

# Recommended Edits to the 4-27-15 Draft Meteorological/Hydrological Flood Standards

Flood Standards Development Committee Meeting  
June 30 & July 1, 2015

## MHF-1, Flood Event Data Sources

### Disclosures

Professional Team: **Technical/Editorial**

Explanation: Disclosures 4 and 5 edited to be consistent with the Professional Team’s recommendations for Forms MHF-2 and MHF-3.

Amendatory Language:

- 4. Provide a completed Form MHF-2, (Coastal Flood Characteristics by Return Periods) for coastal flooding, which includes data for flood extent and stillwater flood depth corresponding to modeled 10-, ~~25~~, 50-, 100-, ~~250, and~~ 500-, ~~and 1,000~~ year return periods. Provide a link to the location of the form [insert hyperlink here].
  
- 5. Provide a completed Form MHF-3 (Inland Flood Characteristics by Return Periods) for inland flooding, which includes data for flood extent and depth corresponding to modeled 10-, ~~25~~, 50-, 100-, ~~250, and~~ 500-, ~~and 1,000~~-year return periods. Provide a link to the location of the form [insert hyperlink here].

### Audit

Professional Team: **Editorial**

Amendatory Language:

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

## **MHF-2, Flood Parameters (Inputs)**

### Disclosures

Professional Team: **Editorial**

Amendatory Language:

10. Describe any assumptions or calculations used in the model relating to antecedent conditions (e.g., groundwater levels, lake levels, river discharges, tides, waves, ~~etc.~~).

### Audit

Professional Team: **Editorial**

Explanation: Reworded for consistency with audit wording.

Amendatory Language:

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

## **MHF-3, Wind and Pressure Field Structures for Storm Surge**

### Disclosures

Professional Team: **Editorial**

Amendatory Language:

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

## Audit

Professional Team: **Editorial**

Explanation: Reworded for consistency with audit wording.

Amendatory Language:

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

## ***MHF-4, Flood Characteristics (Outputs)***

### Disclosures

Professional Team: **Technical/Editorial**

Explanation: Disclosure 1 edited to be consistent with the Professional Team's recommendations for the 5 Florida regions given in proposed Figure 3 (Panhandle, North Florida, East Florida, Southeast Florida, and Southwest Florida).

Amendatory Language:

1. Provide comparisons of the modeled and historical flood extents and depths for the following events: Hurricane Andrew (1992), Hurricane Ivan (2004), Hurricane Jeanne (2004), Hurricane Wilma (2005), Tropical Storm Fay (2008), Unnamed storm on ~~east-central~~ East Florida (May 2009), Unnamed storm on ~~Florida p~~ Panhandle (July 2013), and one additional Florida storm of the modeling organization's choosing. If data are not available, the modeling organization may substitute a historical storm of their choosing.

## Audit

Professional Team: **Editorial**

Explanation: Reworded for consistency with audit wording.

Amendatory Language:

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

## **MHF-5, Flood Probability Distributions**

### **Audit**

Professional Team: **Editorial**

Explanation: Reworded for consistency with audit wording.

Amendatory Language:

1. ~~Demonstrate that~~The consistency in accounting for similar ~~model~~-flood parameters and characteristics ~~are accounted for in the same manner~~ across Florida and ~~are appropriate for~~ adjacent segments in Alabama and Georgia will be reviewed.

## **MHF-6, Modeling of Regional/Local Flood Mitigation and Prevention Measures**

### **Standard**

Commission/Professional Team: **Editorial**

Explanation: For consistency with changes made at the June 4, 2015 meeting.

Amendatory Language:

MHF-6 Modeling of Regional/Local Flood ~~Mitigation and Prevention~~Control Measures

- A. The model's treatment of flood ~~mitigation and prevention~~control measures shall be consistent with historical records and with current state-of-the-science.
- B. The modeling organization shall have a documented procedure for reviewing available flood ~~mitigation and prevention~~control data and shall update the flood model ~~mitigation and prevention~~control databases as necessary.
- C. Any treatment of the potential failure of flood ~~mitigation or prevention~~ control measures shall be based upon currently accepted scientific literature, empirical studies, or engineering analyses.

