty.
4. Justify any differences between the historical and modeled results using current scientific and statistical methods in the appropriate disciplines.

5. Provide graphical comparisons of modeled and historical data and goodness-of-fit evaluations. Examples to include are flood frequencies, flow, elevations or depths, and available damage.
6. 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. Justification for the goodness-of-fit tests used will also be reviewed.
2. The modeling organization characterization of uncertainty for damage estimates, annual flood loss, flood probable maximum loss levels, and flood loss costs will be reviewed.
3. Regression analyses performed will be reviewed, including for example parameter estimation, graphical summaries and numerical measures of the quality of fit, residual analysis and verification of regression assumptions, outlier treatment, and associated uncertainty assessment.

## 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 current scientific and statistical methods in the appropriate disciplines and shall have taken appropriate action.*

Purpose: Sensitivity analysis involves the quantification of the magnitude and direction of the output (e.g., flood extent and depth, flood loss cost) as a function of the input variables in the flood model and provides critical insight into the behavior of the flood model.

Relevant Form: GF-4, 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 or high-resolution 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 current 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: Uncertainty analysis involves the quantification of the variability of the output (e.g., flood extent and depth, flood loss cost) as a function of the input variables in the flood model and provides critical insight into the behavior of the flood model.

Relevant Form: GF-4, 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 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 or high-resolution 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 the modeled coastal and inland flooding combined.***

**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 should be less than 5% of the flood loss cost estimate unless otherwise justified.

**Relevant Forms:** GF-4, Statistical Flood Standards Expert Certification  
AF-2, Total Flood Statewide Loss Costs  
AF-3, Personal Residential Standard Flood Loss Costs by ZIP Code

### **Disclosures**

1. Describe the sampling plan used to obtain the average annual flood loss costs and flood output ranges. 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.
2. Describe the nature and results of the convergence 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.

### **Audit**

1. An exhibit of the standard error by each 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. 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 the combined effects of flood hazard, vulnerability functions, and loss estimation. 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 Form: GF-4, Statistical Flood Standards Expert Certification

### Disclosure

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 listed in Form HHF-1, Historical Event Flood Extent and Elevation or Depth Validation Maps.

### Audit

1. The following information for each flood event in Form HHF-1, Historical Event Flood Extent and Elevation or Depth Validation Maps, will be reviewed:
  - a. The validity of the flood model assessed by comparing projected flood losses produced by the flood model to available 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 differences between the modeled and observed flood conditions used in validating a particular flood event,

- 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, and
  - 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 and data referenced in the flood model submission in hard copy or electronic form,
    - b. Modeling-organization-specific documentation and data used in validation of flood losses,
    - c. An analysis that identifies and explains anomalies observed in the validation data, and
    - 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. The results for more than one flood event will be reviewed to the extent data are available.

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

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

- A. 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.

Year Range Used for Fitting refers to the year range of data upon which the flood model distribution parameters are estimated.

Year Range Used for Validation refers to the year range of data upon which the goodness-of-fit statistics are based.

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

Stochastic Flood Parameter (Function or Variable)	Classification: Coastal or Inland	Functional Form of Distribution	Data Sources	Year Range Used		Justification for Functional Form and Parameter Estimates
				For Fitting	For Validation	

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

**Purpose:** This form provides the modeling organization flood loss exceedance estimates for coastal and inland flood losses combined.

- A. One or more automated programs or scripts should be used to generate and arrange the data in Form SF-2, Examples of Flood Loss Exceedance Estimates (Coastal and Inland Combined).
- B. Provide estimates of the annual 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 for certain return periods, state so and why.
- C. 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

\_\_\_\_\_

## VULNERABILITY FLOOD STANDARDS

### VF-1 Derivation of Building Flood Vulnerability Functions\*

*(\*Significant Revision)*

- A. Development of the building flood vulnerability functions shall be based on two or more of the following: (1) rational structural analysis, (2) post-event site investigations, (3) scientific and technical literature, (4) expert opinion, (5) laboratory or field testing, and (6) insurance claims data. Building flood vulnerability functions shall be supported by historical and other relevant data.**
- B. The derivation of building flood vulnerability functions and the treatment of 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 buildings.**
- D. The following flood characteristics shall be used or accounted for in the derivation of building flood vulnerability functions: depth above ground, and in coastal areas, damaging wave action.**
- E. The following primary building characteristics shall be used or accounted for in the derivation of building flood vulnerability functions: lowest floor elevation relative to ground, foundation type, construction materials, number of stories, and year of construction.**
- F. Flood vulnerability functions shall be separately derived for personal residential buildings and manufactured homes.**

Purpose: Both flood and building characteristics affect building flood vulnerability functions. The development of building flood vulnerability functions is to be supported by historical or other relevant data.

In coastal areas, the effects of damaging wave action must be incorporated into building flood vulnerability functions by explicit wave modeling or by wave proxies.

The data and methods used to develop building flood vulnerability functions, and the treatment of 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 year and enforcement of statewide and local building codes and floodplain management regulations affect the flood vulnerability functions.



Relevant Forms: GF-5, Vulnerability Flood Standards Expert Certification  
VF-1, Coastal Flood with Damaging Wave Action  
VF-2, Inland Flood by Flood Depth  
AF-1, Zero Deductible Personal Residential Standard Flood Loss Costs  
AF-6, Logical Relationships to Flood Risk (Trade Secret Item)  
AF-7, Percentage Change in Logical Relationships to Flood Risk

## Disclosures

1. Describe any modifications to the building vulnerability component of the flood model since the currently accepted flood model.
2. Provide a flowchart documenting the process by which the building flood vulnerability functions are derived and implemented.
3. Describe the assumptions, data, methods, and processes used for the development of the building flood vulnerability functions.
4. As applicable, describe the nature and extent of actual insurance company flood claims data used to develop the building flood vulnerability functions. Describe in detail the breakdown of data into number of policies, number of insurers, dates of flood loss, amount of flood loss, and amount of dollar exposure, separated into personal residential and manufactured homes.
5. Describe any new insurance company flood claims datasets reviewed since the currently accepted flood model.
6. Summarize post-event site investigations, including the sources, and provide a brief description of the resulting use of these data in the development or validation of building flood vulnerability functions.
7. Describe how the building flood vulnerability functions incorporate depth of flooding (above ground and above lowest floor) and damaging wave action (in coastal areas). For coastal areas, define the thresholds indicating the presence of damaging wave action for buildings and manufactured homes. Describe the area over which building flood vulnerability functions for damaging wave action or wave proxies are applied.
8. State if the following flood characteristics are considered in the development of the building flood vulnerability functions, and if so, how; if not, explain why:
  - a. Flood velocity,
  - b. Flood duration,
  - c. Flood-induced erosion,
  - d. Flood-borne debris,

- e. Salinity (saltwater versus freshwater flooding), and
  - f. Contaminated floodwaters.
9. Describe how the building flood vulnerability functions incorporate the following primary building characteristics:
- a. Lowest floor elevation relative to ground,
  - b. Foundation type,
  - c. Primary construction materials,
  - d. Number of stories, and
  - e. Year of construction.
10. State if the following building characteristics are considered in the development of the building flood vulnerability functions, and if so, how; if not, explain why:
- a. Use of each story (e.g., habitable space, parking, storage, other),
  - b. Presence of basement,
  - c. Replacement value of building,
  - d. Structure value by story,
  - e. Square footage of living area,
  - f. Other construction characteristics, as applicable, and
  - g. Distance from building to flood source(s) (e.g., river, lake, coast).
11. Describe the process by which local construction practices, statewide and local building code, and floodplain management regulation adoption and enforcement are considered in the development of building flood vulnerability functions.
12. Provide the total number of building flood vulnerability functions available for use in the flood model. Describe which building flood vulnerability functions are used for personal residential buildings, manufactured homes, condo unit owners, and apartment renters.
13. Describe the assumptions, data, methods, and processes used to develop building flood vulnerability functions when:
- a. personal residential construction types are unknown, or
  - b. one or more primary building characteristics are unknown, or
  - c. building input characteristics are conflicting.

14. Describe similarities and differences in how the building flood vulnerability functions are developed and applied for coastal and inland flooding.
15. Describe if and how building flood vulnerability functions are based on or depend on NFIP FIRM or other FIS data.
16. For a building in an area subject to coastal and inland flooding, describe how the flood model calculates and reports flood damage.
17. Describe the treatment of uncertainties associated with the building flood vulnerability functions.
18. Provide a completed Form VF-1, Coastal Flood with Damaging Wave Action. Provide a link to the location of the form [insert hyperlink here].
19. Provide a completed Form VF-2, Inland Flood by Flood Depth. Provide a link to the location of the form [insert hyperlink here].

## **Audit**

1. All building and manufactured home flood vulnerability functions will be reviewed. The magnitude of logical changes among these for given flood events and validation materials will be reviewed.
2. Comparison of building flood vulnerability functions for Form VF-1, Coastal Flood with Damaging Wave Action, reference structures will be reviewed. Comparison of building flood vulnerability functions for Form VF-2, Inland Flood by Flood Depth, reference structures will be reviewed.
3. If the flood model uses component-based vulnerability functions, comparisons of the overall building flood vulnerability functions and the individual component-based vulnerability functions will be reviewed for each of the reference structures in Form VF-1, Coastal Flood with Damaging Wave Action, and Form VF-2, Inland Flood by Flood Depth (16 comparisons total, eight for each form).
4. Modifications to the building vulnerability component of the flood model since the currently accepted flood model will be reviewed in detail, including the rationale for the modifications, the scope of the modifications, the process, the resulting modifications, and their impacts on the building vulnerability functions.
5. Comparisons of the building flood vulnerability functions with the currently accepted flood model will be reviewed.
6. Building vulnerability functions that incorporate waves or wave proxies will be reviewed. Thresholds for damaging wave action will be reviewed. The area over which building flood vulnerability functions for damaging waves or wave proxies are applied will be reviewed.
7. Validation of the building flood vulnerability functions and the treatment of associated uncertainties will be reviewed.

8. 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 building 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 building 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 scientific and technical literature and expert opinion summaries will be reviewed. Insurance claims data will be reviewed.
9. All scientific and technical literature, reports, and studies used in the continual development of the building flood vulnerability functions must be available for review in hard copy or electronic form.
10. Justification for the personal residential building construction classes and characteristics used will be reviewed.
11. Documentation and justification for the effects on the building flood vulnerability functions due to local and regional construction practices, and statewide and local building codes, floodplain management regulations, and their enforcement will be reviewed. If year of construction or geographical location of the building 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-bands and geographical regions of construction that separate particular groups will be reviewed.
12. Describe in detail the breakdown of new flood claims data into number of policies, number of insurers, dates of flood loss, amount of flood loss, and amount of dollar exposure; separated into personal residential and manufactured homes. Indicate whether or not the new flood claims datasets were incorporated into the flood model. Describe research performed and analyses on the new flood claims datasets and the impact on flood vulnerability functions.
13. How the claim practices of insurance companies are accounted for when flood claims data for those insurance companies are used to develop or to verify building 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, the impact of public adjusting, or the impact of the legal environment.
14. The percentage of damage at or above which the flood model assumes a total building loss will be reviewed.
15. The treatment of law and ordinance in building flood vulnerability functions will be reviewed.
16. Documentation and justification for the method of derivation and data on which the building flood vulnerability functions are based will be reviewed.
17. If modeled, the treatment of water intrusion in building flood vulnerability functions will be reviewed.

18. The basis or dependence of building flood vulnerability functions on NFIP FIRM or other FIS data will be reviewed.
19. The process to account for FEMA's change in flood insurance premium rating to Risk Rating 2.0 will be reviewed, if applicable.
20. Form VF-1, Coastal Flood with Damaging Wave Action, will be reviewed.
21. Form VF-2, Inland Flood by Flood Depth, will be reviewed.

## **VF-2 Derivation of Contents Flood Vulnerability Functions\***

*(\*Significant Revision)*

**A. Development of the contents flood vulnerability functions shall be based on some combination of the following: (1) post-event site investigations, (2) scientific and 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 relationship between building and contents flood vulnerability functions shall be reasonable.**

**Purpose:** Contents flood vulnerability functions and flood losses are affected by various flood, contents, and building characteristics. The development of contents flood vulnerability functions is to be supported by historical or other relevant data.

In coastal areas, the effects of damaging wave action must be incorporated into contents flood vulnerability functions by explicit wave modeling or by wave proxies.

The development of contents flood vulnerability functions is to be documented with respect to the methods and sources.

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

**Relevant Forms:** GF-5, Vulnerability Flood Standards Expert Certification  
AF-1, Zero Deductible Personal Residential Standard Flood Loss Costs  
AF-6, Logical Relationships to Flood Risk (Trade Secret Item)  
AF-7, Percentage Change in Logical Relationships to Flood Risk

### **Disclosures**

1. Describe any modifications to the contents vulnerability component of the flood model since the currently accepted flood model.
2. Provide a flowchart documenting the process by which the contents flood vulnerability functions are derived and implemented.
3. Describe the relationship between contents and building flood vulnerability functions.
4. Describe any assumptions, data, methods, and processes used to develop and validate the contents flood vulnerability functions.

