

ACTUARIAL FLOOD STANDARDS

AF-1 Flood Modeling Input Data

- A. Adjustments, edits, inclusions, or deletions to insurance company or other input data used by the modeling organization shall be based upon accepted actuarial, underwriting, and statistical procedures.***
- B. All modifications, adjustments, assumptions, inputs and input file identification, and defaults necessary to use the flood model shall be actuarially sound and shall be included with the flood model output report. Treatment of missing values for user inputs required to run the flood model shall be actuarially sound and described with the flood model output report.***

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

Different modeling approaches may require different input data.

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

Disclosures

1. Identify insurance-to-value assumptions and describe the methods and assumptions used to determine the property value and associated flood losses. Provide a sample calculation for determining the property value.
2. Identify depreciation assumptions and describe the methods and assumptions used to reduce insured flood losses on account of depreciation. Provide a sample calculation for determining the amount of depreciation and the actual cash value (ACV) flood losses.
3. Describe the methods used to distinguish among the different flood policies, contracts, and endorsements as specified in Section 627.715, Florida Statutes.
4. Disclose, in a flood model output report, the specific type of input that is required to use the flood model or flood model output in a personal residential property flood insurance rate filing. Such input includes, but is not limited to, optional features of the flood model, type of data and selections to be supplied by the flood model user and needed to derive flood loss projections from the flood model, and any variables that a flood model user is authorized to set in using the flood model for the type of coverage being modeled. Include the flood model name and version identification on the flood model output report. All items included in the flood model output form submitted to the Commission shall be clearly labeled and defined.

5. Provide a copy of the input form(s) used in the flood model with options chosen to reflect 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 shall be clearly labeled and defined.
6. Explain the differences in data input and model output required for coastal and inland flood modeling.
7. Describe actions performed to ensure the validity of insurer or other input data used for flood model inputs or validation/verification.

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

AF-2 Flood Events Resulting in Modeled Flood Losses

- A. Flood modeled loss costs and flood probable maximum loss levels shall reflect insured flood related damages from both coastal and inland flood events impacting Florida.***
- B. Time element flood loss costs shall reflect insured flood losses due to infrastructure damage caused by a flood event.***
- C. The modeling organization shall have a documented procedure for addressing double counting or under counting of flood 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 events) that contribute to flooding in Florida. Coastal flooding includes storm surge, 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 damages and time element flood losses in Florida resulting from an event modeled as a flood event (as described above) consistent with Section 627.715, Florida Statutes consistent with the different flood policies, contracts, and endorsements. The event shall include all such insured flood related damage due to a flood event causing loss in Florida and should not be over-estimated due to double counting or under-estimated due to unduly restrictive counting.

Relevant Forms: GF-5, Actuarial Flood Standards Expert Certification
AF-2, Flood Event Statewide Losses

Disclosures

1. Describe how damage from model generated floods (originating either inside or outside of Florida) is included in the calculation of flood loss costs and flood probable maximum loss levels for Florida.
2. Describe how wind losses associated with coastal flooding are removed from the calculation of flood loss costs and flood probable maximum loss levels for Florida.
3. Describe how the model considers the correlation and potential overlap of losses associated with coastal and inland flooding.
4. Other than coastal and inland flooding, state whether any other types of flooding events are modeled. If so, describe how damage resulting from these flood type

events is treated in the calculation of flood loss costs and flood probable maximum loss levels for Florida.

Audit

1. The flood model will be reviewed to evaluate whether the determination of losses in the flood model is consistent with this standard.
2. The flood model will be reviewed to determine that meteorological or hydrological events originating either inside or outside of Florida are modeled for flood losses occurring in Florida and that such effects are considered in a manner which is consistent with this standard.
3. The flood model will be reviewed to determine whether the model takes into account any damage resulting directly and solely from wind. Losses associated with flooding will be reviewed to ensure wind losses are not included.
4. The documented procedure addressing the double counting or under counting of flood losses will be reviewed.

AF-3 Flood Coverages

- A. The methods used in the development of personal residential structure flood loss costs shall be actuarially sound.***
- B. The methods used in the development of personal residential appurtenant structure flood loss costs shall be actuarially sound.***
- C. The methods used in the development of personal residential contents flood loss costs shall be actuarially sound.***
- D. The methods used in the development of personal residential time element coverage flood loss costs shall be actuarially sound.***
- E. The methods used in the development of increased cost of compliance (ICC) coverage flood loss costs shall be actuarially sound.***

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

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

Disclosures

1. Describe the methods used in the flood model to calculate flood loss costs for residential structure coverage associated with personal residential properties.
2. Describe the methods used in the flood model to calculate flood loss costs for appurtenant structure coverage associated with personal residential properties.
3. Describe the methods used in the flood model to calculate flood loss costs for contents coverage associated with personal residential properties.
4. Describe the methods used in the flood model to calculate flood loss costs for time element coverage associated with personal residential properties.
5. Describe the methods used in the flood model to calculate flood loss costs for ICC coverage associated with personal residential properties.