### **Purpose**

Commission/Professional Team: **Editorial**

Explanation: For consistency with changes made at the June 4, 2015 meeting.

Amendatory Language:

This standard requires that regional/local flood ~~mitigation and prevention~~control measures are accounted for and updated as necessary. It also requires that any treatment of the potential failure

of flood ~~mitigation or prevention~~control measures properly reflects the scientific and engineering basis.

Flood control measures are those measures undertaken outside the building footprint and on a larger scale, to reduce the presence, depth or energy of flow or waves that affect one or more residential structures. Flood control measures may include, but not be limited to:

- Flood barriers and their corresponding location, dimensions, and strength (e.g., dams, levees, floodwalls, seawalls)
- Flow diversions, retention ponds and water storage areas, including associated catch basins, channels, culverts, gates, pumps, etc.
- Intentional or accidental release of water from behind flood barriers or from water storage areas.

## Disclosures

Commission/Professional Team: **Editorial**

Explanation: For consistency with changes made at the June 4, 2015 meeting.

Amendatory Language:

1. List the flood ~~mitigation and prevention~~control measures incorporated in the flood model and the sources of all data employed.
2. Describe the methodology to account for flood ~~mitigation and prevention~~control measures in the flood model and indicate if these measures can be set (either to on or off) in the flood model.
3. Describe if flood ~~mitigation and prevention~~control measures which require human intervention or ongoing maintenance are incorporated into the flood model. Disclose the consideration given, if any, ~~on~~for the time required to construct, install or activate such measures, as compared with warning time that may be available before a flood event. Disclose the consideration given, if any, for the likelihood of construction/installation/ activation based on reports for past storm events.
4. Provide the probability distributions of flood extent, depth, and other characteristics showing the impact of flood ~~mitigation and prevention~~control measures versus no flood ~~mitigation and prevention~~control measures.
5. Describe how a determination is made to update any flood ~~mitigation and prevention~~control measure modeling databases or the time period planned for regular updating of databases.
6. Describe and justify the methodology used to account for the potential failure or alteration of flood ~~mitigation and prevention~~control measures in the flood model and if the level of failure can be adjusted in the flood model.

## Audit

Commission/Professional Team: **Editorial**

Explanation: For consistency with changes made at the June 4, 2015 meeting.

Amendatory Language:

1. Treatment of flood ~~mitigation and prevention~~control measures incorporated in the flood model will be reviewed.
2. The documented procedure addressing the updating of flood ~~mitigation and prevention~~control measures as necessary will be reviewed.
3. The methodology and justification used to account for the potential failure or alteration of flood ~~mitigation and prevention~~control measures in the flood model will be reviewed.
4. The probability distribution for flooding scenarios incorporating the failure of flood ~~mitigation and prevention~~control measures will be reviewed.

## ***MHF-7, Logical Relationships Among Flood Parameters and Characteristics***

### Standard

Professional Team: **Technical/Editorial**

Amendatory Language:

- H. ~~If locally generated coastal waves are represented, t~~The heights and periods of local generated coastal waves shall increase with increasing windspeed, subject to depth, fetch and wind duration limits, all other factors held constant.

### Disclosures

Professional Team: **Technical/Editorial**

Explanation: Disclosure 1 edited to be consistent with the Professional Team's recommendations for the 5 Florida regions given in proposed Figure 3 (Panhandle, North Florida, East Florida, Southeast Florida, and Southwest Florida).

