**Actuarial FLOOD Standards**

**AF-1 Flood Modeling Input Data and Output Reports**

1. ***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.***
2. ***All modifications, adjustments, assumptions, inputs and input file identification, and defaults necessary to use the flood model shall be actuarially sound and shall be included with the flood model output report. Treatment of missing values for user inputs required to run the flood model shall be actuarially sound and described with the flood model output report.***

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

 Different modeling approaches may require different input data.

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

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

1. Describe actions performed to ensure the validity of insurer or other input data used for flood model inputs or validation/verification.
2. Disclose if changing the order of the flood model input exposure data produces different flood model output or results.
3. Disclose if removing or adding policies from the flood model input file affects the output for the remaining policies.

**Audit**

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

1. 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.
2. Explanation of the differences in data input and model output for coastal and inland flood modeling will be reviewed.

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

1. ***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.***

1. ***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

**Disclosures**

1. Describe how damage from model-generated floods (originating either inside or outside of Florida) is excluded or included in the calculation of flood loss costs and flood probable maximum loss levels for Florida.
2. Describe how wind losses associated with coastal 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 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 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 the model takes into account any damage resulting directly and solely from wind. Losses associated with flooding will be reviewed to determine the treatment of wind losses.
4. The flood model will be reviewed to determine how losses from water intrusion are identified and calculated.
5. The documented procedure for distinguishing flood-related 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**

1. ***The methods used in the calculation of personal residential structure flood loss costs shall be actuarially sound.***
2. ***The methods used in the calculation of personal residential appurtenant structure flood loss costs shall be actuarially sound.***
3. ***The methods used in the calculation of personal residential contents flood loss costs shall be actuarially sound.***
4. ***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.

**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. If it is not modeled, justification will be reviewed.

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

1. ***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.***
2. ***Flood loss cost projections and flood probable maximum loss levels shall not make a prospective provision for economic inflation.***
3. ***Flood loss cost projections and flood probable maximum loss levels shall not include any explicit provision for wind losses.***
4. ***Damage caused from inland and coastal flooding shall be included in the flood model’s calculation of flood loss costs and flood probable maximum loss levels.***
5. ***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.***
6. ***Demand surge shall be included in the flood model’s calculation of flood loss costs and flood probable maximum loss levels using relevant data and actuarially sound methods and assumptions.***

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

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

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

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

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

Relevant Forms: GF-6, Actuarial Flood Standards Expert Certification

 AF-6, Flood Probable Maximum Loss for Florida

**Disclosures**

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

1. Identify the highest level of resolution for which flood loss costs and flood probable maximum loss levels can be provided. Identify all possible resolutions available for the reported flood output ranges.
2. 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.
3. Provide citations to published papers, if any, or modeling-organization studies that were used to develop how the flood model estimates demand surge.
4. 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 and flood probable maximum loss levels associated with coastal flooding will be reviewed.
	8. How the flood model determines flood loss costs and flood probable maximum loss levels associated with inland flooding will be reviewed.
	9. 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.
	10. All referenced literature will be reviewed, in hard copy or electronic form, to determine applicability.

**AF-5 Flood Policy Conditions**

1. ***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.***
2. ***The relationship among the modeled deductible flood loss costs shall be reasonable.***
3. ***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 Form: GF-6, Actuarial Flood Standards Expert Certification

**Disclosures**

1. Describe the methods used in the flood model to treat deductibles, policy limits, policy exclusions, loss settlement provisions, and insurance-to-value criteria when projecting flood loss costs and flood probable maximum loss levels. In particular, specify the loss settlement options available for manufactured homes.
2. Provide an example of how insurer flood loss (flood loss net of deductibles) is calculated. Discuss data or documentation used to validate the method used by the flood model.