5. As applicable, describe the nature and extent of actual insurance company flood claims data used to develop the contents flood vulnerability functions. Describe in detail the breakdown of contents flood claims data into number of policies, number of insurers, dates of flood loss, amount of flood loss, and amount of dollar exposure, separated into personal residential buildings and manufactured homes.
6. Describe any new contents flood claims datasets used in the flood model since the currently accepted flood model.
7. Provide the total number of contents flood vulnerability functions available for use in the flood model. Describe whether different contents flood vulnerability functions are used for buildings, manufactured homes, unit location for condo owners and apartment renters, and various building classes.
8. Describe any relationships between flood characteristics and contents flood vulnerability functions.
9. State the minimum threshold, if any, at which contents flood damage is calculated (e.g., contents flood damage is estimated for building 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.
10. Describe similarities and differences in how contents flood vulnerability functions are developed and applied for coastal and inland flooding.
11. Describe if and how contents flood vulnerability functions are based on or depend on NFIP FIRM or other FIS data.

## **Audit**

1. Modifications to the contents vulnerability component of the flood model since the currently accepted flood model will be reviewed in detail, including the rationale for the modifications, the scope of the modifications, the process, the resulting modifications and their impact on the contents vulnerability functions.
2. Comparisons of the contents flood vulnerability functions with the currently accepted flood model will be reviewed.
3. All contents flood vulnerability functions will be reviewed.
4. Contents flood vulnerability functions that incorporate waves or wave proxies will be reviewed. Thresholds for damaging wave action will be reviewed. The area over which contents flood vulnerability functions for damaging waves or wave proxies are applied will be reviewed.
5. Validation of the contents flood vulnerability functions and the treatment of associated uncertainties will be reviewed.

6. Documentation and justification of the method of derivation and underlying data or assumptions related to contents flood vulnerability functions will be reviewed.
7. 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 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 scientific and technical literature and expert opinion summaries will be reviewed. Insurance claims data will be reviewed.
8. Justification for changes from the currently accepted flood model in the relativities between flood vulnerability functions for building and the corresponding flood vulnerability functions for contents will be reviewed.
9. Documentation and justification of the method of derivation and underlying data or assumptions related to contents flood vulnerability functions will be reviewed.
10. The basis or dependence of contents flood vulnerability functions on NFIP FIRM or other FIS data will be reviewed.
11. All scientific and technical literature, reports, and studies used in the continual development of the contents flood vulnerability functions must be available for review in hard copy or electronic form.



## **VF-3 Derivation of Time Element Flood Vulnerability Functions\***

*(\*Significant Revision)*

- A. Development of the time element flood vulnerability functions shall be based on one or more of the following: (1) post-event site investigations, (2) scientific and technical literature, (3) expert opinion, (4) laboratory or field testing, and (5) insurance claims data.**
- B. The relationship among building, contents, and time element flood vulnerability functions shall be reasonable.**
- C. Time element flood vulnerability functions derivations shall consider the estimated time required to repair or replace the property.**

**Purpose:** Time element flood vulnerability functions and flood losses are affected by various flood, contents, and building characteristics, as well as external factors that affect the ability to repair or replace a structure. The development of time element flood vulnerability functions is to be supported by historical or other relevant data.

In coastal areas, the treatment of damaging wave action in time element flood vulnerability functions may be important.

The development of time element flood vulnerability functions is to be documented with respect to the methods and sources.

A reasonable representation of time element flood vulnerability is necessary in order to address policies that cover time element flood 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-5, Vulnerability Flood Standards Expert Certification  
AF-1, Zero Deductible Personal Residential Standard Flood Loss Costs  
AF-6, Logical Relationships to Flood Risk (Trade Secret Item)  
AF-7, Percentage Change in Logical Relationships to Flood Risk

### **Disclosures**

1. Describe any modifications to the time element vulnerability component of the flood model since the currently accepted flood model.
2. Provide a flowchart documenting the process by which the time element flood vulnerability functions are derived and implemented.
3. Describe the assumptions, data, methods, and processes used to develop and validate time element flood vulnerability functions.

4. Describe the relationships among building, contents, and time element flood vulnerability functions.
5. As applicable, describe the nature and extent of actual insurance company flood claims data used to develop the time element flood vulnerability functions. Describe in detail the breakdown of time element flood claims data into number of policies, number of insurers, dates of flood loss, amount of flood loss, and amount of dollar exposure, separated into personal residential buildings and manufactured homes.
6. Describe any new time element flood claims datasets used in the flood model since the currently accepted flood model.
7. Provide the total number of 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, manufactured homes, unit location for condo owners and apartment renters, and various building classes.
8. Describe similarities and differences in how time element flood vulnerability functions are developed and applied for coastal and inland flooding.
9. Describe whether and how building classification and characteristics, and flood characteristics, are incorporated into the time element flood vulnerability functions.
10. Describe whether and how time element flood vulnerability functions take into consideration the damage to local and regional infrastructure, or time element vulnerability resulting from a governmental mandate associated with flood events (e.g., evacuation and re-entry mandates).

## **Audit**

1. Modifications to the time element vulnerability component of the flood model since the currently accepted flood model will be reviewed in detail, including the rationale for the modifications, the scope of the modifications, the process, the resulting modifications and their impact on the time element vulnerability functions.
2. Comparisons of the time element flood vulnerability functions with the currently accepted flood model will be reviewed.
3. All time element flood vulnerability functions will be reviewed.
4. Time element flood vulnerability functions that incorporate waves or wave proxies will be reviewed. Thresholds for damaging wave action will be reviewed. The area over which time element flood vulnerability functions for waves or wave proxies are applied will be reviewed.
5. Validation of the time element flood vulnerability functions and the treatment of associated uncertainties will be reviewed.
6. Documentation and justification of the method of derivation and underlying data or assumptions related to time element flood vulnerability functions will be reviewed.

7. 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. To the extent historical data are used to develop 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 scientific and technical literature and expert opinion summaries will be reviewed. Insurance claims data will be reviewed.
8. If included, the methodology and validation for determining the extent of infrastructure flood damage and governmental mandate and their effect on time element flood vulnerability will be reviewed.
9. Justification for changes from the currently accepted flood model in relativities between flood vulnerability functions for building and the corresponding flood vulnerability functions for time element will be reviewed.
10. Documentation and justification of the method of derivation and underlying data or assumptions related to time element flood vulnerability functions will be reviewed.

## **VF-4 Flood Mitigation Measures\***

*(\*Significant Revision)*

- A. Modeling of flood mitigation measures to improve flood resistance of buildings, and the corresponding effects on flood vulnerability and associated uncertainties shall be theoretically sound and consistent with fundamental engineering principles. These measures shall include design, construction, and retrofit techniques that affect the flood resistance or flood protection of personal residential buildings.**
- B. The modeling organization shall justify all flood mitigation measures considered by the flood model.**
- C. Application of flood mitigation measures that affect the performance of personal residential buildings and the damage to contents shall be justified as to the impact on reducing flood damage whether done individually or in combination.**

Purpose: Flood mitigation measures are those measures undertaken at an individual building level, usually within the building footprint, and may include the following:

- Elevating the building
- Adding flood openings to enclosure walls
- Wet or dry floodproofing
- Permanent elevation or protection of equipment and utilities
- Flood barriers
- Pumps.

Multiple flood mitigation measures will be considered and their combined effect on flood damage must be estimated.

Relevant Forms: GF-5, Vulnerability Flood Standards Expert Certification  
VF-3, Flood Mitigation Measures, Range of Changes in Flood Damage  
VF-4, Differences in Flood Mitigation Measures  
AF-6, Logical Relationships to Flood Risk (Trade Secret Item)  
AF-7, Percentage Change in Logical Relationships to Flood Risk

### **Disclosures**

1. Describe any modifications to flood mitigation measures used by the flood model since the currently accepted flood model.
2. Describe the procedures used to calculate the impact of flood mitigation measures, including software, its identification, and current version. Describe whether or not such procedures have been modified since the currently accepted flood model.

3. 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].
4. 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.
5. Describe how time element flood losses are affected by performance of flood mitigation measures. Identify any assumptions.
6. Describe how building and contents damage and the treatment of associated uncertainties are affected by flood mitigation measures. Identify any assumptions.
7. 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.
8. Provide a completed Form VF-4, Differences in Flood Mitigation Measures. Provide a link to the location of the form [insert hyperlink here].

## **Audit**

1. Flood mitigation measures used by the flood model, whether or not referenced in Form VF-3, Flood Mitigation Measures, will be reviewed for theoretical soundness and reasonability.
2. Modifications to flood mitigation measures in the flood model since the currently accepted flood model will be reviewed in detail, including the rationale for the modifications, the scope of the modifications, the process, the resulting modifications, and their impacts on the flood vulnerability component.
3. Comparisons of flood mitigation measures in the flood model with the currently accepted flood model will be reviewed.
4. Procedures, including software, used to calculate the impact of flood mitigation measures will be reviewed.
5. Form VF-3, Flood Mitigation Measures, Range of Changes in Flood Damage, and Form VF-4, Differences in Flood Mitigation Measures, will be reviewed.
6. 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 in flood damage over the range of flood depths above ground for individual flood mitigation measures will be reviewed. Historical data, scientific and technical literature, expert opinion, or insurance company claims data 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.

7. 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 in flood damage over the range of flood depths above ground for multiple flood mitigation measures will be reviewed.

# Form VF-1: Coastal Flood with Damaging Wave Action

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 buildings subject to coastal flooding with damaging wave action.

A. Sample personal residential exposure data for 8 reference buildings as defined below and 26 stillwater flood depths (0-25 feet at 1-foot increments) are provided in the file named “*VFEventFormsInput21.xlsx*.”

Model the sample personal residential exposure data provided in the file versus the stillwater flood depths, and provide the damage/exposure ratios summarized by flood depth and construction type. Estimated Damage for each individual flood depth is the sum of ground up loss to all reference buildings in the flood depth range, excluding demand surge.

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

### Reference Buildings

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 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 buildings used in completing the form are identical to those in the above table for the reference buildings.

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 stillwater flood depth versus estimated damage/subject exposure data.

E. Include Form VF-1, Coastal Flood with Damaging Wave Action, in a submission appendix.

**Form VF-1: Coastal Flood with Damaging Wave Action**

<b>Stillwater Flood Depth (Feet) Above Ground Level</b>	<b>Estimated Damage/ Subject Exposure</b>
0	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	



## Form VF-2: Inland Flood by Flood Depth

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 buildings subject to inland (inundation) flooding.

- A. Sample personal residential exposure data for 8 reference buildings as defined below and 26 flood depths (0-25 feet at 1-foot increments) are provided in the file named “*VFEventFormsInput21.xlsx*.”

Model the sample personal residential exposure data provided in the file versus the flood depths, and provide the damage/exposure ratios summarized by flood depth and construction type. Estimated Damage for each individual flood depth is the sum of ground up loss to all reference buildings in the flood depth range, excluding demand surge.

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

### Reference Buildings

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 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 buildings used in completing the form are identical to those in the above table for the reference buildings.
- 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 flood depth versus estimated damage/subject exposure data.
- E. Include Form VF-2, Inland Flood by Flood Depth, in a submission appendix.

**Form VF-2: Inland Flood by Flood Depth**

<u>Flood Depth (Feet) Above Ground Level</u>	<u>Estimated Damage/ Subject Exposure</u>
0	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	

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

**Purpose:** This form illustrates the changes in flood damage ratios for three specific reference buildings subject to individual flood mitigation measures and to combinations of flood mitigation measures.

- A. Provide the change in the personal residential reference building damage ratio (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. Personal residential contents, appurtenant structures, or time-element coverages are not included.
- 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 should include the abbreviated name of the modeling organization, the flood 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 Buildings

Wood Frame	Masonry
One story Crawlspace foundation Top of foundation wall 3 feet above grade	One story Slab foundation Top of slab 1 foot above grade Unreinforced masonry exterior walls
Two story Timber pile foundation Top of pile 8 feet above grade Wood floor system bolted to piles	

- D. Place the reference buildings 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  
 Latitude: 27.9957517  
 Longitude: -82.8277373

St. Johns River  
 Latitude: 29.3768881  
 Longitude: -81.6190223

- E. Provide the ground elevation used from the flood model elevation database for both reference points.

