

FEMA Response to the Review of the Interim FFRMS Flood Mapping Data Development Methodology Report Assessed by the Federal Flood Risk Management Standard (FFRMS) Science Subgroup of the Flood Resilience Interagency Working Group of the National Climate Task Force

Introduction

This document is intended to provide a response to the technical assessment of the *Interim Federal Flood Risk Management Standard (FFRMS) Flood Mapping Data Development* prepared by the FFRMS Science Subgroup (Spring 2024).

The Federal Flood Risk Management Standard (FFRMS) was established by Executive Order (EO) 13690 on *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input* (2015) and builds on EO 11988, *Floodplain Management* (1977) to encourage federal agencies to consider and manage current and future flood risks. The FFRMS applies to federally funded projects, defined as “[a]ctions where federal funds are used for new construction, substantial improvement, or to address substantial damage to structures and facilities.” The FFRMS requires agencies to select one or more of the following three approaches for establishing the flood elevation (“how high”) and corresponding flood hazard area (“how wide”) used for project siting, design, and construction: the Climate Informed Science Approach (CISA), the Freeboard Value Approach (FVA), or the 0.2-Percent Flood Approach (0.2PFA), which are outlined in the [2015 Guidelines for Implementing EO 11988 and EO 13690](#). Given the complexity of the FFRMS, the federal government is developing multiple resources to support agencies and their non-Federal partners in the implementation of this standard. The development of these resources is supported by the National Climate Task Force Flood Resilience Interagency Working Group (IWG), co-chaired by CEQ, FEMA, and OMB and the Flood Resilience IWG Science Subgroup, co-chaired by HUD, NOAA, and OSTP. These resources include the [FFRMS Floodplain Determination Job Aid \(August 2023\)](#), the Federal Flood Standard Support Tool (Spring 2024), and the *Interim FFRMS Flood Mapping Data Development Methodology* report (Spring 2024).

Response to Review

The comments from the FFRMS Science Subgroup in response to the charge questions are appreciated and will go far in ensuring that the methodology to create the background data is robust and well documented. In response, FEMA focused on the comments directly related to the development of the data, as that is the intended focus of the Interim Methodology Report. The FFRMS Science Subgroup raised a number of important considerations as it relates to the decision making behind the development of the Federal Flood Standard Support Tool, as well as the use and implementation of the data behind the tool. These are important questions; however, the response focuses on the questions pertaining to the development of the underlying data as the focus of the Interim Methodology Report. Companion reports such as the [FFRMS Climate Informed Science Approach \(CISA\) State of the Science Report](#), the [FFRMS Floodplain Determination Job Aid \(“Job Aid”\)](#), and the documentation embedded in the tool itself are excellent sources of information to address questions broader than the data development.

This Interim Methodology Report was designed to summarize the methodology processes and procedures followed by FEMA to create digital flood elevations and extents that can be used to support

the Federal Flood Standard Support Tool in applying simplified CISA (where applicable), FVA, and 0.2PFA approaches. The methodology processes and procedures summarized within this document use the hydrologic and hydraulic model-backed, digital flood hazard datasets that have gone through a full public comment and appeal period and are published as part of FEMA's Flood Insurance Rate Maps as the basis. This document provides a resource that federal agencies and their non-federal partners (including potential federal grant recipients) may use to understand the process and procedures followed by FEMA in data development of the Freeboard Mapping data and 0.2PFA data.

The data produced are water surface elevation (WSEL) rasters at the county (or county-equivalent) level:

- Freeboard WSEL rasters for +0, +1, +2-, and +3-foot elevations for all areas (where digital effective FEMA floodplain data exists).
- Freeboard WSEL rasters for +0 through +10-foot elevations for coastal areas on the Atlantic and Gulf Coasts, to support a simplified CISA application within the Federal Flood Standard Support Tool
- 0.2-percent-annual-chance flood WSEL rasters where effective FEMA data include 0.2-percent-annual-chance flood elevations. (Note that these datasets will not be included in the first iteration of the Federal Flood Standard Support Tool.)