Audit

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

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

- A. Flood loss cost projections and flood probable maximum loss levels shall not include expenses, risk load, investment income, premium reserves, taxes, assessments, or profit margin.***
- B. Flood loss cost projections and flood probable maximum loss levels shall not make a prospective provision for economic inflation.***
- C. Flood loss cost projections and flood probable maximum loss levels shall not include any explicit provision for any wind losses.***
- D. Water damage caused from storm surge resulting from tropical systems shall be included in the flood model's calculation of flood loss costs and flood probable maximum loss levels.***
- E. Flood loss cost projections and flood probable maximum loss levels shall be capable of being calculated from exposures at a geocode (latitude-longitude) level of resolution including the consideration of elevation.***
- 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.***
- G. The methods, data, and assumptions used in the estimation of demand surge for flood shall be actuarially sound.***

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 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 and 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

construct and validate flood loss projection models. The standard does not allow for prospective recognition of future economic inflation or price inflation.

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

Disclosures

1. Describe the method or methods used to estimate annual flood loss costs and flood probable maximum loss levels. Identify any source documents used and any relevant research results.
2. Identify the highest level of resolution for which flood loss costs and flood probable maximum loss levels can be provided. Identify all possible resolutions available for the reported output ranges.
3. Describe how the flood model incorporates demand surge in the calculation of flood loss costs and flood probable maximum loss levels. Indicate if there are any differences in the manner that demand surge is incorporated for coastal and inland flooding.
4. Provide citations to published papers, if any, or modeling organization studies that were used to develop how the flood model estimates demand surge.
5. Describe whether and how economic inflation has been applied to past insurance experience to construct and validate flood models.

Audit

1. The flood model's handling of 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 inclusion of secondary uncertainty in the flood probable maximum loss levels will be reviewed.
3. 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.
4. The manner in which the flood model accounts for economic inflation associated with past insurance experience will be reviewed.
5. The manner in which the flood model accounts for storm surge coastal flooding will be reviewed.

6. The efforts that have been made to ensure that any wind losses other than water damage caused from storm surge associated with tropical systems have not been included in the flood model losses will be reviewed.
7. The detailed manner in which the flood model accounts for coastal flooding will be reviewed.
8. The detailed manner in which the flood model accounts for inland flooding will be reviewed.
9. All referenced literature will be reviewed to determine applicability.

AF-5 Flood Policy Conditions

- A. The methods used in the development of mathematical distributions to reflect the effects of deductibles and policy limits shall be actuarially sound.**
- B. The relationship among the modeled deductible flood loss costs shall be reasonable.**

Purpose: For a given flood extent and elevation/depth, wave conditions, and personal residential structure type, there is a range of possible results. Some flood losses may fall below the deductible. The distribution of flood losses is therefore important to the determination of the effects of deductibles and policy limits.

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

Disclosures

1. Describe the methods used in the flood model to treat deductibles, policy limits, replacement costs, and insurance-to-value when projecting flood loss costs.
2. Provide an example of how insurer flood loss (flood loss net of deductibles) is calculated. Discuss data or documentation used to confirm or validate the method used by the flood model.

Example:

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

3. Describe how the flood model calculates annual deductibles.
4. Explain how the flood model treats policy limits, replacement costs, and coinsurance.

Audit

1. The process used to determine the accuracy of the insurance-to-value criteria in data used to develop or validate the flood model results will be reviewed.
2. To the extent that historical data are used to develop mathematical depictions of deductibles and policy limits 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 and policy limits for flood coverage in the data will be reviewed.

AF-6 Flood Loss Outputs and Logical Relationships to Risk

- A. The methods, data, and assumptions used in the estimation of flood probable maximum loss levels shall be actuarially sound.***
- B. Flood loss costs shall not exhibit an illogical relation to risk, nor shall flood loss costs exhibit a significant change when the underlying risk does not change significantly.***
- C. Flood loss costs produced by the flood model shall be positive and non-zero for all rating areas and geographic zones.***
- D. Flood loss costs cannot increase as the quality of construction type, materials and workmanship increases, all other factors held constant.***
- E. Flood loss costs cannot increase as the presence of fixtures or construction techniques designed for flood hazard mitigation increases, all other factors held constant.***
- F. Flood loss costs cannot increase as the quality of building codes and enforcement increases, all other factors held constant.***
- G. Flood loss costs shall decrease as deductibles increase, all other factors held constant.***
- H. The relationship of flood loss costs for individual coverages, (e.g., personal residential structures, appurtenant structures, contents, and time element) shall be consistent with the coverages provided.***
- I. Flood output ranges shall be logical for the type of risk being modeled and deviations supported.***
- J. 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.***
- K. For flood loss cost and flood probable maximum loss level estimates derived from or validated with historical insured flood losses or other input data and information, the assumptions in the derivations concerning (1) construction characteristics, (2) policy provisions, (3) contractual provisions, and (4) relevant underwriting practices underlying those flood losses, as well as any actuarial modifications, shall be appropriate based on the type of risk being modeled.***