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

INDIVIDUAL FLOOD MITIGATION MEASURES		PERCENTAGE CHANGES IN DAMAGE ((REFERENCE DAMAGE RATIO - MITIGATED DAMAGE RATIO) / REFERENCE DAMAGE RATIO) * 100									
		TWO-STORY 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	—	—	—	—	—	—	—	—	—	
ELEVATE STRUCTURE	Elevate Floor 1 Foot						—	—	—	—	
	Elevate Floor 2 Feet						—	—	—	—	
	Elevate Floor 3 Feet						—	—	—	—	
UTILITY EQUIPMENT	Elevate or Protect 1 Foot										
	Elevate or Protect 2 Feet										
	Elevate or Protect 3 Feet										
FLOODPROOFING	Wet 1 Foot										
	Wet 2 Feet										
	Wet 3 Feet										
	Dry 1 Foot	—	—	—	—	—					
	Dry 2 Feet	—	—	—	—	—					
	Dry 3 Feet	—	—	—	—	—					
FLOOD OPENINGS		ONE-STORY WOOD FRAME STRUCTURE									
		FLOOD DEPTH (FT) ABOVE GROUND									
		1	3	5	7	9					
		Flood Openings in Foundation Walls						—	—	—	—
FLOOD MITIGATION MEASURES IN COMBINATION		PERCENTAGE CHANGES IN DAMAGE ((REFERENCE DAMAGE RATIO - MITIGATED DAMAGE RATIO) / REFERENCE DAMAGE RATIO) * 100									
		TWO-STORY 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
		Elevate Utility Equipment 2 Feet Above Floor and Wet Floodproof Structure to 2 Feet									

## **Form VF-4: Differences in Flood Mitigation Measures**

**Purpose:** This form illustrates the impact of changes in the flood model of the flood mitigation measures from the currently accepted flood model.

- A. Provide the differences between the values reported in Form VF-3, Flood Mitigation Measures, Range of Changes in Damage, relative to the equivalent data compiled from the currently accepted flood model.
- B. Provide a list and describe any assumptions made to complete this form.
- C. Provide a summary description of the differences.
- D. Provide this form in Excel format without truncation. The file name should include the abbreviated name of the modeling organization, the flood standards year, and the form name. Also include Form VF-4, Differences in Flood Mitigation Measures, in a submission appendix.

## Form VF-4: Differences in Flood Mitigation Measures

INDIVIDUAL FLOOD MITIGATION MEASURES		DIFFERENCES FROM FORM VF-3 RELATIVE TO CURRENTLY ACCEPTED FLOOD MODEL											
		TWO-STORY 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	—	—	—	—	—	—	—	—	—	—	—	—
ELEVATE STRUCTURE	Elevate Floor 1 Foot						—	—	—	—	—	—	—
	Elevate Floor 2 Feet						—	—	—	—	—	—	—
	Elevate Floor 3 Feet						—	—	—	—	—	—	—
UTILITY EQUIPMENT	Elevate or Protect 1 Foot												
	Elevate or Protect 2 Feet												
	Elevate or Protect 3 Feet												
FLOODPROOFING	Wet 1 Foot												
	Wet 2 Feet												
	Wet 3 Feet												
	Dry 1 Foot	—	—	—	—	—							
	Dry 2 Feet	—	—	—	—	—							
	Dry 3 Feet	—	—	—	—	—							
FLOOD OPENINGS		ONE-STORY WOOD FRAME STRUCTURE											
		FLOOD DEPTH (FT) ABOVE GROUND											
		1	3	5	7	9							
		Flood Openings in Foundation Walls						—	—	—	—	—	—
FLOOD MITIGATION MEASURES IN COMBINATION		DIFFERENCES FROM FORM VF-3 RELATIVE TO CURRENTLY ACCEPTED FLOOD MODEL											
		TWO-STORY 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		
	Elevate Utility Equipment 2 Feet Above Floor and Wet Floodproof Structure to 2 Feet												

## ACTUARIAL FLOOD STANDARDS

### AF-1 Flood Model Input Data and Output Reports\*

(\*Significant Revision)

- A. Adjustments, edits, inclusions, or deletions to insurance company or other input data used by the modeling organization shall be based upon generally 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: Modeled flood loss costs and flood 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-6, 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, version identification, and platform identification on the input form. All items included in the input form 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 in Florida. Include the flood model name, version identification, and platform identification on the flood model output report. All items included in the flood model output report should be clearly labeled, highlighted, and defined.
6. Provide a list of all options available (e.g., flood event data source, vulnerability functions) to the user. Identify the specific options acceptable for a Florida rate filing.
7. Explain the differences in data input and flood model output required for coastal and inland flood modeling.
8. Describe actions performed to ensure the validity of insurer or other input data used for flood model inputs or for validation/verification.
9. Disclose if changing the order of the flood model input exposure data produces different flood model output or results.
10. Disclose if removing or adding policies from the flood model input file affects the flood model 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 flood model output for coastal and inland flood modeling will be reviewed.
4. The human-computer interface relevant to input data and output reports and corresponding nomenclature used in Florida rate filings will be reviewed.



## **AF-2 Flood Events Resulting in Modeled Flood Losses\***

*(\*Significant Revision)*

**A. Modeled flood 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 distinguishing flood-related losses from other peril losses.**

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 and hydraulic 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 flood loss in Florida.

Relevant Forms: GF-6, Actuarial Flood Standards Expert Certification  
AF-2, Total Flood Statewide Loss Costs  
AF-3, Personal Residential Standard Flood Loss Costs by ZIP Code

### **Disclosures**

1. Describe how damage from flood 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 and inland flooding are treated in the calculation of flood loss costs and flood probable maximum loss levels for Florida.
3. Describe how the flood model considers the correlation and potential overlap of flood 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 flood 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 flood losses in the flood model is consistent with this standard.
2. The flood model will be reviewed to determine that meteorological or hydrological and hydraulic 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 and how the flood model takes into account any damage resulting directly and solely from wind and water infiltration.
4. The flood model will be reviewed to determine how flood losses from water intrusion are identified and calculated.
5. The documented procedure for distinguishing flood-only losses from other peril losses will be reviewed.
6. The effect on flood loss costs and flood probable maximum loss levels arising from flood events that are neither inland nor coastal flooding will be reviewed.

## **AF-3 Flood Coverages\***

*(\*Significant Revision)*

- A. The methods used in the calculation of personal residential structure flood loss costs, including the effect of law and ordinance coverage, 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 structure, appurtenant structure, 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-6, 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.
5. Describe the methods used in the flood model to account for law and ordinance 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.
2. The treatment of law and ordinance coverage will be reviewed, including the 25% and 50% coverage options for personal residential policies.

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

*(\*Significant Revision)*

- 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 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 Flood 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-6, Actuarial Flood Standards Expert Certification  
AF-8, 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 and the treatment of associated uncertainties. Identify any source documents used and any relevant research results.
2. Identify all possible resolutions available for the reported flood output ranges. Identify the finest level of resolution (i.e., the most granular level) for which flood loss costs and flood probable maximum loss levels can be provided.
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. How the flood model determines flood loss costs associated with coastal flooding will be reviewed.

8. How the flood model determines flood probable maximum loss levels associated with coastal flooding will be reviewed.
9. How the flood model determines flood loss costs associated with inland flooding will be reviewed.
10. How the flood model determines flood probable maximum loss levels associated with inland flooding will be reviewed.
11. 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.
12. All referenced scientific and technical literature will be reviewed, in hard copy or electronic form, to determine applicability.

## **AF-5 Flood Policy Conditions\***

*(\*Significant Revision)*

- 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 flood 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 Forms: GF-6, Actuarial Flood Standards Expert Certification  
AF-4, Flood Output Ranges  
AF-5, Percentage Change in Flood Output Ranges  
AF-6, Logical Relationships to Flood Risk (Trade Secret Item)  
AF-7, Percentage Change in Logical Relationships to Flood Risk

### **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. In particular, specify the loss settlement options available for manufactured homes.
2. Describe if and how the flood model treats policy exclusions and loss settlement provisions.
3. Describe if and how the flood model treats annual deductibles.

### **Audit**

1. The extent that historical data are used to develop mathematical depictions of deductibles, policy limits, policy exclusions, and loss settlement provisions for flood coverage will be reviewed.
2. The extent that historical data are used to validate the flood model results will be reviewed.
3. Treatment of annual deductibles will be reviewed, if applicable.

4. Justification for the changes from the currently accepted flood model in the relativities among corresponding deductible amounts for the same coverage will be reviewed.



## **AF-6 Flood Loss Outputs and Logical Relationships to Risk\***

*(Significant Revision)*

- A. The methods, data, and assumptions used in the estimation of flood loss costs and 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 costs 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:** Flood loss costs and flood probable maximum loss levels are to be 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-6, Actuarial Flood Standards Expert Certification  
SF-2, Examples of Flood Loss Exceedance Estimates (Coastal and Inland Combined)  
AF-1, Zero Deductible Personal Residential Standard Flood Loss Costs  
AF-2, Total Flood Statewide Loss Costs  
AF-3, Personal Residential Standard Flood Losses by ZIP Code  
AF-4, Flood Output Ranges  
AF-5, Percentage Change in Flood Output Ranges  
AF-6, Logical Relationships to Flood Risk (Trade Secret Item)  
AF-7, Percentage Change in Logical Relationships to Flood Risk  
AF-8, Flood Probable Maximum Loss for Florida

## **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 Losses 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-5, Percentage Change in Flood Output Ranges. Provide a link to the location of the form [insert hyperlink here].
6. Provide a completed Form AF-6, Logical Relationships to Flood Risk (Trade Secret Item), if not considered as Trade Secret. Provide a link to the location of the form [insert hyperlink here].
7. Provide a completed Form AF-7, Percentage Change in Logical Relationships to Flood Risk. Provide a link to the location of the form [insert hyperlink here].

8. Explain any assumptions, deviations, and differences from the prescribed exposure information in Form AF-6, Logical Relationships to Flood Risk (Trade Secret Item), and Form AF-7, Percentage Change in Logical Relationships to Flood Risk. In particular, explain how the treatment of unknown is handled in each sensitivity exhibit.
9. Provide a completed Form AF-8, Flood Probable Maximum Loss for Florida. Provide a link to the location of the form [insert hyperlink here].
10. Describe the calculation of uncertainty intervals.
11. Describe how the flood model produces flood probable maximum loss levels.
12. Provide citations to published papers, if any, or modeling-organization studies that were used to estimate flood probable maximum loss levels.
13. Explain any differences between the values provided on Form AF-8, Flood Probable Maximum Loss for Florida, and those provided on Form SF-2, Examples of Flood Loss Exceedance Estimates (Coastal and Inland Combined).
14. Provide an explanation for all flood loss costs that are not consistent with the requirements of this standard.
15. Provide an explanation of the differences in flood output ranges between the currently accepted flood model and the flood model under review.

## **Audit**

1. The data and methods used for flood probable maximum loss levels for Form AF-8, Flood Probable Maximum Loss for Florida, will be reviewed. The Top Event and Conditional Tail Expectations will be reviewed.
2. The frequency distribution and the individual event severity distribution, or information about the formulation of events, underlying Form AF-8, Flood Probable Maximum Loss for Florida, will be reviewed.
3. All referenced scientific and technical literature will be reviewed, in hard copy or electronic form, to determine applicability.
4. Graphical representations of flood loss costs by rating areas and geographic zones (consistent with the modeling-organization 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 Flood Standard AF-6, Flood Loss Outputs and Logical Relationships to Risk, 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 Losses by ZIP Code; and AF-6, Logical Relationships to Flood Risk (Trade Secret Item); and AF-7, Percentage Change in Logical Relationships to Flood Risk, will be reviewed to assess flood coverage relationships.

6. The flood loss cost relationships among deductible, policy form, construction type, coverage, year of construction, foundation type, number of stories, and lowest floor elevation will be reviewed. For coastal flooding, the flood loss cost relationship with distance to the closest coast 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 Losses by ZIP Code, will be reviewed.
8. Form AF-4, Flood Output Ranges, and Form AF-5, Percentage Change in Flood Output Ranges, will be reviewed, including geographical representations of the data where applicable.
9. Justification for all changes in flood loss costs from the currently accepted flood model will be reviewed.
10. Form AF-4, Flood Output Ranges, will be reviewed to ensure appropriate relativities among deductibles, coverages, and construction types.
11. Apparent reversals in the flood output ranges and their justification will be reviewed.
12. Details on the calculation of uncertainty intervals 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 seven 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 NFIP. Rating areas or geographic zones are to be defined by the modeling organization.

- B. Create exposure sets for these exhibits by modeling the frame and masonry building and manufactured homes from Notional Set 3 described in the file *“NotionalInput21\_Flood.xlsx”* geocoded to each rating area or geographic zone in the state, as provided in the flood model. Define the flood rating areas or geographic zones. Provide the predominant County name and the Federal Information Processing Standards (FIPS) Code (*Figure 2*) 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. Describe if and how Law and Ordinance is included in this form.
- D. 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.
- E. Provide, in the format given in the file named *“2021FormAF1.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 should include the abbreviated name of the modeling organization, the flood standards year, and the form name.

*Figure 2*

## Florida County Codes

<b>County Code</b>	<b>County Name</b>	<b>County Code</b>	<b>County Name</b>	<b>County Code</b>	<b>County Name</b>
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.