A key component of the data development is the distinct separation between the datasets developed for use in the FVA and the datasets developed for use within simplified CISA. For coastal areas considered within the simplified CISA application (Atlantic and Gulf), the coastal data is processed fully independently and is separated from the rest of the county based on the extents of the coastal Stillwater Elevation that is produced as part of the FIRM. For the FVA approach, the elevation data published on the FIRM is used as the base data. Even in areas where these two things may overlap, the WSEL rasters are computed independently. The Base Flood Elevation on the FIRMs that is used as the base data for all Freeboard Mapping Data does include elevations that contain components from riverine and coastal sources in transition zones that are computed using FEMA's standard approach. Documentation of this approach can be found in the appropriate county Flood Insurance Study or the Combined Coastal and Riverine Floodplain guidance document (FEMA, 2020)¹.

Direct responses to the charge questions are outlined below.

2. Response to Charge Questions

The FFRMS Science Subgroup agencies were invited to reply to each of the questions in the charge. FEMA addressed each question in the following sections.

¹ [December 2020- Guidance for Flood Risk Analysis and Mapping – Combined Coastal and Riverine Floodplain](#)

a. Does the Methodology Report clearly state how the underlying data were utilized?

The Science Subgroup agreed that the Interim Methodology Report states how the underlying data were utilized, but identified three areas that would benefit from additional discussion: estimation of water levels in areas subject to both coastal and riverine flooding, data uncertainty, and data use within the Federal Flood Standard Support Tool.

FEMA agrees that more clarification on the estimation of water levels in locations subject to both coastal and riverine hazards is needed. FEMA has added additional clarification to the Interim Methodology Report.

FEMA does not agree that uncertainties surrounding the underlying data (National Flood Hazard Layer) and The National Map are appropriate to be addressed within the Interim Methodology Report. The documentation on the data development (Flood Insurance Study) for any area are publicly available to any practitioner using the Federal Flood Standard Support Tool and are the best source of information surrounding the underlying data.

Specific comments for improved clarity were integrated into the Interim Methodology Report.

b. Under the FFRMS, agencies may utilize one or more of the three approaches outlined in E.O. 13690 to determine the FFRMS floodplain. The Climate-Informed Science Approach (CISA) should be used where data are available and actionable. Does the Methodology Report make it clear what, and where, CISA data are available and actionable in the Federal Flood Standard Support Tool?

Comments from the Science Subgroup indicated that more clarity could be provided as to what and where actionable data were produced that support a simplified CISA analysis. FEMA provided more discrete clarifications within the Interim Methodology Report as to where the simplified CISA data were produced and added clarifications that identify the simplified nature of the data development.

However, the questions raised regarding the actionability of CISA data or the implementation of a simplified CISA approach are appropriately addressed Agency by Agency. The [FFRMS Climate Informed Science Approach \(CISA\) State of the Science Report](#) provides context to actionability, but the implementation of a CISA approach is dependent on Agency decisions and capabilities. The Job Aid provides more context on the actionability of a simplified approach, and the implementation of this approach within the tool can be determined through information embedded in the tool or by future documentation updates.

c. The [2015 Implementation Guidelines](#), [Appendix H of the 2015 Implementation Guidelines](#) and the 2023 [FFRMS CISA State of the Science Report](#) use the terms “best available data and science” and “actionable” in identifying what data or science should be applied in the CISA. These terms are defined in Section 1.B.1 of the [2015 Implementation Guidelines](#) and Section 1.A.I [Appendix H of the 2015 Implementation Guidelines](#). Can the methodology described in the Methodology Report take into account best available data and actionable science?

The Science Subgroup in general, agreed that the Interim Methodology Report addresses “best available data and science.” Comments were raised regarding the choice to prioritize Digital Effective FIRM datasets that have gone through a full public comment and appeal period as the basis for this effort, the choices surrounding the freeboard values for the simplified CISA, and the choices surrounding treatment of areas of combined hazard.