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

Modeled flood loss costs shall 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 shall also be higher. Likewise, if there is no difference in risk there shall be no difference in flood loss costs. Flood loss costs not having these properties will be determined to have an illogical relationship to risk.

Relevant Forms: GF-5, Actuarial Flood Standards Expert Certification
AF-1, Zero Deductible Personal Residential Flood Loss Costs
AF-2, Flood Event Statewide Losses
AF-3, Coastal Flooding Losses
AF-4, Inland Flooding Losses
AF-5, Combined Coastal and Inland Flooding Losses
AF-6, Flood Output Ranges
AF-7, Logical Relationship to Flood Risk (Trade Secret item)
AF-8, Flood Probable Maximum Loss for Florida
SF-2, Examples of Flood Loss Exceedance Estimates
SF-5, Average Annual Zero Deductible Statewide Flood Loss Costs –
Historical versus Modeled

Disclosures

1. Provide a completed Form AF-1, Zero Deductible Personal Residential Flood Loss Costs. Provide a link to the location of the form [insert hyperlink here].
2. Provide a completed Form AF-2, Flood Event Statewide Losses. Provide a link to the location of the form [insert hyperlink here].
3. Provide a completed Form AF-3, Coastal Flooding Losses. Provide a link to the location of the form [insert hyperlink here].
4. Provide a completed Form AF-4, Inland Flooding Losses. Provide a link to the location of the form [insert hyperlink here].
5. Provide a completed Form AF-5, Combined Coastal and Inland Flooding Losses. Provide a link to the location of the form [insert hyperlink here].
6. Provide a completed Form AF-6, Flood Output Ranges, using the [data set to be determined][form to be developed based on the territories and rating areas used by the modelers which may have various grid resolutions]. Provide a link to the location of the form [insert hyperlink here].

5. A completed Form AF-7, Logical Relationship to Flood Risk (Trade Secret item) shall be provided during the closed meeting portion of the Commission meeting to review the model for acceptability.
6. Provide a completed Form AF-8, Flood Probable Maximum Loss for Florida. Provide a link to the location of the form [insert hyperlink here].
7. Describe how the flood model produces flood probable maximum loss levels.
8. Provide citations to published papers, if any, or modeling organization studies that were used to estimate flood probable maximum loss levels.
9. Explain any difference 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.
10. Provide an explanation for all anomalies in the flood loss costs that are not consistent with the requirements of this standard.
11. Describe how flood loss adjustment expenses are considered within the flood loss cost and flood probable maximum loss level estimates.

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 will be reviewed.
2. All referenced literature will be reviewed to determine applicability.
3. Graphical representations of flood loss costs by rating areas and geographic zones (consistent with the modeling organization's grid resolution) will be reviewed.
4. Color-coded maps depicting the effects of topography and flood control measures on flood loss costs by rating areas and geographic zones (consistent with the modeling organization's grid resolution) will be reviewed.
5. The procedures used by the modeling organization to verify the individual flood loss cost relationships will be reviewed. Forms AF-1, Zero Deductible Personal Residential Flood Loss Costs; AF-2, Flood Event Statewide Losses; AF-3, Coastal Flooding Losses; AF-4, Inland Flooding Losses; AF-5, Combined Coastal and Inland Flooding Losses; and AF-7, Logical Relationship to Flood Risk (Trade Secret item) will be used to assess flood coverage relationships.
6. The flood loss cost relationships among deductible, construction type, policy form, coverage, building code/enforcement, building strength, elevation of residential structure, territory, and region will be reviewed.

7. The total personal residential insured flood losses provided in Forms AF-2, Flood Event Data Sources Statewide Losses; AF-3, Coastal Flooding Losses; AF-4, Inland Flooding Losses; and AF-5, Combined Coastal and Inland Flooding Losses will be reviewed.
8. Form AF-6, Flood Output Ranges will be reviewed, including geographical representations of the data where applicable.
9. Form AF-6, Flood Output Ranges will be reviewed to ensure appropriate relativities among deductibles, coverage, and construction types.
10. Apparent anomalies in the flood output ranges and their justification will be reviewed.