## Notional Standard Flood Policy Specifications

<u>Policy Type</u>	<u>Assumptions</u>
<b>Owners</b>	<p><b>Coverage A = Building Property</b></p> <ul style="list-style-type: none"><li>• Replacement cost equal to Coverage A limit</li><li>• Excludes all appurtenant structures</li></ul> <p><b>Coverage B = Personal Property</b></p> <ul style="list-style-type: none"><li>• Actual cash value equal to Coverage B limit</li></ul> <p><b>Time Element Coverage</b></p> <ul style="list-style-type: none"><li>• To be defined by the modeling organization</li></ul> <p>✧ Flood loss costs per \$1,000 should 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</p>
<b>Manufactured Homes</b>	<p><b>Coverage A = Building Property</b></p> <ul style="list-style-type: none"><li>• Replacement cost equal to Coverage A limit</li></ul> <p><b>Coverage B = Personal Property</b></p> <ul style="list-style-type: none"><li>• Actual cash value equal to Coverage B limit</li></ul> <p><b>Time Element Coverage</b></p> <ul style="list-style-type: none"><li>• To be defined by the modeling organization</li></ul> <p>✧ Flood loss costs per \$1,000 should 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</p>

## Form AF-2: Total Flood Statewide Loss Costs

**Purpose:** This form illustrates the modeling organization's ability to estimate flood loss costs for a modeling-organization-specified, predetermined and comprehensive exposure dataset.

- A. Provide the total personal residential insured 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 should 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 tropical cyclones from HURDAT2 and rainfall events to be included in the modeling organization flood-event dataset. The modeling organization should populate the table with its own flood-event dataset. Each tropical cyclone and rainfall event has been assigned an ID number. For tropical cyclones resulting in zero loss, the table entry should be left blank. Additional tropical cyclones and rainfall events included in the modeling organization flood-event dataset should be added to the table in order of year and assigned an intermediate ID number within the bounding ID numbers.

As defined, a by-passing hurricane (ByP) is a hurricane which does not make landfall on Florida, but produces minimum damaging windspeeds or greater on Florida. For the by-passing hurricanes included in the table only, the hurricane intensity entered is the maximum windspeed at closest approach to Florida as a hurricane, not the windspeed over Florida.

- 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. The file name should include the abbreviated name of the modeling organization, the flood standards year, and the form name. Also include Form AF-2, Total Flood Statewide Loss Costs, in a submission appendix.

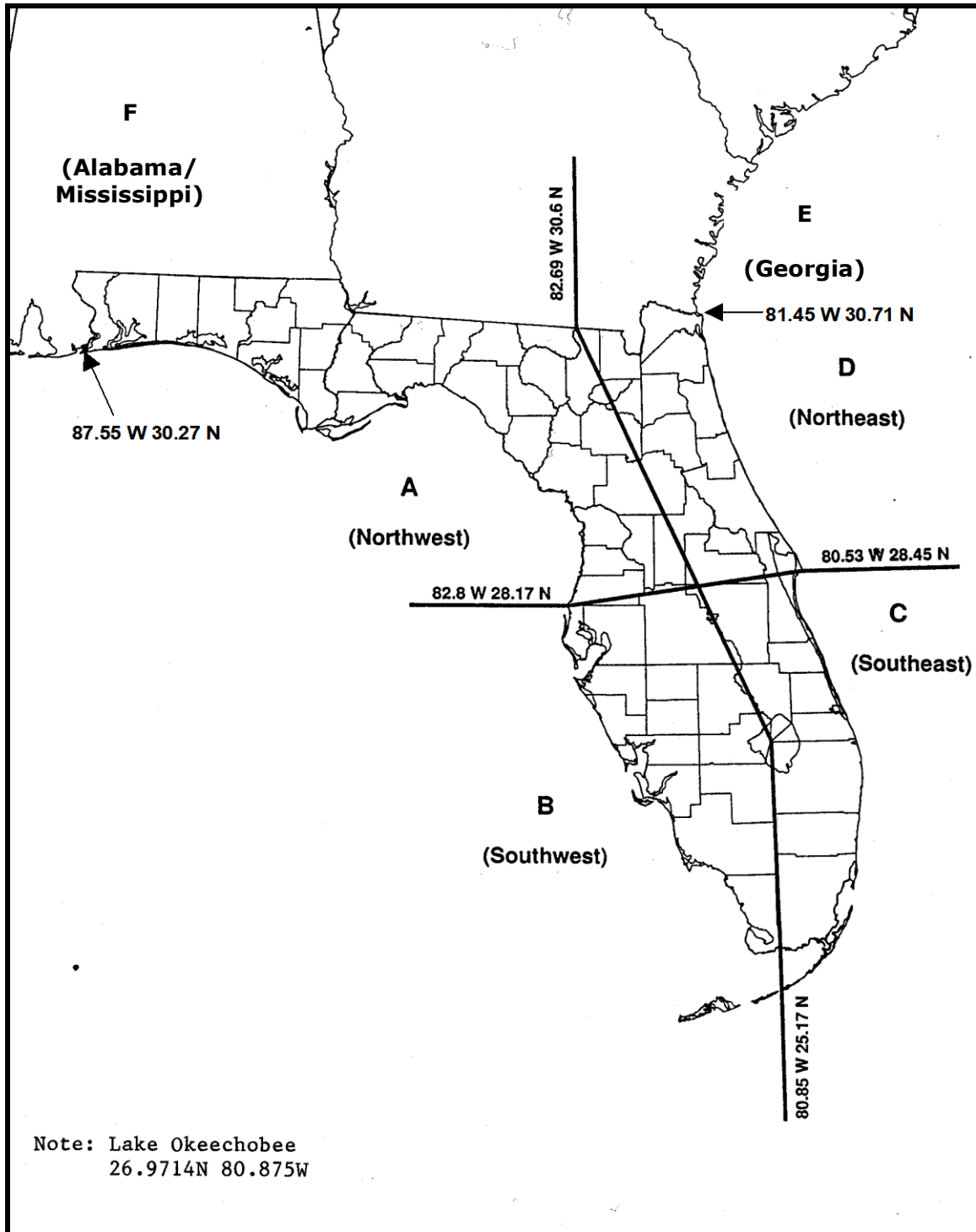


ID	Tropical Cyclone/ Hurricane Landfall/Closest Approach Date	Year	Name	Hurricane Landfall Region as defined in <i>Figure 3 - Category</i>	Personal Residential Insured Flood Losses (\$)
005	10/25/1921	1921	TampaBay06-1921	B-3	
010	09/18/1926	1926	GreatMiami07-1926	C-4/A-3	
015	09/17/1928	1928	LakeOkeechobee04-1928	C-4	
020	09/03/1935	1935	LaborDay03-1935	C-5/A-2	
025	08/31/1950	1950	Baker-1950	F-1/ByP-1	
030	09/05/1950	1950	Easy-1950	A-3	
035	10/18/1950	1950	King-1950	C-4	
040	09/26/1953	1953	Florence-1953	A-1	
045	10/09/1953	1953	Hazel-1953	B-1	
050	09/25/1956	1956	Flossy-1956	A-1	
055	09/10/1960	1960	Donna-1960	B-4	
060	09/15/1960	1960	Ethel-1960	F-1	
065	08/27/1964	1964	Cleo-1964	C-2	
070	09/10/1964	1964	Dora-1964	D-2	
075	10/14/1964	1964	Isbell-1964	B-2	
080	09/08/1965	1965	Betsy-1965	C-3	
085	06/09/1966	1966	Alma-1966	A-1	
090	10/04/1966	1966	Inez-1966	C-1	
095	10/19/1968	1968	Gladys-1968	A-1	
100	08/18/1969	1969	Camille-1969	F-5	
105	06/19/1972	1972	Agnes-1972	A-1	
110	09/23/1975	1975	Eloise-1975	A-3	
115	09/04/1979	1979	David-1979	C-2/E-2	
120	09/13/1979	1979	Frederic-1979	F-3	
125	09/02/1985	1985	Elena-1985	F-3/ByP-3	
130	11/21/1985	1985	Kate-1985	A-2	
135	10/12/1987	1987	Floyd-1987	B-1	
140	08/24/1992	1992	Andrew-1992	C-5	
145	08/03/1995	1995	Erin-1995	C-1/A-1	
150	10/04/1995	1995	Opal-1995	A-3	
155	07/19/1997	1997	Danny-1997	F-1	
160	09/03/1998	1998	Earl-1998	A-1	
165	09/25/1998	1998	Georges-1998	B-2/F-2	
170	10/15/1999	1999	Irene-1999	B-1	
175	06/04/2001	2001	Tropical Storm Allison- 2001	---	
180	08/13/2004	2004	Charley-2004	B-4	
185	09/05/2004	2004	Frances-2004	C-2	
190	09/16/2004	2004	Ivan-2004	F-3/ByP-3	
195	09/26/2004	2004	Jeanne-2004	C-3	
200	07/10/2005	2005	Dennis-2005	A-3	
205	08/25/2005	2005	Katrina-2005	C-1	
210	09/20/2005	2005	Rita-2005	ByP-2	
215	10/24/2005	2005	Wilma-2005	B-3	
220	08/18/2008	2008	Tropical Storm Fay-2008	---	
225	---	2009	Unnamed Storm in East Florida-May 2009	---	

ID	Tropical Cyclone/ Hurricane Landfall/Closest Approach Date	Year	Name	Hurricane Landfall Region as defined in <i>Figure 3 - Category</i>	Personal Residential Insured Flood Losses (\$)
230	---	2013	Unnamed Storm in Panhandle-July 2013	---	
235	09/02/2016	2016	Hermine-2016	A-1	
240	10/07/2016	2016	Matthew-2016	ByP-3	
245	0910/2017	2017	Irma-2017	B-4	
250	10/08/2017	2017	Nate-2017	F-1	
255	10/10/2018	2018	Michael-2018	A-5	
260	09/04/2019	2019	Dorian-2019	ByP-2	
265	09/16/2020	2020	Sally-2020	F-2	
270	10/28/2020	2020	Zeta-2020	ByP-3	
275	11/11/2020	2020	Eta-2020	ByP-1	
			<b>Total</b>		

Figure 3

## State of Florida and Neighboring States by Region



## Form AF-3: Personal Residential Standard Flood Losses by ZIP Code

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

- A. One or more automated programs or scripts should be used to generate and arrange the data in Form AF-3, Personal Residential Standard Flood Losses by ZIP Code.
- B. Provide the percentage of total personal residential zero deductible standard flood loss, rounded to four decimal places, and the modeled loss from the events listed below using the modeling-organization-specified, predetermined, and comprehensive exposure dataset.

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 in Panhandle (July 2013)  
Hurricane Matthew (2016)  
Hurricane Irma (2017)  
Hurricane Michael (2018)

- C. Provide maps color-coded by ZIP Code depicting the percentage total personal residential standard flood loss from each flood event using the following interval coding:

Red	> 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	> 0% to 0.1%
White	0%

- D. 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.
- E. Provide, in the format given in the file named "2021FormAF3.xlsx" in both Excel and PDF format, the total flood losses by ZIP Code. The file name should include the abbreviated name of the modeling organization, the flood standards year, and the form name.