Example:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| (A) |  | (B) | (C) | (D)=(A)\*(C) | (E)=(D)-(B) |
| StructureValue | PolicyLimit | Deductible | DamageRatio | Zero DeductibleFlood Loss | Flood Loss Net ofDeductible |
| 100,000 | 90,000 | 1,500 | 2% | 2,000 | 500 |

1. Describe how the flood model treats annual deductibles.

**Audit**

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

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

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

1. Treatment of annual deductibles will be reviewed.

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

1. ***The methods, data, and assumptions used in the estimation of flood probable maximum loss levels shall be actuarially sound.***
2. ***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.***
3. ***Flood loss costs cannot increase as the structure flood damage resistance increases, all other factors held constant.***
4. ***Flood loss costs cannot increase as flood hazard mitigation measures incorporated in the structure increase, all other factors held constant.***
5. ***Flood loss costs shall be consistent with the effects of major flood control measures, all other factors held constant.***
6. ***Flood loss costs cannot increase as the flood resistant design provisions increase, all other factors held constant.***
7. ***Flood loss costs cannot increase as building code enforcement increases, all other factors held constant.***
8. ***Flood loss costs shall decrease as deductibles increase, all other factors held constant.***
9. ***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.***
10. ***Flood output ranges shall be logical for the type of risk being modeled and apparent deviations shall be justified.***
11. ***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.***
12. ***For flood loss cost and flood probable maximum loss level estimates derived from and validated with historical insured flood losses or other input data and information, the assumptions in the derivations concerning (1) construction characteristics, (2) policy provisions, and (3) contractual provisions shall be appropriate based on the type of risk being modeled.***

Purpose: 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

 AF-1, Zero Deductible Personal Residential Standard Flood Loss Costs

 AF-2, Total Flood Statewide Loss Costs

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

 AF-4, Flood Output Ranges

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

 AF-6, Flood Probable Maximum Loss for Florida

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

**Disclosures**

1. Provide a completed Form AF-1, Zero Deductible Personal Residential Standard Flood Loss Costs. Provide a link to the location of the form [insert hyperlink here].
2. Provide a completed Form AF-2, Total Flood Statewide Loss Costs. Provide a link to the location of the form [insert hyperlink here].
3. Provide a completed Form AF-3, Personal Residential Standard Flood Loss Costs by ZIP Code. Provide a link to the location of the form [insert hyperlink here].

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

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

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

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

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

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

**Audit**

1. The data and methods used for flood probable maximum loss levels for Form AF-6, Flood Probable Maximum Loss for Florida, will be reviewed. The Top Event and Conditional Tail Expectations will be reviewed.
2. The frequency distribution and the individual event severity distribution, or information about the formulation of events, underlying Form AF-6, Flood Probable Maximum Loss for Florida, will be reviewed.
3. The first and second moments of the Annual Aggregate and Annual Occurrence distributions underlying the tables in Form AF-6, Flood Probable Maximum Loss for Florida, will be reviewed.
4. The first and second moments of the frequency and severity distributions, or similar information about the event distributions, underlying the flood probable maximum loss levels shown in Parts A and B in Form AF-6, Flood Probable Maximum Loss for Florida, will be reviewed.
5. All referenced literature will be reviewed, in hard copy or electronic form, to determine applicability.
6. Graphical representations of flood loss costs by rating areas and geographic zones (consistent with the modeling-organization grid resolution) will be reviewed.
7. Color-coded maps depicting the effects of topography and flood control measures on flood loss costs by rating areas and geographic zones (consistent with the modeling-organization grid resolution) will be reviewed.
8. The procedures used by the modeling organization to verify the individual flood loss cost relationships will be reviewed. Methods (including any software) used in verifying Standard AF-6 will be reviewed. Forms AF-1, Zero Deductible Personal Residential Standard Flood Loss Costs, AF-2, Total Flood Statewide Loss Costs, AF-3, Personal Residential Standard Flood Loss Costs by ZIP Code, and AF-5, Logical Relationship to Flood Risk (Trade Secret Item), will be reviewed to assess flood coverage relationships.
9. The flood loss cost relationships among deductible, construction type, policy form, coverage, year of construction, foundation type, condo unit floor, 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.
10. The total personal residential insured flood losses provided in Forms AF-2, Total Flood Statewide Loss Costs, and AF-3, Personal Residential Standard Flood Loss Costs by ZIP Code, will be reviewed.
11. Form AF-4, Flood Output Ranges, will be reviewed, including geographical representations of the data where applicable.
12. Form AF-4, Flood Output Ranges, will be reviewed to ensure appropriate relativities among deductibles, coverages, and construction types.
13. Apparent anomalies in the flood output ranges and their justification will be reviewed.
14. Form AF-6, Flood Probable Maximum Loss for Florida, 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.