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

- A. Provide three maps, color-coded by rating areas or geographic zones (with a minimum of 6 value ranges), displaying zero deductible personal residential flood loss costs per \$1,000 of exposure for wood frame, masonry, and manufactured housing.
- B. Create exposure sets for these exhibits by modeling all of the buildings from Notional Set 3 described in the file “*NotionalInput17.xlsx*” geocoded to each rating area or geographic zone in the state, as provided in the flood model. Define the model’s flood rating areas or geographic zones. Provide the predominant County name and the Federal Information Processing Standards (FIPS) Code associated with each rating area or geographic zone. Refer to the Notional Policy Specification below for additional modeling information. Explain any assumptions, deviations, and differences from the prescribed exposure information.
- C. Provide, in the format given in the file named “*2017FormAF1.xlsx*,” the underlying flood loss cost data rounded to 3 decimal places used for A. above in both Excel and PDF format. The file name shall include the abbreviated name of the modeling organization, the standards year, and the form name.

Notional Policy Specifications

<u>Policy Type</u>	<u>Assumptions</u>
Owners	<p>Coverage A = Building</p> <ul style="list-style-type: none"> • Replacement Cost included subject to Coverage A limit • Ordinance or Law not included <p>Coverage B = Appurtenant Structures</p> <ul style="list-style-type: none"> • Replacement Cost included subject to Coverage B limit • Ordinance or Law not included <p>Coverage C = Contents</p> <ul style="list-style-type: none"> • Replacement Cost included subject to Coverage C limit <p>Coverage D = Time Element</p> <ul style="list-style-type: none"> • Time limit = 12 months • Per diem = \$150.00/day per policy, if used <p>◇ Flood loss costs per \$1,000 shall be related to the Coverage A limit.</p>
Manufactured Housing	<p>Coverage A = Building</p> <ul style="list-style-type: none"> • Replacement Cost included subject to Coverage A limit <p>Coverage B = Appurtenant Structures</p> <ul style="list-style-type: none"> • Replacement Cost included subject to Coverage B limit <p>Coverage C = Contents</p> <ul style="list-style-type: none"> • Replacement Cost included subject to Coverage C limit <p>Coverage D = Time Element</p> <ul style="list-style-type: none"> • Time limit = 12 months

- Per diem = \$150.00/day per policy, if used
- ✧ Flood loss costs per \$1,000 shall be related to the Coverage A limit.

VERSION 1 OF FORM AF-2:

Form AF-2: Flood Event Statewide Losses

A. Provide the total insured flood loss and the dollar contribution to the average annual flood loss assuming zero deductible policies for individual historical floods using a modeling organization specified, predetermined and comprehensive exposure dataset*. The list of flood events in this form should include all Florida flood events in the modeling organization flood data sources, including those in Standard MHF-1, Flood Event Data Sources.

*Options for Exposure dataset: (same as in Standard GF-1)

1. A modeler specified, predetermined and comprehensive exposure dataset
2. Sample dataset of exposures from the NFIP for Florida
3. A notional dataset developed by modelers analogous to the notional dataset for the Logical Relationship to Risk form for hurricane

The table below contains the minimum number of flood events to be included in the flood data sources. Each flood event has been assigned an ID number. As defined in Standard MHF-1, Flood Event Data Sources, the flood data sources for the modeling organization may exclude flood events that had zero modeled impact, or it may include additional flood events when there is clear justification for the changes. For flood events in the table below resulting in zero flood loss, the table entry should be left blank. Additional flood events included in the flood model’s flood data sources shall be added to the table below in order of year and assigned an intermediate ID number as the flood event falls within the bounding ID numbers.

B. Provide this form in Excel format. The file name shall include the abbreviated name of the modeling organization, the standards year, and the form name. Form AF-2, Flood Event Statewide Losses shall also be included in a submission appendix.

ID	Year	Name	Personal Residential Insured Flood Losses (\$)	Dollar Contribution
005	1992	Hurricane Andrew		
010	2004	Hurricane Ivan		
015	2004	Hurricane Jeanne		
020	2005	Hurricane Wilma		
025	2008	Tropical Storm Fay		
030	May 2009	Unnamed Storm on East Florida		
035	July 2013	Unnamed Storm on Panhandle		
040		Storm chosen by modeling organization		
045				
050				
		Total		

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Note: Total dollar contributions should agree with the total average annual zero deductible statewide flood loss costs provided in Form SF-5, Average Annual Zero Deductible Statewide Flood Loss Costs – Historical versus Modeled for current year.

ALTERNATE VERSION OF FORM AF-2

Form AF-2: Coastal Flooding Statewide Losses

A. Provide the total insured loss and the dollar contribution to the average annual 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 also include all Florida and by-passing hurricanes in the modeling organization Base Hurricane Storm Set as well as any tropical cyclones below hurricane strength that would have caused coastal flooding losses in Florida.