The choices were designed to span most applications for what was determined with decision makers and stakeholders deemed needed to implement. These choices do not preclude the use of data that could be determined best available as outlined via the definitions within the cited documents, but the prioritization of data development was required under the constraints of the data development effort. The choices in data development were determined with decision makers and stakeholders to be appropriate to meet the needs of the tool, designed as a resource to help federal agencies and their non-federal partners conduct a screening to determine if a proposed federally funded action will be located within an FFRMS floodplain, based on the CISA, FVA, or 0.2PFA approaches.

Additional comments and questions were made regarding the limitations of existing FIRM maps as well as planned update schedules. The Interim Methodology Report was intended to describe the methodology as implemented for this effort. Limitations of the underlying data are best described by the documentation associated with the FIRM and FIS of the area of interest. Any plans for updates associated with the Federal Flood Standard Support Tool or the underlying data may or may not be addressed in conjunction with decision makers and other FFRMS stakeholders.

d. Are challenges and potential solutions to data limitations clearly explained?

The comments made by the Science Subgroup indicated areas in which the Interim Methodology Report should include more resources and suggested methods for how to address underlying data limitations. Some additional clarifications were added to the report, specifically surrounding areas which experience both coastal and riverine flooding. Additional specificity surrounding data limitations and application is planned for the more comprehensive data development methodology report planned for July 2024.

e. Are the methodologies outlined in the Methodology Report articulated in a way that is clear and transparent?

The comments made by the Science Subgroup indicate that the Interim Methodology Report is clear and transparent, however notes that some connections regarding the use of the underlying data may be valuable. The Interim Methodology Report is intended to document the development of the underlying data. Further discussion and explanation of the CISA methodology and use of the data is beyond the scope of the methodology report and more appropriately represented through comprehensive documentation of the tool itself. Additional documentation surrounding the specific quality control measures can be included the planned July 2024 report.

f. Does the Methodology Report clearly explain how conflicts in elevation outputs are or might be addressed, in particular in areas of confluence in coastal and riverine floodplains?

The Science Subgroup indicated that more clarification may be needed surrounding areas subject to both coastal and riverine flood sources. Some additional clarification has been added to the report to distinguish how the sources were developed for the purposes of the underlying FFRMS datasets. The comments surrounding the NFHL and FIRM data itself are best documented by referencing the FIRM and FIS datasets associated with the site of interest. While the comments indicate there may be benefit to documenting planned future work, any planned work associated with data development should be addressed in conjunction with decision makers and other FFRMS stakeholders.

g. Is the methodology for utilizing topographic information and flood elevation information to delineate a FFRMS floodplain depth well-reasoned and appropriately explained?

The comments made by the Science Subgroup indicate that the Interim Methodology Report explains the approach well. There are suggestions to re-organize for clarity, which can be considered for the planned July 2024 update. Additional documentation on the use of cross-sections and DEMs has been incorporated into the report. The comments also indicate that more detail should be provided regarding the clarity of the underlying FIRM and FIS data. The methodology as constructed and documented within the Interim Methodology Report is not designed to address limitations on the underlying data, and the documentation found within the FIRM and FIS for the site of interest should be consulted.

h. What are areas of future research in advancing flood resilience?

The Science Subgroup identified a number of areas for potential opportunities. These should be considered in conjunction with decision makers and other FFRMS stakeholders for any potential future implementation.

The final discussion of the Science Subgroup review identified two areas of future work, and due to the nature may require more discussion with FFRMS decision makers and stakeholders. Firstly, the use of a physics-based methodology to determine WSEL may be appropriate within the context of a CISA approach, it may not be appropriate within the definitions in the EO and Implementation Guidelines for a FVA approach. Secondly, while the comment on the availability of FFRMS is understood, FEMA would state that this availability is not necessarily income correlated, but it is recognized to be population correlated, and the burden that is mentioned is more appropriately contextualized for rural communities, rather than lower-income communities. FEMA did consider equity in the development of the FFRMS flood mapping data development by prioritizing communities based on the following factors:

- The expected annual Flood Risk experienced by disadvantaged communities, based on the Climate and Economic Justice Screening Tool (CEJST)²
- The availability of digital effective model backed data
- Communities in a US Territory
- Communities that are on Federally Recognized Tribal lands

² [Climate and Economic Justice Screening Tool | U.S. Climate Resilience Toolkit](#)