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

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

1. Create exposure sets for these exhibits by modeling all of the buildings from Notional Set 3 described in the file *“NotionalInput17\_Flood.xlsx”* geocoded to each rating area or geographic zone in the state, as provided in the flood model. Define the flood model’s flood rating areas or geographic zones. Provide the predominant County name and the Federal Information Processing Standards (FIPS) Code associated with each rating area or geographic zone. Refer to the Notional Standard Flood Policy Specifications below for additional modeling information. Explain any assumptions, deviations, and differences from the prescribed exposure information.
2. Provide, in the format given in the file named *“2017FormAF1.xlsx”* in both Excel and PDF format,the underlying standard flood loss cost data, rounded to three decimal places in the PDF file, used for A above. The file name shall include the abbreviated name of the modeling organization, the flood standards year, and the form name.

**Notional Standard Policy Specifications**

**Policy Type Assumptions**

**Owners Coverage A = Building Property**

* Replacement cost equal to Coverage A limit
* Excludes all appurtenant structures

**Coverage B = Personal Property**

* Actual cash value equal to Coverage B limit

**Time Element Coverage**

* To be defined by the modeling organization

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

**Manufactured Homes Coverage A = Building**

* Replacement cost equal to Coverage A limit

 **Coverage B = Personal Property**

* Actual cash value equal to Coverage B limit

**Time Element Coverage**

* To be defined by the modeling organization
* Flood loss costs per $1,000 shall be related to the Coverage A limit for Coverage A, to the Coverage B limit for Coverage B, and to the Time Element limit for Time Element Coverage

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

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

1. Provide the total personal residential insured flood loss and the percentage contribution of 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 shall include meteorological and hydrological events and circumstances occurring inside or outside of Florida that resulted in or contributed to flooding in Florida included in the modeling organization flood-event dataset (e.g., Florida and by-passing hurricanes, tropical cyclones below hurricane strength that caused flood losses in Florida, rainfall events that caused flood losses in Florida).

The table below contains the minimum number of tropical cyclones from HURDAT2 and rainfall events to be included in the modeling organization flood-event dataset. Hurricane intensity for by-passing hurricanes (ByP) is the maximum windspeed at closest approach to Florida, not the windspeed over Florida. Each tropical cyclone and rainfall event has been assigned an ID number. Additional tropical cyclones and rainfall events included in the modeling organization flood-event dataset shall be added to the table below in order of year and assigned an intermediate ID number as the tropical cyclone and rainfall event falls within the bounding ID numbers.