*Options for Exposure dataset: (same as in Standard GF-1)

1. A modeler specified, predetermined and comprehensive exposure dataset
2. Sample dataset of exposures from the NFIP for Florida
3. A notional dataset developed by modelers analogous to the notional dataset for the Logical Relationship to Risk form for hurricane

The table below contains the minimum number of tropical cyclones from HURDAT2 to be included in the Base Hurricane Storm Set, based on the period 1900-2016. Each hurricane has been assigned an ID number. The modeling organization may exclude tropical cyclones that had zero modeled impact, or it may include additional tropical cyclones when there is clear justification for the changes. For tropical cyclones in the table below resulting in zero loss, the table entry should be left blank. Additional tropical cyclones included in the model's Base Hurricane Storm Set shall be added to the table below in order of year and assigned an intermediate ID number as the tropical cyclone falls within the bounding ID numbers.

B. Provide this form in Excel format. The file name shall include the abbreviated name of the modeling organization, the standards year, and the form name. Form AF-2, Coastal Flooding Statewide Losses shall also be included in a submission appendix.

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

ID	Landfall/ Closest Approach Date	Year	Name	Personal Residential Insured Losses (\$)	Dollar Contribution
075	09/29/1917	1917	NoName04-1917		
080	09/10/1919	1919	NoName02-1919		
085	10/25/1921	1921	TampaBay06-1921		
090	09/15/1924	1924	NoName05-1924		
095	10/21/1924	1924	NoName10-1924		
100	07/28/1926	1926	NoName01-1926		
105	09/18/1926	1926	GreatMiami07-1926		
110	10/21/1926	1926	NoName10-1926		
115	08/08/1928	1928	NoName01-1928		
120	09/17/1928	1928	LakeOkeechobee04-1928		
125	09/28/1929	1929	NoName02-1929		
130	09/01/1932	1932	NoName03-1932		
135	07/30/1933	1933	NoName05-1933		
140	09/04/1933	1933	NoName11-1933		
145	09/03/1935	1935	LaborDay03-1935		
150	11/04/1935	1935	NoName07-1935		
155	07/31/1936	1936	NoName05-1936		
160	08/11/1939	1939	NoName02-1939		
165	10/06/1941	1941	NoName05-1941		
170	10/18/1944	1944	NoName13-1944		
175	06/24/1945	1945	NoName01-1945		
180	09/15/1945	1945	NoName09-1945		
185	10/08/1946	1946	NoName05-1946		
190	09/17/1947	1947	NoName04-1947		
195	10/12/1947	1947	NoName08-1947		
200	09/22/1948	1948	NoName07-1948		
205	10/05/1948	1948	NoName08-1948		
210	08/27/1949	1949	NoName02-1949		
215	08/31/1950	1950	Baker-1950		
220	09/05/1950	1950	Easy-1950		
225	10/18/1950	1950	King-1950		
230	09/26/1953	1953	Florence-1953		
235	09/25/1956	1956	Flossy-1956		
240	09/10/1960	1960	Donna-1960		
245	08/27/1964	1964	Cleo-1964		
250	09/10/1964	1964	Dora-1964		
255	10/14/1964	1964	Isbell-1964		
260	09/08/1965	1965	Betsy-1965		
265	06/09/1966	1966	Alma-1966		
270	10/04/1966	1966	Inez-1966		
275	10/19/1968	1968	Gladys-1968		
280	06/19/1972	1972	Agnes-1972		
285	09/23/1975	1975	Eloise-1975		
290	09/04/1979	1979	David-1979		
295	09/13/1979	1979	Frederic-1979		
300	09/02/1985	1985	Elena-1985		
305	11/21/1985	1985	Kate-1985		

ID	Landfall/ Closest Approach Date	Year	Name	Personal Residential Insured Losses (\$)	Dollar Contribution
310	10/12/1987	1987	Floyd-1987		
315	08/24/1992	1992	Andrew-1992		
320	08/02/1995	1995	Erin-1995		
325	10/04/1995	1995	Opal-1995		
330	07/19/1997	1997	Danny-1997		
335	09/03/1998	1998	Earl-1998		
340	09/25/1998	1998	Georges-1998		
345	10/15/1999	1999	Irene-1999		
350	08/13/2004	2004	Charley-2004		
355	09/05/2004	2004	Frances-2004		
360	09/16/2004	2004	Ivan-2004		
365	09/26/2004	2004	Jeanne-2004		
370	0710/2005	2005	Dennis-2005		
375	08/25/2005	2005	Katrina-2005		
380	10/24/2005	2005	Wilma-2005		
385	08/18/2008	2008	Tropical Storm Fay		
390		May 2009	Unnamed Storm on East Florida		
395		July 2013	Unnamed Storm on Panhandle		
400			Storm chosen by modeling organization		
			Total		