Amendatory Language:

1. Provide a sample graph of water surface elevation and discharge versus time associated with inland flooding for modeling organization defined locations within each region in Florida defined in Figure 3: Panhandle, ~~Gulf Coast~~, North Florida, ~~Central-East~~ Florida, Southeast Florida, and Southwest Florida. Discuss how the flood characteristics exhibit logical relationships.

## **Form MHF-1: Historical Event Flood Extent and Depth Validation Maps**

Professional Team: **Editorial**

Explanation: Edited for consistency with Professional Team's recommendations for the 5 Florida regions given in proposed Figure 3.

Amendatory Language:

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

Hurricane Andrew (1992)

Hurricane Ivan (2004)

Hurricane Jeanne (2004)

Hurricane Wilma (2005)

Tropical Storm Fay (2008)

Unnamed Storm East ~~Central~~ Florida (May 2009)

Unnamed Storm ~~Florida~~-Panhandle (July 2013)

Storm chosen by modeling organization

## **Form MHF-2: Coastal Flood Characteristics by Return Periods**

Professional Team: **Technical**

Amendatory Language:

~~For areas subject only~~ Define one study area subject to coastal flooding, ~~within each of five Florida geographic regions (see Figure 3): Panhandle, North Florida, East Florida, Southeast Florida, and Southwest Florida.~~ The extent of each study area shall be determined by the modeling organization and shall be large enough to encompass at least one county.

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

~~A. If erosion is incorporated in the flood model, provide erosion depth grids (original grade elevation minus eroded grade elevation) corresponding to modeled 10, 25, 50, 100, 250, 500, and 1,000 year return periods.~~

~~B. Provide stillwater flood extent and depth grids corresponding to modeled 10, 25, 50, 100, 250, 500, and 1,000 year return period flood events. If the flood model incorporates erosion, include erosion effects in the flood depth grids.~~

~~C.A. Provide flood~~ Flood extent and stillwater flood depth ~~grids, including overland waves and wave run-up as appropriate,~~ corresponding to modeled 10-, ~~25-,~~ 50-, 100-, ~~250, and~~ 500-, ~~and 1,000~~ year return period flood events. ~~If the flood model incorporates erosion, include erosion effects in the flood depth grids.~~ Flood extent and stillwater flood depth shall incorporate 1) the effects of wave setup, if modeled, and 2) the effects of erosion, if modeled.

~~D.B. Provide w~~ Wave height associated with overland flooding, and wave runup height associated with runup on steep slopes ~~grids~~ corresponding to modeled 10-, ~~25-,~~ 50-, 100-, ~~250, and~~ 500-, ~~and 1,000~~ year return period flood events.

C. Wave crest elevation and wave runup elevation corresponding to the modeled 10-, 50-, 100-, and 500-year return period flood events.

D. To the degree that flood-induced erosion effects are included in the vulnerability model, the depth of erosion (original ground elevation minus eroded ground elevation) corresponding to modeled 10-, 50-, 100-, and 500-year return period flood events.

~~E. If~~ To the degree that flow velocity effects are included in the vulnerability model, ~~is considered in the vulnerability functions, provide the~~ flow velocity ~~grids~~ corresponding to modeled 10-, ~~25-,~~ 50-, 100-, ~~250, and~~ 500-, ~~and 1,000~~ year return period flood events.

~~F. Provide graphs and underlying data in Excel format depicting flood elevation probability distributions (include wave effects, if present) for modeling organization defined locations within each region in Florida: Panhandle, Gulf Coast, North Florida, Central Florida, and South Florida. To the degree that flood duration effects are included in the vulnerability model, the duration of flooding above ground corresponding to modeled 10-, 50-, 100-, and 500-year return period flood events.~~

~~G. Provide color coded maps depicting grids at modeling organization defined locations within each region in Florida: Panhandle, Gulf Coast, North Florida, Central Florida, and South Florida. Increasing flood depths, flood velocities, and erosion shall be indicated by greater color intensity.~~

~~H.G. Plot the areas where the erosion depth,~~ Indicate where and how flood extent, stillwater flood depth, or flood velocity and wave conditions grids are affected by flood control measures, and flood protection system by failure of those measures. Flood conditions for both intact and failed measures shall be presented.