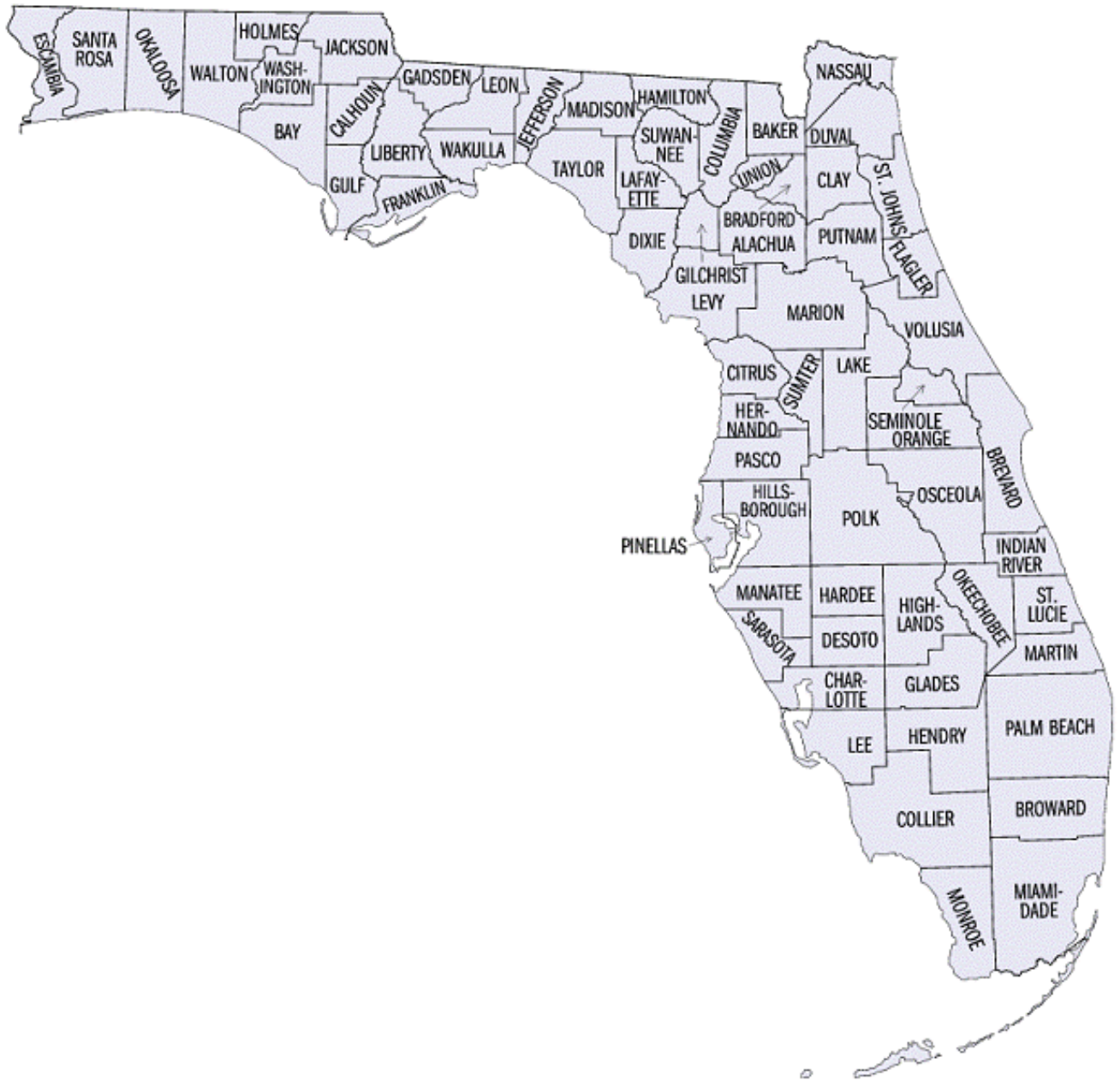
## Form AF-4: Flood Output Ranges

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. One or more automated programs or scripts should be used to generate the personal residential flood output ranges in the format shown in the file named “2021FormAF4.xlsx.”
- B. Provide this form in Excel format. The file name should include the abbreviated name of the modeling organization, the flood standards year, and the form name. Also include Form AF-4, Flood Output Ranges, in a submission appendix.
- C. Provide flood loss costs, rounded to three decimal places, by county (*Figure 4*). Within each county, flood loss costs should 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 should 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 is to be developed from the modeling-organization-specified, predetermined, and comprehensive exposure dataset except for insured values and deductibles information. Insured values are to be based on the 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).
- D. 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 flood model submission document of those rating areas or geographic zones where this occurs.
- E. 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 flood model submission document of the rating areas or geographic zones where this occurs.
- F. NA should be used in cells to signify no exposure.
- G. Describe how Law and Ordinance is included in the flood output ranges.
- H. 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.

Figure 4

## State of Florida by County



## Flood Output Range Specifications

<u>Policy Type</u>	<u>Assumptions</u>
<b>Owners</b>	<p><b>Coverage A = Building Property</b></p> <ul style="list-style-type: none"><li>• Coverage A limit = \$100,000</li><li>• Replacement cost equal to Coverage A limit</li><li>• Deductible = \$1,500</li></ul> <p><b>Coverage B = Personal Property</b></p> <ul style="list-style-type: none"><li>• Coverage B limit = \$40,000</li><li>• Actual cash value equal to Coverage B limit</li><li>• Deductible = \$1,000</li></ul> <p><b>Time Element Coverage</b></p> <ul style="list-style-type: none"><li>• To be defined by the modeling organization</li></ul> <p>✧ Flood loss costs per \$1,000 should 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</p>
<b>Renters</b>	<p><b>Coverage B = Personal Property</b></p> <ul style="list-style-type: none"><li>• Coverage B limit = \$50,000</li><li>• No coverage for tenant improvements</li><li>• Deductible = \$1,000</li><li>• Actual cash value equal to Coverage B limit</li></ul> <p><b>Time Element Coverage</b></p> <ul style="list-style-type: none"><li>• To be defined by the modeling organization</li></ul> <p>✧ Flood loss costs per \$1,000 should be related to the Coverage B limit for Coverage B and to the Time Element limit for Time Element Coverage</p>

**Policy Type****Assumptions****Condo Unit Owners****Coverage A = Building Property**

- Coverage A limit = 10% of Coverage B limit
- Replacement cost equal to Coverage A limit

**Coverage B = Personal Property**

- Coverage B limit = \$50,000
- Actual cash value equal to Coverage B limit
- Deductible = \$500

**Time Element Coverage**

- To be defined by the modeling organization

- ✧ Flood loss costs per \$1,000 should 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 Property**

- Coverage A limit = \$50,000
- Replacement cost equal to Coverage A limit
- Deductible = \$500

**Coverage B = Personal Property**

- Coverage B limit = \$25,000
- Actual cash value equal to Coverage B limit

**Time Element Coverage**

- To be defined by the modeling organization

- ✧ Flood loss costs per \$1,000 should 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-5: Percentage Change in Flood Output Ranges

**Purpose:** This form illustrates the impact of changes in the flood model on the flood loss cost output ranges from the currently accepted flood model.

- A. One or more automated programs or scripts should be used to generate and arrange the data in Form AF-5, Percentage Change in Flood Output Ranges.
- B. Provide summaries of the percentage change in average flood loss cost output range data compiled in Form AF-4, Flood Output Ranges, relative to the equivalent data compiled from the currently accepted flood model in the format shown in the file named *"2021FormAF5.xlsx."*

For the change in flood output range exhibit, provide the summary by regions as defined in *Figure 1* (Panhandle, North Florida, Southwest Florida, East Florida, and Southeast Florida) and Statewide (overall percentage change). The East Florida Region boundary in Orange and Polk Counties is based on the South Florida Water Management District boundary.

- C. Provide this form in Excel format. The file name should include the abbreviated name of the modeling organization, the flood standards year, and the form name. Also include all tables in Form AF-5, Percentage Change in Flood Output Ranges, in a submission appendix.
- D. Provide color-coded maps by county reflecting the percentage changes in the average flood loss costs with specified deductibles for frame owners, masonry owners, frame renters, masonry renters, frame condo unit owners, masonry condo unit owners, and manufactured homes from the flood output ranges from the currently accepted flood model.

Counties with a negative percentage change (reduction in flood loss costs) should be indicated with shades of blue, counties with a positive percentage change (increase in flood loss costs) should be indicated with shades of red, and counties with no percentage change should be white. The larger the percentage change in the county, the more intense the color-shade.

Figure 1

## State of Florida by Region



## Form AF-6: Logical Relationships to Flood Risk (Trade Secret Item)

Purpose: This form provides an illustration of the flood loss cost relationships among deductible, policy form, construction type, coverage, year of construction, foundation type, number of stories, lowest floor elevation and for coastal flooding, the flood loss cost relationship with distance to the closest coast.

- A. One or more automated programs or scripts should be used to generate the exhibits in Form AF-6, Logical Relationships to Flood Risk (Trade Secret Item).
- B. Provide the logical relationship to flood risk exhibits in the format shown in the file named “2021FormAF5.xlsx.”
- C. 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 “NotionalInput21\_Flood.xlsx.” Refer to the Notional Standard Flood Policy Specifications below for additional modeling information.

Exhibit	Notional Set
Deductible Sensitivity	Set 1
Policy Form Sensitivity	Set 2
Construction Sensitivity	Set 3
Coverage Sensitivity	Set 4
Year Built Sensitivity	Set 5
Foundation Type Sensitivity	Set 6
Number of Stories Sensitivity	Set 7
Lowest Floor Elevation of Residential Structure Sensitivity	Set 8

- D. Flood models are to treat points in Location Grid A as coordinates that would result from a geocoding process. Flood models should treat points by simulating flood loss at exact location or by using the nearest modeled parcel/street/cell in the flood model. Report results for each of the points in Location Grid A individually, unless specified. Flood loss cost per \$1,000 of exposure should be rounded to three decimal places.

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

- E. Provide graphical summaries to demonstrate the sensitivities for each Notional Set. *Figure 5* illustrates an example graphical representation of deductible sensitivities using the 2019 Florida Public Hurricane Loss Model data for frame owners from Notional Data Set 1.

Figure 5

Notional Set 1 – Deductible Sensitivities, Frame Owners

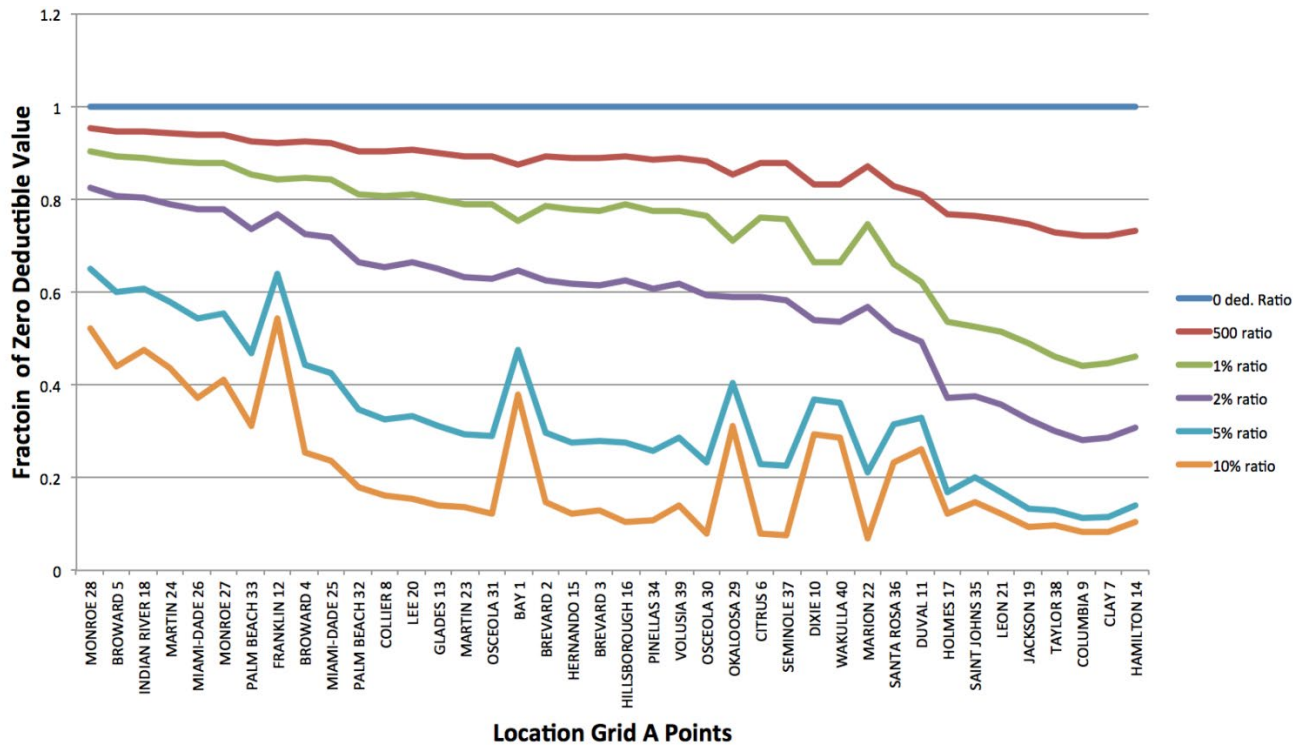


Figure 5 data is from the Florida Public Hurricane Loss Model Version 8.1 acceptable under the 2019 Hurricane Standards. Curves plotted are ratios of loss costs for specified deductibles to the corresponding zero deductible for each of the 40 locations in Location Grid A. The locations along the x-axis are given left to right in decreasing order of their zero-deductible loss cost.

- F. Create an exposure set and report flood loss cost results for slab foundation owners frame buildings (Notional Set 6) for each of the points in Location Grid B as described in the file “NotionalInput21\_Flood.xlsx.”
- G. Provide a color-coded contour or high-resolution 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).
- H. Describe how Law and Ordinance is included in the flood loss costs.
- I. 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.