Form AF-3: Coastal Flooding Losses

By ZIP Code/Flood Zones for specific events

Choose among:

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

Form AF-4: Inland Flooding Losses

By ZIP Code/Flood Zones for specific events

Choose among:

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

Form AF-5: Combined Coastal and Inland Flooding Losses

By ZIP Code/Flood Zones for specific events

Choose among:

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

Form AF-6: Flood Output Ranges

- A. Provide personal residential flood output ranges in the format shown in the file named “2017FormAF6.xlsx” by using an automated program or script. Provide this form in Excel format. The file name shall include the abbreviated name of the modeling organization, the standards year, and the form name. Form AF-6, Flood Output Ranges shall also be included in a submission appendix.
- B. Provide flood loss costs rounded to three (3) decimal places by county. Within each county, flood loss costs shall be shown separately per \$1,000 of exposure for frame owners, masonry owners, frame renters, masonry renters, frame condo unit owners, masonry condo unit owners, and manufactured housing. 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 information in the file named [to be determined] except for insured value and deductibles information. Insured values shall be based on the flood output range specifications below. Deductible amounts of 0% and as specified in the flood output range specifications will be assumed to be uniformly applied to all risks. When calculating the weighted average flood loss costs, weight the flood loss costs by the total insured value calculated above. Include the statewide range of flood loss costs (i.e., low, high, and weighted average).
- C. If a modeling organization has flood loss costs for a rating area or geographic zone for which there is no exposure, give the flood loss costs zero weight (i.e., assume the exposure in that rating area or geographic zone is zero). Provide a list in the submission document of those rating areas or geographic zones where this occurs.
- D. If a modeling organization does not have flood loss costs for a rating area or geographic zone for which there is some exposure, do not assume such flood loss costs are zero, but use only the exposures for which there are flood loss costs in calculating the weighted average flood loss costs. Provide a list in the submission document of the rating areas or geographic zones where this occurs.
- E. All anomalies in flood loss costs that are not consistent with the requirements of Standard AF-6, Flood Loss Output and have been explained in Disclosure 11 shall be shaded.

Indicate if per diem is used in producing flood loss costs for Coverage D (ALE) in the personal residential flood output ranges. If a per diem rate is used in the submission, a rate of \$150.00 per day per policy shall be used.

Flood Output Range Specifications

<u>Policy Type</u>	<u>Assumptions</u>
Owners	<p>Coverage A = Building</p> <ul style="list-style-type: none"> • Coverage A limit = \$100,000 • Replacement Cost included subject to Coverage A limit • Ordinance or Law not included <p>Coverage B = Appurtenant Structures</p> <ul style="list-style-type: none"> • Coverage B limit = 10% of Coverage A limit • Replacement Cost included subject to Coverage B limit • Ordinance or Law not included <p>Coverage C = Contents</p> <ul style="list-style-type: none"> • Coverage C limit = 50% of Coverage A limit • Replacement Cost included subject to Coverage C limit <p>Coverage D = Time Element</p> <ul style="list-style-type: none"> • Coverage D limit = 20% of Coverage A limit • Time limit = 12 months • Per diem = \$150.00/day per policy, if used <p>✧ Dominant Coverage = A.</p> <p>✧ Flood loss costs per \$1,000 shall be related to the Coverage A limit.</p> <p>✧ Flood loss costs for the various specified deductibles shall be determined based on annual deductibles.</p> <p>✧ Flood deductible shall be 2% of coverage limit, applied separately to each coverage.</p>
Renters	<p>Coverage C = Contents</p> <ul style="list-style-type: none"> • Coverage C limit = \$25,000 • Replacement Cost included subject to Coverage C limit <p>Coverage D = Time Element</p> <ul style="list-style-type: none"> • Coverage D limit = 40% of Coverage C limit • Time limit = 12 months • Per diem = \$150.00/day per policy, if used <p>✧ Dominate Coverage = C.</p> <p>✧ Flood loss costs per \$1,000 shall be related to the Coverage C limit.</p> <p>✧ Flood loss costs for the various specified deductibles shall be determined based on annual deductibles.</p> <p>✧ Flood deductible shall be \$500.</p>
Condo Unit Owners	<p>Coverage A = Building</p> <ul style="list-style-type: none"> • Coverage A limit = 10% of Coverage C limit • Replacement Cost included subject to Coverage A limit <p>Coverage C = Contents</p> <ul style="list-style-type: none"> • Coverage C limit = \$50,000 • Replacement Cost included subject to Coverage C limit

Coverage D = Time Element

- Coverage D limit = 40% of Coverage C limit
- Time limit = 12 months
- Per diem = \$150.00/day per policy, if used

- ✧ Dominant Coverage = C.
- ✧ Flood loss costs per \$1,000 shall be related to the Coverage C limit.
- ✧ Flood loss costs for the various specified deductibles shall be determined based on annual deductibles.
- ✧ Flood deductible shall be \$500.