B. 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 shall 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 *Figure 4*-Category** | **Personal Residential Insured Flood Losses ($)** | **Percentage Contribution**  |
| --- | --- | --- | --- | --- | --- | --- |
| 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-3 |  |  |
| 080 | 09/08/1965 | 1965 | Betsy-1965 | C-3 |  |  |
| 085 | 06/09/1966 | 1966 | Alma-1966 | A-2 |  |  |
| 090 | 10/04/1966 | 1966 | Inez-1966 | B-1 |  |  |
| 095 | 10/19/1968 | 1968 | Gladys-1968 | A-2 |  |  |
| 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-2 |  |  |
| 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 | 08/13/2004 | 2004 | Charley-2004 | B-4 |  |  |
| 180 | 09/05/2004 | 2004 | Frances-2004 | C-2 |  |  |
| 185 | 09/16/2004 | 2004 | Ivan-2004 | F-3/ByP-3 |  |  |
| 190 | 09/26/2004 | 2004 | Jeanne-2004 | C-3 |  |  |
| 195 | 0710/2005 | 2005 | Dennis-2005 | A-3 |  |  |
| 200 | 08/25/2005 | 2005 | Katrina-2005 | C-1 |  |  |
| 205 | 09/20/2005 | 2005 | Rita-2005 | ByP-2 |  |  |
| 210 | 10/24/2005 | 2005 | Wilma-2005 | B-3 |  |  |
| 215 | 08/18/2008 | 2008 | Tropical Storm Fay-2008 |  |  |  |
| 220 |  | May 2009 | Unnamed Storm in East Florida-2009 |  |  |  |
| 225 |  | July 2013 | Unnamed Storm in Panhandle-2013 |  |  |  |
| 230 | 09/02/2016 | 2016 | Hermine-2016 | A-1 |  |  |
| 235 | 10/07/2016 | 2016 | Matthew-2016 | ByP-3 |  |  |
| TBD |  |  | Storm(s) chosen by modeling organization |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  | **Total** |  |  |  |

**Form AF-3: Personal Residential Standard Flood Loss Costs**

**by ZIP Code**

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

1. Provide the percentage of personal residential zero deductible standard flood losses, rounded to four decimal places, and the monetary contribution from the events listed below using the modeling-organization-specified, predetermined, and comprehensive exposure dataset. Include all ZIP Codes where losses are material. Disclose the materiality threshold.
2. Provide maps color-coded by ZIP Code depicting the percentage total personal residential standard flood losses from each flood event and for the cumulative flood losses using the following interval coding:

Red Over 5%

Light Red 2% to 5%

Pink 1% to 2%

Light Pink 0.5% to 1%

Light Blue 0.2% to 0.5%

Medium Blue 0.1% to 0.2%

Blue Below 0.1%

1. 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.

Form AF-3 Events:

* Hurricane Andrew (1992)
* Hurricane Ivan (2004)
* Hurricane Jeanne (2004)
* Hurricane Wilma (2005)
* Tropical Storm Fay (2008)
* Unnamed Storm in East Florida (May 2009)
* Unnamed Storm in Panhandle (July 2013)
* Storm chosen by modeling organization
1. Provide, in the format given in the file named *“2017FormAF3.xlsx”* in Excel format, the total flood loss costs by ZIP Code. The file name shall include the abbreviated name of the modeling organization, the flood standards year, and the form name. Also include Form AF-3, Personal Residential Standard Flood Loss Costs by ZIP Code, in a submission appendix.

**Form AF-4: Flood Output Ranges**

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

A. Provide personal residential flood output ranges in the format shown in the file named *“2017FormAF4.xlsx”* by using an automated program or script.Provide this form in Excel format. The file name shall include the abbreviated name of the modeling organization, the flood standards year, and the form name. Also include Form AF-4, Flood Output Ranges, in a submission appendix.

B. Provide flood loss costs by county, rounded to three decimal places. Within each county, flood loss costs shall be shown separately per $1,000 of exposure for frame owners, masonry owners, frame renters, masonry renters, frame condo unit owners, masonry condo unit owners, and manufactured homes. For each of these categories using rating areas or geographic zones, the flood output range shall show the highest flood loss cost, the lowest flood loss cost, and the weighted average flood loss cost. The aggregate personal residential exposure data for this form shall be developed from the modeling-organization-specified, predetermined, and comprehensive exposure dataset except for insured values and deductibles information. Insured values shall be based on the standard flood output range specifications given below. When calculating the weighted average flood loss costs, weight the flood loss costs by the total insured value calculated above. Include the statewide range of flood loss costs (i.e., low, high, and weighted average).