## Notional Standard Flood Policy Specifications

<u>Policy Type</u>	<u>Assumptions</u>
<b>Owners</b>	<p><b>Coverage A = Building Property</b></p> <ul style="list-style-type: none"><li>• Coverage A limit = \$100,000</li><li>• Replacement cost equal to Coverage A limit</li></ul> <p><b>Coverage B = Personal Property</b></p> <ul style="list-style-type: none"><li>• Coverage B limit = \$40,000</li><li>• Actual cash value equal to Coverage B limit</li></ul> <p><b>Time Element Coverage</b></p> <ul style="list-style-type: none"><li>• To be defined by the modeling organization</li></ul> <p>✧ Flood loss costs per \$1,000 should be specified for each coverage limit</p>
<b>Renters</b>	<p><b>Coverage B = Personal Property</b></p> <ul style="list-style-type: none"><li>• Coverage B limit = \$50,000</li><li>• No coverage for tenant improvements</li><li>• Actual cash value equal to Coverage B limit</li></ul> <p><b>Time Element Coverage</b></p> <ul style="list-style-type: none"><li>• To be defined by the modeling organization</li></ul> <p>✧ Flood loss costs per \$1,000 should be related to the Coverage B limit</p>
<b>Condo Unit Owners</b>	<p><b>Coverage A = Building Property</b></p> <ul style="list-style-type: none"><li>• Coverage A limit = 10% of Coverage B limit</li><li>• Replacement cost equal to Coverage A limit</li></ul> <p><b>Coverage B = Personal Property</b></p> <ul style="list-style-type: none"><li>• Coverage B limit = \$50,000</li><li>• Actual cash value equal to Coverage B limit</li></ul> <p><b>Time Element Coverage</b></p> <ul style="list-style-type: none"><li>• To be defined by the modeling organization</li></ul> <p>✧ Flood loss costs per \$1,000 should be related to the Coverage B limit</p>

**Policy Type**

**Assumptions**

**Manufactured Homes**

**Coverage A = Building Property**

- Coverage A limit = \$50,000
- Replacement cost equal to Coverage A limit

**Coverage B = Personal Property**

- Coverage B limit = \$25,000
- Actual cash value equal to Coverage B limit

**Time Element Coverage**

- To be defined by the modeling organization

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

## Form AF-7: Percentage Change in Logical Relationships to Flood Risk

Purpose: This form illustrates the impact of changes in the flood model on the logical relationship to flood risk exhibits from the currently accepted flood model.

- A. One or more automated programs or scripts should be used to generate the exhibits in Form AF-7, Percentage Change in Logical Relationships to Flood Risk.
- B. Provide summaries of the percentage change in logical relationship to flood risk exhibits from the currently accepted flood model in the format shown in the file named *"2021FormAF7.xlsx."*
- C. Create exposure sets for each exhibit by modeling all of the coverages from the appropriate Notional Set listed below at each of the locations in Location Grid B as described in the file *"NotionalInput21\_Flood.xlsx."* Refer to the Notional Hurricane Policy Specifications provided in Form AF-6, Logical Relationships to Flood Risk (Trade Secret Item), for additional modeling information.

Exhibit	Notional Set
Deductible Sensitivity	Set 1
Policy Form Sensitivity	Set 2
Construction Sensitivity	Set 3
Coverage Sensitivity	Set 4
Year Built Sensitivity	Set 5
Foundation Type Sensitivity	Set 6
Number of Stories Sensitivity	Set 7
Lowest Floor Elevation of Residential Structure Sensitivity	Set 8

- D. Flood models are to treat points in Location Grid B as coordinates that would result from a geocoding process. Flood models should treat points by simulating flood loss at exact location or by using the nearest modeled parcel/street/cell in the flood model. Provide the results statewide (overall percentage change) and by the regions defined in Form AF-5, Percentage Change in Flood Output Ranges.
- E. Provide this form in Excel format. The file name should include the abbreviated name of the modeling organization, the flood standards year, and the form name. Also include all exhibits in Form AF-7, Percentage Change in Logical Relationships to Flood Risk, in a submission appendix.

## Form AF-8: 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. One or more automated programs or scripts should be used to generate and arrange the data in Form AF-8, Flood Probable Maximum Loss for Florida.
- B. Provide the expected flood loss and 10% (lower bound) and 90% (upper bound) flood loss levels for each of the Personal Residential Annual Exceedance Probabilities given in Part A, Annual Aggregate and Part B, Annual Occurrence. Describe how the uncertainty in flood vulnerability functions has been propagated to the uncertainty in portfolio loss and how it relates to the 10% and 90% flood loss levels. If the modeling methodology does not allow the flood model to produce a viable answer for certain exceedance probabilities, state so and why.
- 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 this form in Excel format. The file name should include the abbreviated name of the modeling organization, the flood standards year, and the form name. Also include Form AF-8, Flood Probable Maximum Loss for Florida, in a submission appendix.



**Part A – Personal Residential Flood Probable Maximum Loss for Florida – Annual Aggregate**

<b>Annual Exceedance Probability</b>	<b>Expected Flood Loss Level</b>	<b>10% Loss Level</b>	<b>90% Loss Level</b>
Top Event			
0.001			
0.002			
0.004			
0.01			
0.02			
0.05			
0.10			
0.20			

**Part B – Personal Residential Flood Probable Maximum Loss for Florida – Annual Occurrence**

<b>Annual Exceedance Probability</b>	<b>Expected Flood Loss Level</b>	<b>10% Loss Level</b>	<b>90% Loss Level</b>
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\*

(\*Significant Revision)

- A. Flood model functionality and technical descriptions shall be documented formally in an archival format separate from the use of correspondence including emails, presentation materials, and unformatted text files.**
- B. A primary document repository shall be maintained, containing or referencing a complete set of documentation specifying the flood model structure, detailed software description, and functionality. Documentation shall be indicative of current model development and software engineering practices.**
- C. All computer software (i.e., user interface, scientific, engineering, actuarial, data preparation, and validation) relevant to the flood model shall be consistently documented and dated.**
- D. The following shall be maintained: (1) a table of all changes in the flood model from the currently accepted flood model to the initial submission this year, and (2) 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.**
- F. A list of all externally acquired currently used flood model-specific software and data assets shall be maintained. The list shall include (1) asset name, (2) asset version number, (3) asset acquisition date, (4) asset acquisition source, (5) asset acquisition mode (e.g., lease, purchase, open source), and (6) length of time asset has been in use by the modeling organization.**

**Purpose:** To capture all aspects of *documenting* the flood model. Documentation enables the modeling organization personnel to create a shared, formal flood model organizational structure of all information specifically related to the flood model. This structure (1) may include many forms of media such as printed documentation, diagrams, and time-based media such as animations, and (2) may be implemented on one or more platforms.

**Relevant Form:** GF-7, Computer/Information Flood Standards Expert Certification

## **Audit**

1. The primary document repository, containing or referencing full documentation of the software in either electronic or physical form, and its maintenance process will be reviewed.
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 and data will be reviewed.
6. The list of all externally acquired flood model-specific software and data assets will be reviewed.
7. The tables specified in Flood Standard CIF-1.D that contain the items listed in Flood Standard GF-1, Scope of the Flood Model and Its Implementation, Disclosure 8 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 Organization and Component Design, CIF-4, Flood Model Implementation, CIF-5, Flood Model Verification, and CIF-7, Flood Model Maintenance and Revision.
8. Tracing of the flood model changes specified in Flood Standard GF-1, Scope of the Flood Model and Its Implementation, Disclosure 8 and Audit 9 through all Computer/Information Flood Standards will be reviewed.

## CIF-2 Flood Model Requirements\*

(\*Significant Revision)

***A complete set of requirements for each software component, as well as for each database or data file accessed by a component, shall be maintained. Requirements shall be updated whenever changes are made to the flood model.***

**Purpose:** To define an initial stage of flood model development. 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 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 subsequent design (Flood Standard CIF-3, Flood Model Organization and Component Design), implementation (Flood Standard CIF-4, Flood Model Implementation), and verification (Flood Standard CIF-5, Flood Model Verification) 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 FLOOD LOSS COSTS. Write the low-level code in Java.
4. ***Network Organization:*** For example, the use of multiple platforms, client-server layout, and cloud services.
5. ***Documentation:*** For example, use Acrobat PDF for the layout language, and add PDF hyperlinks in documents to connect the sub-documents.
6. ***Data:*** For example, store the flood vulnerability data in an Excel spreadsheet using a different sheet for each construction type.

7. **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.
8. **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).
9. **Security:** For example, store tapes off-site, with incremental daily backups. Password-protect all source files.
10. **Quality Assurance:** For example, filter insurance claims data against norms and extremes created for the last project.

Relevant Form: GF-7, Computer/Information Flood Standards Expert Certification

### **Disclosure**

1. Provide a description of the flood model and platform(s) documentation for interface, human factors, functionality, system 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 Organization and Component Design\*

(\*Significant Revision)

**A. The following shall be maintained and documented: (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, (4) network organization, and (5) system model representations associated with (1)-(4) above. Documentation shall be to the level of components that make significant contributions to the flood model output.**

**B. All flowcharts (e.g., software, data, and system models) in the submission or in other relevant documentation shall be based on (1) a referenced industry standard (e.g., UML, BPMN, SysML), or (2) a comparable internally-developed standard which is separately documented.**

Purpose: To *design* the flood model once requirements (Flood Standard CIF-2, Flood Model Requirements) have been specified. The software system (comprised of code and data) and the business process (composed of people and information flows) are designed as a collection of interconnected components. Flood models are designed to function over networks and sometimes are embedded in more than one platform. Networks include component nodes such as router, client, server, and cloud.

Flood model components are frequently specified in hierarchical flowcharts and diagrams. Example components might include: FLOOD, TERRAIN, FLOOD ELEVATION OR DEPTH, WAVE CONDITIONS, FLOOD EXTENT, DAMAGE, and FLOOD LOSS COSTS, and the major sub-components of each. The purpose of each example component is, as follows:

1. FLOOD 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 OR DEPTH, WAVE CONDITIONS, and FLOOD EXTENT;
3. FLOOD ELEVATION OR DEPTH accepts the output from FLOOD 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 OR 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 OR DEPTH, TERRAIN, and WAVE CONDITIONS and generates the horizontal limits of flooding for a flood event;
6. DAMAGE accepts the output from FLOOD ELEVATION OR DEPTH and WAVE CONDITIONS and generates flood damage to personal residential property;
7. FLOOD LOSS COSTS accepts the output from DAMAGE and generates flood loss costs.

Relevant Form: GF-7, 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,
  - 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), and
  - f. If the flood model is implemented on more than one platform, the detailed control and data flowcharts, component interface specifications, schema documentation for all data files, and detailed network flowcharts for each platform.
2. A flood model component custodian, or designated proxy, should be available for the review of each component.
3. The flowchart reference guide or industry standard reference will be reviewed.

## **CIF-4 Flood Model Implementation\***

*(Significant Revision)*

- A. A complete procedure of coding guidelines consistent with current software engineering practices shall be maintained.**
- B. Network organization documentation shall be maintained.**
- C. A complete procedure used in creating, deriving, or procuring and verifying databases or data files accessed by components shall be maintained.**
- D. All components shall be traceable, through explicit component identification in the flood model representations (e.g., flowcharts) down to the code level.**
- E. A table of all software components affecting flood loss costs and flood probable maximum loss levels shall be maintained 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.**
- F. 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.**
- G. The following documentation shall be maintained for all components or data modified by items identified in Flood Standard GF-1, Scope of the Flood Model and Its Implementation, Disclosure 8 and Audit 9:**
  - 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 G.1 above.**
- H. Flood model code and data shall be accompanied by documented maintenance, testing, and update plans with their schedules. The vintage of the code and data shall be justified.**

Purpose: To *implement* the flood model based on requirements (Flood Standard CIF-2, Flood Model Requirements) and design (Flood Standard CIF-3, Flood Model Organization and Component Design). The flood model implementation is created using computer software (i.e., code) and data. Elements formed in the design stage should be fully traceable to components of the implementation. The design stage serves as an abstract, and often visual, representation of the underlying implementation comprised of code and data.



## **Disclosure**

1. Specify the hardware, operating system, and essential software required to use the flood model on a given platform.

## **Audit**

1. Sample code and data implementations will be selected and reviewed, for at least the meteorology, hydrology and hydraulics, vulnerability, and actuarial components.
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 Flood Standard CIF-4.E 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.
9. Unique aspects within various platforms with regard to the use of hardware, operating system, and essential software will be reviewed.
10. Network organization implementation will be reviewed.

11. Code and data maintenance plans, testing plans, update plans, and schedules will be reviewed. Justification for the vintage of code and data will be reviewed.

## **CIF-5 Flood Model Verification\***

*(Significant Revision)*

### **A. General**

***For each component, procedures shall be maintained 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. Testing software shall be used to assist in documenting and analyzing all components.***
- 2. Unit tests shall be performed and documented for each updated component.***
- 3. Regression tests shall be performed and documented on incremental builds.***
- 4. Integration 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. Testing software shall be used to assist in documenting and analyzing all databases and data files accessed by components.***
- 2. Integrity, consistency, and correctness checks shall be performed and documented on all databases and data files accessed by the components.***

**Purpose:** To ensure a correct mapping from executing the implementation (Flood Standard CIF-4, Flood Model Implementation) to previously specified requirements (Flood Standard CIF-2, Flood Model Requirements) and design (Flood Standard CIF-3, Flood Model Organization and Component Design). *Verification* requires tests to be run by varying component inputs to ensure correct output.

**Relevant Form:** GF-7, 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. Procedures for unit conversion verification will be reviewed.
2. 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.
3. The testing software used by the modeling organization will be reviewed.
4. The component (unit, regression, integration) and data test processes and documentation will be reviewed including compliance with independence of the verification procedures.
5. 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.
6. Flowcharts defining the processes used for manual and automatic verification will be reviewed.
7. Verification approaches used for externally acquired data, software, and models will be reviewed.