Manufactured Housing**Coverage A = Building**

- Coverage A limit = \$50,000
- Replacement Cost included subject to Coverage A limit

Coverage B = Appurtenant Structures

- Coverage B limit = 10% of Coverage A limit
- Replacement Cost included subject to Coverage B limit

Coverage C = Contents

- Coverage C limit = 50% of Coverage A limit
- Replacement Cost included subject to Coverage C limit

Coverage D = Time Element

- Coverage D limit = 20% of Coverage A limit
- Time limit = 12 months
- Per diem = \$150.00/day per policy, if used

- ✧ Dominant Coverage = A.
- ✧ Flood loss costs per \$1,000 shall be related to the Coverage A limit.
- ✧ Flood loss costs for the various specified deductibles shall be determined based on annual deductibles.
- ✧ Flood deductible shall be 2% of coverage limit, applied separately to each coverage.

**Form AF-7: Logical Relationship to Flood Risk
(Trade Secret Item)**

- A. Provide the logical relationship to flood risk exhibits in the format shown in the file named “2017FormAF6.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.xlsx.” Refer to the Notional Flood Policy Specifications below for additional modeling information. Explain any assumptions, deviations, and differences from the prescribed exposure information.

Exhibit	Notional Set
Deductible Sensitivity	Set 1
Construction Sensitivity	Set 2
Policy Form Sensitivity	Set 3
Coverage Sensitivity	Set 4
Building Code/Enforcement (Year Built) Sensitivity	Set 5
Residential Structure Strength Sensitivity	Set 6
Condo Unit Floor Sensitivity	Set 7
Elevation of Residential Structure Sensitivity	Set 8
Distance to principal coastal or inland flood source (e.g., ocean, river, lake, gulf)	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.

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 3 decimal places.

- C. All flood deductibles are \$0 except for the Deductible Sensitivity.
- D. All anomalies in flood loss costs that are not consistent with the requirements of Standard AF-6, Flood Loss Output and have been explained in Disclosure 11 shall be shaded.
- E. Create an exposure set and report flood loss costs results for strong owners frame buildings (Notional Set 6) for each of the points in “Location Grid B” as described in the file “NotionalInput17.xlsx.” Provide a color-coded contour map of the flood loss costs. Provide a scatter plot of the flood loss costs (y-axis) against distance to closest coast (x-axis).

Notional Flood Policy Specifications

<u>Policy Type</u>	<u>Assumptions</u>
Owners	<p>Coverage A = Building</p> <ul style="list-style-type: none"> • Replacement Cost included subject to Coverage A limit • Ordinance or Law not included <p>Coverage B = Appurtenant Structures</p> <ul style="list-style-type: none"> • Replacement Cost included subject to Coverage B limit • Ordinance or Law not included <p>Coverage C = Contents</p> <ul style="list-style-type: none"> • Replacement Cost included subject to Coverage C limit <p>Coverage D = Time Element</p> <ul style="list-style-type: none"> • Time limit = 12 months • Per diem = \$150.00/day per policy, if used <p>✧ Flood loss costs per \$1,000 shall be related to the Coverage A limit.</p>
Renters	<p>Coverage C = Contents</p> <ul style="list-style-type: none"> • Replacement Cost included subject to Coverage C limit <p>Coverage D = Time Element</p> <ul style="list-style-type: none"> • Time limit = 12 months • Per diem = \$150.00/day per policy, if used <p>✧ Flood loss costs per \$1,000 shall be related to the Coverage C limit.</p>
Condo Unit Owners	<p>Coverage A = Building</p> <ul style="list-style-type: none"> • Replacement Cost included subject to Coverage A limit <p>Coverage C = Contents</p> <ul style="list-style-type: none"> • Replacement Cost included subject to Coverage C limit <p>Coverage D = Time Element</p> <ul style="list-style-type: none"> • Time limit = 12 months • Per diem = \$150.00/day per policy, if used <p>✧ Flood loss costs per \$1,000 shall be related to the Coverage C limit.</p>
Manufactured Housing	<p>Coverage A = Building</p> <ul style="list-style-type: none"> • Replacement Cost included subject to Coverage A limit <p>Coverage B = Appurtenant Structures</p> <ul style="list-style-type: none"> • Replacement Cost included subject to Coverage B limit <p>Coverage C = Contents</p> <ul style="list-style-type: none"> • Replacement Cost included subject to Coverage C limit <p>Coverage D = Time Element</p> <ul style="list-style-type: none"> • Time limit = 12 months • Per diem = \$150.00/day per policy, if used <p>✧ Flood loss costs per \$1,000 shall be related to the Coverage A limit.</p>

Form AF-8: Flood Probable Maximum Loss for Florida

- A. Provide a detailed explanation of how the Expected Annual Flood Losses and Return Periods are calculated.