~~H. To the degree that the following effects are included in the vulnerability model, indicate where and how flood-induced erosion, flow velocity, and flood duration are affected by flood control measures, and by failure of those measures. Flood conditions for both intact and failed measures shall be presented.~~

~~J.I. 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 MHF-2<sub>2</sub> (Coastal Flood Characteristics by Return Periods) shall also be included in a submission appendix.

## **Form MHF-3: Inland Flood Characteristics by Return Periods**

Professional Team: **Technical**

Amendatory Language:

~~For areas subject only~~ Define one study area subject to inland flooding, within each of five Florida geographic regions (see Figure 3): Panhandle, North Florida, East Florida, Southeast Florida, and Southwest Florida. The extent of each study area shall be determined by the modeling organization and shall be large enough to encompass at least one county.

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

~~A.—If erosion is incorporated in the flood model, provide erosion depth grids (original grade elevation minus eroded grade elevation) corresponding to modeled 10, 25, 50, 100, 250, 500, and 1,000 year return period flood events.~~

~~B.A. Provide stillwater flood~~ Flood extent and depth grids corresponding to modeled 10-, 25-, 50-, 100-, 250-, and 500-, and 1,000 year return period flood events. If the flood model incorporates erosion, include erosion effects in the flood depth grids. Flood extent and depth shall incorporate the effects of erosion, if modeled. For locations subject to both inland and coastal flooding, this information should reflect only inland flooding.

~~B. To the degree that flood-induced erosion effects are included in the vulnerability model, the depth of erosion (original ground elevation minus eroded ground elevation) corresponding to modeled 10-, 50-, 100-, and 500-year return period flood events.~~

~~C. If flow velocity is considered in the vulnerability functions, provide flow velocity grids corresponding to modeled 10, 25, 50, 100, 250, 500, and 1,000 year return period flood events. To the degree that flow velocity effects are included in the vulnerability model, the flow velocity corresponding to modeled 10-, 50-, 100-, and 500-year return period flood events.~~

~~D. For selected locations and flood events, compare the flood model elevation probability distributions with historical floods as available data allow. To the degree that flood duration effects are included in the vulnerability model, the duration of flooding above ground corresponding to modeled 10-, 50-, 100-, and 500-year return period flood events.~~

~~E.—Provide graphs and underlying data in Excel format depicting stillwater flood elevation probability distributions for modeling organization defined locations within each region in Florida: Panhandle, Gulf Coast, North Florida, Central Florida, and South Florida.~~

~~F.—Provide color coded maps depicting grids at modeling organization defined locations within each region in Florida: Panhandle, Gulf Coast, North Florida, Central Florida, and South Florida. Increasing flood depths, flood velocities, and erosion depths shall be indicated by greater color intensity.~~

~~G.E. Plot the areas~~ Indicate where and how the erosion depth, flood extent and depth, or flood velocity grids are affected by flood mitigation and prevention control measures or other flood protection system and by failure of those measures. Flood conditions for both intact and failed measures shall be presented.

H.F. To the degree that the following effects are included in the vulnerability model, indicate where and how flood-induced erosion, flow velocity, and flood duration are affected by flood control measures, and by failure of those measures. Flood conditions for both intact and failed measures shall be presented.

H.G. Form MHF-3, Inland Flood Characteristics by Return Periods shall also be included in a submission appendix.

~~For areas subject to both inland and coastal flooding,~~

~~J.— Provide separate flood depth and flood velocity and erosion grids with combined coastal and inland stillwater flooding, including erosion effects if the flood model incorporates erosion.~~

~~K.— 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 MHF 3 (Inland Flood Return Periods) shall also be included in a submission appendix.~~

Figure 3

## State of Florida By Region