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

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

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

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

**Standard Flood Output Range Specifications**

**Policy Type Assumptions**

**Owners Coverage A = Building Property**

* Coverage A limit = $100,000
* Replacement cost equal to Coverage A limit
* Deductible = $1,500

 **Coverage B = Personal Property**

* Coverage B limit = $40,000
* Actual cash value equal to Coverage B limit
* Deductible = $1,000

 **Time Element Coverage**

* To be defined by the modeling organization
* Flood loss costs per $1,000 shall be specified for each coverage limit

**Renters Coverage B = Personal Property**

* Coverage B limit = $25,000
* No coverage for tenant improvements
* Deductible = $1,000
* Actual cash value equal to Coverage B limit

 **Time Element Coverage**

* To be defined by the modeling organization
* Flood loss costs per $1,000 shall be related to the Coverage B limit

**Condo Unit Owners Coverage A = Building Property**

* Coverage A limit = 10% of Coverage C limit
* Replacement cost 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 shall be related to the Coverage B limit

**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 shall be related to the coverage limit

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

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

A. Provide the logical relationship to flood risk exhibits in the format shown in the file named *“2017FormAF5.xlsx.”*

B. Create exposure sets for each exhibit by modeling all of the flood coverages from the appropriate Notional Set listed below at each of the locations in “Location Grid A” as described in the file *“NotionalInput17\_Flood.xlsx.”* Refer to the Notional Standard Flood Policy Specifications below for additional modeling information. Explain any assumptions, deviations, and differences from the prescribed exposure information. In particular, explain how the treatment of unknown is handled in each sensitivity.

|  |  |
| --- | --- |
| Exhibit | Notional Set |
| Deductible Sensitivity | Set 1  |
| Policy Form Sensitivity | Set 2 |
| Policy Form/Construction Sensitivity  | Set 3 |
| Coverage Sensitivity | Set 4 |
| Year Built Sensitivity | Set 5 |
| Foundation Type Sensitivity | Set 6 |
| Condo Unit Floor Sensitivity | Set 7 |
| Number of Stories Sensitivity | Set 8 |
| Lowest Floor Elevation of Residential Structure Sensitivity | Set 9 |

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

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

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

1. All flood loss costs that are not consistent with the requirements of Standard AF-6, Flood Loss Outputs and Logical Relationships to Risk, and have been explained in Disclosure AF-6.9 shall be shaded.
2. 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 *“NotionalInput17\_Flood.xlsx.”* 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).

**Notional Standard Flood Policy Specifications**

**Policy Type Assumptions**

**Owners Coverage A = Building Property**

* Coverage A limit = $100,000
* Replacement cost equal to Coverage A limit

 **Coverage B = Personal Property**

* Coverage B limit = $40,000
* Actual cash value equal to Coverage B limit

 **Time Element Coverage**

* To be defined by the modeling organization
* Flood loss costs per $1,000 shall be specified for each coverage limit

**Renters Coverage B = Personal Property**

* Coverage B limit = $25,000
* No coverage for tenant improvements
* Actual cash value equal to Coverage B limit

 **Time Element Coverage**

* To be defined by the modeling organization
* Flood loss costs per $1,000 shall be related to the Coverage B limit

**Condo Unit Owners Coverage A = Building Property**

* Coverage A limit = 10% of Coverage 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

 **Time Element Coverage**

* To be defined by the modeling organization
* Flood loss costs per $1,000 shall be related to the Coverage B limit

**Manufactured Homes Coverage A = Building Property**

* Coverage A limit = $50,000
* 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 shall be related to the coverage limit

**Form AF-6: Flood Probable Maximum Loss for Florida**

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

1. Provide the estimated flood loss and uncertainty interval for each of the Personal Residential Annual Exceedance Probabilities given in Part A, Annual Aggregate and Part B, Annual Occurrence. Describe how the uncertainty intervals are derived. Also, provide in Parts A and B, the Conditional Tail Expectation, the expected value of flood losses greater than the Estimated Flood Loss Level. If the modeling methodology does not allow the flood model to produce a viable answer for certain exceedance probabilities, state so and why.
2. Provide this form in Excel format. The file name shall include the abbreviated name of the modeling organization, the flood standards year, and the form name. Also include Form AF-6, Flood Probable Maximum Loss for Florida, in a submission appendix.

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

**(Annual Aggregate)**

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

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

**(Annual Occurrence)**

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