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

***Options for Exposure dataset: (same as in Standard GF-1)**

1. A modeler specified, predetermined and comprehensive exposure dataset
2. Sample dataset of exposures from the NFIP for Florida
3. A notional dataset developed by modelers analogous to the notional dataset for the Logical Relationship to Risk form for hurricane

In the column Return Period (Years), provide the return period associated with the average flood loss within the ranges indicated on a cumulative basis.

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

For each flood loss range in millions (\$1,001-\$1,500, \$1,501-\$2,000, \$2,001-\$2,500) the average flood loss within that range should be identified and then the return period associated with that flood loss calculated. The return period is then the reciprocal of the probability of the flood loss equaling or exceeding this average flood loss size.

The probability of equaling or exceeding the average of each range should be smaller as the ranges increase (and the average losses within the ranges increase). Therefore, the return period associated with each range and average flood loss within that range should be larger as the ranges increase. Return periods shall be based on cumulative probabilities.

A return period for an average flood loss of \$4,705 million within the \$4,501-\$5,000 million range should be lower than the return period for an average flood loss of \$5,455 million associated with a \$5,001- \$6,000 million range.

- B. Provide the estimated flood loss and uncertainty interval for each of the Personal Residential Return Periods given in Part B. Describe how the uncertainty intervals are derived.
- C. Provide this form in Excel format. The file name shall include the abbreviated name of the modeling organization, the standards year, and the form name. Form AF-8, Flood Probable Maximum Loss for Florida shall also be included in a submission appendix.

Part A – Personal Residential Flood Probable Maximum Loss for Florida

LOSS RANGE (MILLIONS)			TOTAL LOSS	AVERAGE LOSS (MILLIONS)	NUMBER OF FLOODS	EXPECTED ANNUAL FLOOD LOSSES*	RETURN PERIOD (YEARS)
\$ -	to	\$ 500					
\$ 501	to	\$ 1,000					
\$ 1,001	to	\$ 1,500					
\$ 1,501	to	\$ 2,000					
\$ 2,001	to	\$ 2,500					
\$ 2,501	to	\$ 3,000					
\$ 3,001	to	\$ 3,500					
\$ 3,501	to	\$ 4,000					
\$ 4,001	to	\$ 4,500					
\$ 4,501	to	\$ 5,000					
\$ 5,001	to	\$ 6,000					
\$ 6,001	to	\$ 7,000					
\$ 7,001	to	\$ 8,000					
\$ 8,001	to	\$ 9,000					
\$ 9,001	to	\$ 10,000					
\$ 10,001	to	\$ 11,000					
\$ 11,001	to	\$ 12,000					
\$ 12,001	to	\$ 13,000					
\$ 13,001	to	\$ 14,000					
\$ 14,001	to	\$ 15,000					
\$ 15,001	to	\$ 16,000					
\$ 16,001	to	\$ 17,000					
\$ 17,001	to	\$ 18,000					
\$ 18,001	to	\$ 19,000					
\$ 19,001	to	\$ 20,000					
\$ 20,001	to	\$ 21,000	Limits will need to be reduced for Flood				
\$ 21,001	to	\$ 22,000					
\$ 22,001	to	\$ 23,000					
\$ 23,001	to	\$ 24,000					
\$ 24,001	to	\$ 25,000					
\$ 25,001	to	\$ 26,000					
\$ 26,001	to	\$ 27,000					
\$ 27,001	to	\$ 28,000					
\$ 28,001	to	\$ 29,000					
\$ 29,001	to	\$ 30,000					
\$ 30,001	to	\$ 35,000					
\$ 35,001	to	\$ 40,000					
\$ 40,001	to	\$ 45,000					
\$ 45,001	to	\$ 50,000					
\$ 50,001	to	\$ 55,000					
\$ 55,001	to	\$ 60,000					
\$ 60,001	to	\$ 65,000					
\$ 65,001	to	\$ 70,000					
\$ 70,001	to	\$ 75,000					
\$ 75,001	to	\$ 80,000					
\$ 80,001	to	\$ 90,000					
\$ 90,001	to	\$ 100,000					
\$ 100,001	to	\$ Maximum					
Total							

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

Part B – Personal Residential Flood Probable Maximum Loss for Florida

Return Period (Years)	Estimated Flood Loss Level	Uncertainty Interval
Top Event		
1,000		
500		
250		
100		
50		
20		
10		
5		