## **CIF-6 Human-Computer Interaction\***

*(\*New Flood Standard)*

- A. Interfaces shall be implemented as consistent with accepted principles and practices of Human-Computer Interaction (HCI), Interaction Design, and User Experience (UX) engineering.**
- B. Interface options used in the flood model shall be unique, explicit, and distinctly emphasized.**
- C. For a Florida rate filing, interface options shall be limited to those options found acceptable by the Commission.**

Purpose: To ensure that HCI, and relevant interfaces, meet the state of the art. HCI, Interaction Design, and UX engineering focus on promoting a high degree of usability with minimal ambiguity for the user. Interface options for a currently accepted flood model should have a single option, e.g., labeled FCHLPM with the currently accepted model name and version number.

Relevant Form: GF-7, Computer/Information Flood Standards Expert Certification

### **Disclosure**

1. Identify procedures used to design, implement, and evaluate interface options.

### **Audit**

1. External and internal user interfaces will be reviewed.
2. Documentation related to HCI, Interaction Design, and UX engineering will be reviewed.
3. The decision process specifying the logic of interface option selections, when an acceptable flood model is selected, will be reviewed.

## **CIF-7 Flood Model Maintenance and Revision\***

*(\*Significant Revision)*

- A. A clearly written policy shall be implemented for review, maintenance, and revision of the flood model and network organization, 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. Tracking software shall be used to identify and describe all errors, as well as modifications to code, data, and documentation.**
- D. A list of all flood model versions since the initial submission for this year shall be maintained. Each flood model description shall have a unique version identification and a list of additions, deletions, and changes that define that version.**

Purpose: To create a formal procedure for identifying, organizing, and *maintaining flood model versions*. Flood model software, data, and documentation are stored in an online system that tracks all editing changes by author and change date.

Relevant Form: GF-7, 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 Flood Standard CIF-7.D will be reviewed.

## **CIF-8 Flood Model Security\***

*(\*Significant Revision)*

***Security procedures shall be implemented and fully documented 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: To ensure that the flood model is *secured* against unauthorized access. Security procedures are necessary to maintain an adequate, secure, and correct base for code, data, and documentation of the flood model and platforms. 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.

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### **Disclosure**

1. Describe methods used to ensure the security and integrity of the code, data, and documentation. These methods include the security aspects of each platform and its associated hardware, software, and firmware.

### **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.
3. Security aspects of each platform will be reviewed.
4. Network security documentation and network integrity assurance procedures will be reviewed.

# **WORKING DEFINITIONS OF TERMS**



## **Working Definitions of Terms**

(These terms are applicable to the *Hurricane Standards Report of Activities* or the *Flood Standards Report of Activities*.)

### **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 property 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 and compliance with U.S. Qualification Standards of the American Academy of Actuaries as applicable to property catastrophe modeling.

### **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 Distribution:**

For Commission purposes, the probability distribution of the sum of all losses that are expected to occur for all modeled hurricane events in each year or for all modeled flood events in each year.

### **Annual Exceedance Probability:**

Probability of an annual loss outcome greater than a specified value. Reciprocal of the return period.

### **Annual Occurrence Loss Distribution:**

For Commission purposes, the probability distribution of the largest loss that is expected to occur for all modeled hurricane or flood events in each year.

### **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 may 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.

**Astronomical Tide:**

The periodic variation in sea surface that results from gravitational attraction of the sun and moon without any atmospheric influence.

**Atlantic Basin:**

The area including the entire North Atlantic Ocean, the Caribbean Sea, and the Gulf of Mexico.

**Average Annual Loss (AAL):**

The expected value of the annual aggregate loss distribution.

**Base Hurricane Storm Set:**

The historical storm set used to calibrate and validate simulated hurricanes impacting Florida and adjacent states, as defined in Hurricane Standard M-1, Base Hurricane Storm Set.

**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 on Florida, but produces minimum damaging windspeeds or greater on land in Florida.

**Calibration:**

Process of adjusting values of model input parameters in an attempt to fit appropriate target datasets.

**Catastrophe:**

A natural or man-made event that causes more than \$25 million in insured losses as defined by Property Claims Services.

**Center:**

The point inside the eye of a hurricane where the wind is calm and about which the vortex winds rotate.

**Characteristics (Output):**

For Commission purposes, resulting values or datasets which are generated by the model through a process of analyzing, evaluating, interpreting, or performing calculations on parameters (input).

**Civil Engineer:**

Licensed professional engineer whose practice covers the design, analysis, evaluation, and construction of building foundations and structures.

**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.*

**Code Refactoring:**

Reviewing computer source code to improve nonfunctional attributes of the software through a continuous and sustained code improvement effort. Refactoring involves methods to reduce code complexity, improve readability and extensibility, including unit testing.

**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.

**Commercial Residential Property Insurance:**

The type of coverage provided by condominium association, cooperative association, apartment building, and similar policies, including covering the common elements of a homeowners' association; see s. 627.4025, F.S.

**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.*

**Components and Cladding:**

Elements of the building envelope that do not qualify as part of the main wind-force resisting system.

**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.

**Control Flow:**

The sequence in which operations are performed during the execution of a computer program. *Contrast with: Data Flow.*

**Conversion Factor:**

(1) The ratio of the one-minute 10-meter wind to a reference wind (e.g., another level, gradient wind, or boundary layer depth-average). (2) 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 Scientific and Technical Literature:**

A refereed or peer-reviewed publication 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.

**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 current scientific and technical literature.

**Currently Accepted Model:**

(1) The flood model determined acceptable under the 2017 flood standards. (2) The hurricane model determined acceptable under the 2019 hurricane standards.

**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 hurricane models for purposes of residential rate filings in Florida and flood models for purposes of personal 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 Wave Action:**

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).

**Decay Rate:**

The rate at which surface windspeeds decrease and central pressure increases in a tropical cyclone. Tropical cyclones weaken or decay as central pressure rises. Once tropical cyclones move over land, their rate of decay is affected not only because of the removal of their warm water energy source, but also because of surface roughness. The surface roughness contribution to filling is expected to vary spatially. *See also: Weakening.*

**Demand Surge:**

A sudden and generally temporary increase in material and labor costs which occurs following a catastrophic event.

**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 (cf/s).

**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.

**Elevation:**

Vertical distance above or below a specific vertical datum.

**Erosion (Flood Induced):**

The wearing away, collapse, undermining or subsidence of land during a flood.

**Event:**

For purposes of modeling hurricane losses, an event is any hurricane that makes landfall in Florida as a hurricane or by-passes Florida as a hurricane but comes close enough to cause damaging winds in Florida.

**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.

**Far-Field Pressure:**

The background environmental surface pressure of a tropical cyclone far from the tropical cyclone's center. The difference between the far-field and minimum central pressure is related to the tropical cyclone maximum wind.

**Filling Rate:**

*Synonym: Decay Rate.*

**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 Barrier:**

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.

**Flood-borne 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 or storm surge.

**Flood Conditions:**

Physical characteristics associated with flooding such as extent and elevation or depth, flow velocity, waves, duration, erosion, salinity, contamination, debris.

**Flood Depth (Hazard):**

Flood elevation minus ground elevation.

**Flood Depth (Vulnerability):**

Flood elevation minus lowest floor elevation. For coastal floods, flood depth is measured: (1) from the wave crest elevation or from the water surface including wave runup, or (2) from the stillwater elevation, provided however, that wave conditions are incorporated into vulnerability functions.

**Flood Duration:**

The length of time in which an area or building is inundated by floodwaters.

**Flood Elevation:**

Elevation of the water surface relative to a vertical datum. 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, unless wave conditions are incorporated into vulnerability functions.

**Flood Extent:**

The horizontal limits of a given flood event, occurring where the ground elevation equals the flood elevation.

**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., 0.01 annual probability) is a flood that has a 0.01 probability of being equaled or exceeded in any year.

**Flood, Inland:**

Flood not of coastal origin. Inland floods typically are due to rainfall, runoff, ponding, and include riverine floods, lacustrine floods, and surface water flooding.

**Flood Inundation:**

The rising of a body or source of water and its overflowing onto normally dry land.

**Flood, Lacustrine:**

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.

**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 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, Riverine:**

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.



**Flood, Surface Water:**

Flooding caused by the accumulation of above-ground water which is not associated with a specific watercourse or water body, including flooding of urban areas (e.g., streets).

**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.

**Flow Velocity:**

The velocity of water as it moves within a channel or over land, usually quantified in feet per second (ft/s).

**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 flow of data and control, and flow of information in a system comprised of people and machines.

**Forward Speed:**

The forward speed at which a tropical cyclone is moving along the earth's surface. This is not the speed at which winds are circulating around the tropical cyclone. A forward speed of 3 mph is slow; a forward speed of 10-15 mph is average; a forward speed of 20-30 mph is fast.

**Frequency Distribution:**

Division of a sample of observations into a number of classes together with the number of observations in each class.

**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.

**Guaranteed Replacement Cost:**

A policy provision in which the insurer agrees to pay losses on a replacement cost basis even if in excess of the policy limit.

**Gust Factor:**

Maximum ratio of the windspeed averaged over a short interval of time (such as 3 or 10 seconds) to the mean windspeed.

**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 1950s. 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-Computer Interaction (HCI):**

A multidisciplinary field focusing on the interactions between humans (i.e., users) and computer technology. The principles of HCI focus on the design of user interfaces and common design guidelines for improving the usability of user interfaces.

**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.

**Hurricane Characteristic:**

An output of the hurricane model. Examples are modeled windspeed at a particular location, track, and intensity variation.

**Hurricane Mitigation Measure:**

A factor or function that improves a structure's resistance to wind, water infiltration, or missile impact.

**Hurricane Parameter:**

An input (generally stochastic) to the hurricane model. Examples are radius of maximum wind, maximum wind, profile factor, and instantaneous speed and direction of motion.

**Hydraulic Structure:**

A submerged or partially submerged structure that conveys, controls, or modifies the natural flow of water (e.g., bridges, culverts, canals).

**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.

**Initial Soil Conditions:**

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 initial conditions of soil can have a large impact on rainfall runoff, due to the ability (or inability) of the soil to absorb water. Initial moisture conditions of a soil can be affected by groundwater levels or recent rainfall events.

**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.

**Integration Test:**

A test to ensure the correctness of all components when operating as a whole.

**Intensity:**

The maximum one-minute sustained surface (i.e., 10-meter) winds measured near the center of a tropical cyclone.

**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.

**Inverse Barometer Effect:**

A response in sea level to a change in atmospheric pressure.

**Isotach:**

A line of constant windspeed.

**Landfall:**

A landfall has occurred when the center of tropical cyclone circulation crosses the coastline from sea to land.

**Landfall Frequency Distribution:**

Frequency distribution of hurricanes whose centers have crossed the coastline from water (Atlantic Ocean or Gulf of Mexico) to land. For hurricane paths that, for example, roughly parallel the coastline with multiple crossings, a single count of the initial crossing should be used in the frequency distribution.

**Law and Ordinance Coverage:**

Coverage for loss to the undamaged portion of the building if municipal ordinance or code may require that a partially damaged building be demolished; the cost of demolition of the undamaged portions of the building, if it is mandated by the building, zoning, or land use ordinance or law; any increased expenses incurred to upgrade, repair, or replace the building with one conforming to the current building laws or ordinances.

**Licensed Professional Engineer:**

Professional engineer who has met specific qualification standards in education, work experience, and examinations and has been licensed by a state licensure board.

**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 of exposure.

**Loss Exceedance Estimate:**

The loss amount which would be exceeded at a given level of probability based on a specific exposure dataset.

**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.

**Major Flood Control Measure:**

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.

**Manning's  $n$ :**

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).

**Mapping of ZIP Codes:**

Either a point estimate or a physical geographic area.

**Maximum Windspeed:**

The peak one-minute, 10-meter winds in a hurricane. Depending on context, maximum windspeed may also refer to the strongest gradient wind.

**Mean Windspeed:**

The time average surface (10-meter) windspeed at a location. One minute is used to define the Saffir-Simpson Hurricane Wind Scale.

**Miles Per Hour (mph):**

Standard unit of windspeed measurement.

**Millibar (mb):**

Unit of air pressure. *See also:* **Minimum Central Pressure.**

**Minimum Central Pressure:**

The minimum surface pressure at the center of a tropical cyclone. The atmosphere exerts a pressure force measured in millibars. Average sea level pressure is 1013.25 millibars. Tropical cyclones have low pressure at the center of the cyclone. For a tropical cyclone of a given radius, lower central pressure corresponds to stronger surface windspeeds and storm surge height. The lowest pressure ever measured in a hurricane in the Atlantic basin was 882 mb in Hurricane Wilma (2005).

**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 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 Management:**

The processes associated with the model lifecycle, including design, creation, implementation, verification, validation, maintenance, and documentation of the model.

**Model Organization:**

The structure of components in a program/system, their interrelationships, and the principles and guidelines governing their design and evolution over time.

**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.

**Modeling Organization:**

The entity(s) encompassing the requisite qualifications and experience (as found in Hurricane Standard G-2, Qualifications of Modeling Organization Personnel and Consultants Engaged in Development of the Hurricane Model and Flood 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 or flood loss projections used in personal residential rate filings.

**Modification Factor:**

A scalar adjustment to a vulnerability function that may increase or decrease the amount of change.

**Modification Function:**

Adjusts a vulnerability function and may vary over its range.

**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.

**NFIP Flood Model:**

A collection of hydrologic and hydraulic analyses adopted by a community as part of an NFIP FIS.

**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.

**Network Organization:**

A configuration of computer-based nodes and communication links which connect nodes.

**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.



**NWS:**

The National Weather Service, a division of NOAA.

**Parameters (Input):**

For Commission purposes, values entered into the model which are used, singularly or in combination, to calculate a characteristic (output).

**Parcel:**

Official land boundary defining the legal extent of a property.

**Peak Gust:**

Highest surface (i.e., 10-meter) wind recorded, generally in a 2- to 3-second interval.

**Peak Hurricane Intensity:**

The peak intensity over the lifetime of a hurricane estimated as the maximum one-minute sustained surface (i.e., 10-meter) winds near the center of the hurricane. *See also: Intensity.*

**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. 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.

**Platform:**

The unique combination of hardware, operating system, and essential software required as a base for the model implementation.

**Position:**

The position of a hurricane is the latitude and longitude of its center.

**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. 627.041(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 residential exposures in Florida. Modeling organizations can determine the PML on various bases depending on the needs of the user.

**Professional Engineer:**

A person engaged in the professional practice of rendering service or creative work requiring education, training, and experience in engineering sciences and the application of special knowledge of the mathematical, physical, and engineering sciences in such professional or creative work as consultation, investigation, evaluation, planning or design of public or private utilities, structures, machines, processes, circuits, buildings, equipment or projects, and supervision of construction for the purpose of securing compliance with specifications and design for any such work (National Society of Professional Engineers).

**Profile Factor:**

A hurricane parameter input to the hurricane model that controls the radial structure of the tropical cyclone winds independently of Rmax and Vmax.

**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.

**Radius of Maximum Winds (Rmax):**

Distance from the center of a hurricane to the strongest winds.

**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.

**Recurvature:**

A change in the track of a storm that causes the storm to move continuously from west to east (rather than from east to west as in the tropics), usually also increasing in forward speed. Recurvature happens when the storm moves into the subtropical westerlies.

**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.

**Reinsurance:**

An arrangement by which one insurer (the ceding insurer) transfers all or a portion of its risk under a policy or group of policies to another insurer (the reinsurer). Thus reinsurance is insurance purchased by an insurance company from another insurer, to reduce risk for the ceding insurer.

**Replacement Cost:**

The cost to replace damaged property with a new item of like kind and quality.

**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.

**Residential Property Insurance:**

See s. 627.4025, F.S. *See also:* **Commercial Residential Property Insurance** and **Personal Residential Property Insurance**.

**Return Period:**

The reciprocal of an annual exceedance probability of a given loss or event.

**Roughness:**

Surface characteristics capable of disrupting airflow. Roughness elements may be natural (e.g., mountains, trees, grasslands) or man-made (e.g., buildings, bridges).

**Saffir-Simpson Hurricane Wind Scale:**

A scale ranging from one-to-five based on a hurricane's sustained windspeed. This scale estimates potential property damage from hurricane winds. *Reference:* Saffir-Simpson Hurricane Wind Scale provided in Hurricane Standard M-3, Hurricane Probabilities.

**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.

**Significant Revision:**

Any revision to a standard, disclosure, form, or audit item. Note: This does not include editorial revisions.

**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:**

Sea, Lake and Overland Surges from Hurricanes (SLOSH) is a 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 the 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.

**Stillwater Flood Depth:**

Stillwater elevation minus ground elevation.

**Storm Heading:**

The direction towards which a storm is moving. Angle is measured clockwise from north (0°) so that east is 90°, etc.

**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 trajectory of a tropical cyclone center.

**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.**

**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 unit, aggregation, regression, and 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, rent and rental value, additional living expense, 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 Experience (UX) Engineering:**

The systematic and iterative process of designing, implementing, and evaluating the interactions between humans (i.e., users) and computer technology, particularly user interfaces. UX engineering is closely related to Human-Computer Interaction (HCI), but focuses on the process that user interfaces are iteratively created, rather than the design principles that guide their initial creation.

**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.

**Vertical Datum:**

A base measurement point or set of points to which elevations are referenced.

**Vertical Wind Profile:**

The continuous variation of hurricane windspeed with height.

**Visualization:**

A two- or three-dimensional graphical display, chart, or plot meant to augment or replace a numerical table.

**Vmax (or maximum wind):**

The peak one-minute, 10-meter winds in a hurricane. Depending upon the context, Vmax may also refer to the strongest gradient wind.

**Vortex:**

The circularly-symmetric rotating wind and pressure fields of the hurricane.

**Vulnerability Assessment:**

A determination as to how likely a particular insured structure is to be damaged by a hurricane or flood and an estimate of the loss potential.

**Vulnerability Function (Flood):**

The curve that represents the damage ratios expected at various flood depths.

**Vulnerability Function (Wind):**

The curve that represents the damage ratios expected at various windspeeds.

**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 Infiltration (Wind):**

Rain entering a building during a tropical cyclone, not including water intrusion caused by flood.

**Water Intrusion (Flood):**

Penetration of water from outside the structure into the structure, by means not included in the definition of flood (e.g., sewer back-up, groundwater). Water intrusion does not include water infiltration during a tropical cyclone, or during other rain events.

**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 Proxy:**

A characterization that accounts for the presence of waves without modeling waves explicitly.

**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):**

Super-elevation of the water surface over normal storm surge elevation due to onshore mass transport of water by wave action alone.

**Weakening:**

A reduction in the maximum one-minute sustained 10-meter winds. *See also: Decay Rate.*

**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.

**ZIP Code Centroid:** Two types of centroids:

**Geographic Centroid:**

The geographic center of a ZIP Code.

**Population Weighted Centroid:**

The center determined by weighting the distribution of population over the ZIP Code.

# REFERENCES

## References

(These references are applicable to the *Hurricane Standards Report of Activities* or the *Flood Standards Report of Activities*.)

For the purposes of the hurricane and flood standards for hurricane and flood model specification adopted in the *Hurricane Standards Report of Activities* or in the *Flood Standards Report of Activities*, the following references or published datasets are listed. Subsequent revisions to these documents and datasets shall supersede the versions listed below.

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# **INQUIRIES OR INVESTIGATIONS**

## **INQUIRIES OR INVESTIGATIONS**

The Commission finds that since its activities are ongoing, it is appropriate to set out, as it did at the end of its previous year of inquiry and investigation, a list of matters which the Commission determines are subjects for further inquiry and investigation. These matters may be discussed during any Commission or Committee meeting. This list is not intended to be all-inclusive. The Commission anticipates that other matters will be added as they are identified. The Commission also notes that these matters as set out below imply no particular order of importance and no particular order regarding timing.

The Professional Team provides a report on the inquiries or investigations to the Commission prior to the Committee meetings.

### **Active Inquiries or Investigations**

There are no active inquiries at this time.

### **Previous Inquiries or Investigations**

There have been no previous inquiries.

# APPENDICES



## Acronyms

(These acronyms are applicable to the *Flood Standards Report of Activities* or the *Hurricane Standards Report of Activities*.)

AAL	Average Annual Loss
ACV	Actual Cash Value
AIR	AIR Worldwide Corporation
ALAE	Allocated Loss Adjustment Expense
ALE	Additional Living Expense
ARA	Applied Research Associates, Inc.
ASTM	American Society for Testing and Materials
BCEGS	Building Code Effectiveness Grading Schedule
BPMN	Business Process Model and Notation
ByP	By-Passing
CDF	Cumulative Distribution Function
CF	Conversion Factor
cf/s	Cubic Feet per Second
Commission	Florida Commission on Hurricane Loss Projection Methodology
CL	CoreLogic, Inc.
CP	Central Pressure
CS	Committee Substitute
EPR	Expected Percentage Reduction
EQE	EQECAT, Inc. (now CoreLogic, Inc.)
FBC	Florida Building Code
FCHLPM	Florida Commission on Hurricane Loss Projection Methodology
FEMA	Federal Emergency Management Agency
FFP	Far Field Pressure
FHCF	Florida Hurricane Catastrophe Fund
FIPS	Federal Information Processing Standards
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FPM	Florida Public Hurricane Loss Model
F.S.	Florida Statutes
ft/s	Feet per Second
FWMD	Florida Water Management District
GIS	Geographic Information System
HB	House Bill
HCI	Human-Computer Interaction
HO	Homeowner Insurance Policy
HUD	U.S. Department of Housing and Urban Development
HURDAT2	Hurricane Data 2 <sup>nd</sup> Generation
IF	Impact Forecasting
KCC	Karen Clark & Company
LAE	Loss Adjustment Expense
LHS	Latin Hypercube Sampling
LULC	Land Use Land Cover
mb	Millibar

MH	Manufactured Home Insurance Policy
mph	Miles per Hour
MRLC	Multi-Resolution Land Characteristics
<i>n</i>	Manning's 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
OIR	Office of Insurance Regulation
PBL	Planetary Boundary Layer
PML	Probable Maximum Loss
<i>r</i>	Radius
Rmax	Radius of Maximum Winds
RMS	Risk Management Solutions, Inc.
ROA	Report of Activities
<i>s</i>	Section of Florida Statutes
SA	Sensitivity Analysis
SB	Senate Bill
SBA	State Board of Administration
SLOSH	Sea, Lake, and Overland Surges from Hurricanes
SRC	Standardized Regression Coefficient
SysML	Systems Modeling Language
UA	Uncertainty Analysis
ULAE	Unallocated Loss Adjustment Expense
UML	Unified Modeling Language
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
UX	User Experience
Vmax	Maximum Velocity
VT	Translational Velocity
WGS	World Geodetic System
WSP	Windfield Shape Parameter
ZIP	Zone Improvement Plan

## Florida Statutes, 2021

### **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 for hurricane loss projections. The commission shall revise previously adopted actuarial methods, principles, standards, models, or output ranges no less than every 4 years for flood loss projections.
- (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.

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; s. 1, ch. 2017-142; s. 1 ch. 2019-35.

## **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 or excess 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. An insurer may issue flood insurance policies, contracts, endorsements, or excess coverage on a standard, preferred, customized, flexible, or supplemental basis.

(1) (a) Except for excess flood insurance policies, policies issued under this section include:

1. Standard flood insurance, which 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, which 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, which must include coverage that is broader than the coverage provided under standard flood insurance.
4. Flexible flood insurance, which 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, which 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, 2025, 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) An 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).
- (5) In addition to any other applicable requirements, an insurer providing flood coverage that is not excess 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 provide a written notice to be signed by the applicant before the agent places flood insurance coverage with an admitted or surplus lines insurer for a property receiving flood insurance under the National Flood Insurance Program. The notice 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; s. 2, ch. 2017-142; s. 11, ch. 2020-3; s. 22, ch. 2021-113.

## Meeting Schedule and Topics of Discussion

### 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

### 2017

May 22 & 23	Flood Standards Committee Meetings
June 15 & 16	Adoption of 2017 Flood Standards, Principles, and Acceptability Process
September 27 & 28	Flood Standards Committee Meetings
October 25	Adoption of Revised 2017 Flood Standards and <i>Flood Standards Report of Activities</i>

### 2019

October 29	Adoption of an Amendment to the 2017 Flood Standards Model Review Schedule in the <i>Flood Standards Report of Activities as of November 1, 2017</i> ; Adoption of 2019 Hurricane Standards and <i>Hurricane Standards Report of Activities</i>
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### 2020

April 28	Discussion of Flood Model Submissions and Determination of On-Site Reviews
December 10	KCC Flood Model Determined Acceptable under the 2017 Flood Standards; Adoption of Remote Review Procedures amending the 2017 <i>Flood Standards report of Activities</i> and the 2019 <i>Hurricane Standards Report of Activities</i>

**2021**

September 29 & 30      Flood Standards Committee Meetings

October 26 & 27      Adoption of 2021 Flood Standards, 2021 Hurricane Standards, *Flood Standards Report of Activities*, and *Hurricane Standards Report of Activities*

## 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
May 22 & 23, 2017	Lori Dezell, 850-251-1482
June 15 & 16, 2017	Lori Dezell, 850-251-1482
September 27 & 28, 2017	Lori Dezell, 850-251-1482
October 25, 2017	Lori Dezell, 850-251-1482
October 29, 2019	Lori Dezell, 850-251-1482
April 28, 2020	Lori Dezell, 850-251-1482
December 10, 2020	Lori Dezell, 850-251-1482
September 29 & 30, 2021	Lori Dezell, 850-251-1482
October 26 & 27, 2021	Lori Dezell, 850-251-1482

## **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](mailto: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 \$19.64.

Documentation is also available on the Commission website at [www.sbafla.com/methodology](http://www.sbafla.com/methodology).