

DEPARTMENT OF THE ARMY
U.S. Army Corps of Engineers
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Circular
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Engineering and Design
FLOOD INUNDATION MAPPING

1. Purpose. Ensure proper coordination of Hydrologic, Hydraulic & Coastal (HH&C) and Geospatial Communities of Practice (CoP) regarding geospatial analysis when creating Flood Inundation Maps (FIM). This circular also provides guidance on the use and release of flood inundation maps. The U.S. Army Corps of Engineers (USACE) recognizes its responsibility to protect public safety and welfare by effectively communicating information to the public related to flood risks, in general, and, in particular, the flood risks associated with the operation and performance of USACE dams and levees. USACE must also protect the security of those dams and levees by safeguarding sensitive information.
2. Applicability. This circular applies to all USACE Commands and elements.
3. Distribution. Approved for public release; distribution is unlimited.
4. References.
 - a. Public Law 84-99, Flood Control and Coastal Emergencies (FCCE) (33 U.S.C. 107n) (69 Stat. 186).
 - b. OPORD 2015-11, USACE Response to All Hazards Events (geo appendix)
 - c. 2015 Emergency Support Function (ESF) #3 Field Guide
 - d. 2016 Flood Inundation Mapping (FIM) Standard Operating Procedure (SOP)
 - e. Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988. Pub. L. No. 100-707; amending Pub. L. No. 93-288. Codified at 42 U.S.C. §§ 5121-5207.
5. Scope. This EC pertains to HH&C and Geospatial CoP when executing geospatial analysis in support of Public Law 84-99 and hurricane events. The guidance and direction provided here and in referenced documents pertaining to FIM development shall also be used by programs in support of planning and preparedness for flood events; such as, Silver Jackets and Planning Assistance to States to ensure flood inundation products being produced by these programs are standard products.

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6. Overview. This document ensures coordination of HH&C and Geospatial CoP products by providing guidance on the creation and sharing of flood inundation and geospatial data/maps with stakeholders and the public. Specifically: Section 7 covers the creation of FIM and geospatial data in support of the Dam and Levee Safety Programs and release of information to the public with regard to USACE flood risk management infrastructure; Section 8 covers the production of FIM in support of planning and preparedness activities; Section 9 addresses FIM production during a real time flood event; Section 10 addresses the use of appropriate standards when creating FIM and data management activities; Section 11 provides disclaimer information; Section 12 discusses FIM data hosting options and Section 13 identifies funding FIM and geospatial support activities.

7. FIM Supporting Emergency Action Plans (EAP) for Dam/Levee Safety. FIM developed to support EAPs around systems where USACE operates flood risk management infrastructure (i.e. levees and dams) are not releasable to the public, but are shared with federal agencies and state and local governmental organizations. During a declared emergency such as a flood or potential flood event, USACE divisions have the authority to release static and dynamic geospatial and FIM data to the public in support of flood fighting activities as well as making the public aware of potential consequences. Once USACE starts preparation for an emergency event, FIM that may have been considered sensitive during a non-flood event, can and shall be released during a flood event. Divisions may delegate the authority to their district offices. When the division/district release data during flood event, they shall inform the USACE Operations Center (UOC).

8. FIM Supporting Planning and Preparedness for areas with No USACE Infrastructure. Through programs such as the Silver Jackets and Planning Assistance to States (PAS) Programs, USACE often works with local communities to develop FIM to support flood preparation and preparedness activities. FIM produced in areas where no USACE infrastructure exists, can and shall be released to the public in close coordination with state and local governments.

9. Creation of FIM to support real time flood event. A FIM shows either past, current or predicted extent of flood water within a study area for past, ongoing, or future flood events. FIM produced by USACE or in partnership with USACE shall be shared with government stakeholders, the public and the UOC. All GIS data used to produce FIM as well as all geospatial data created and collected during an event needs to flow seamlessly between districts, divisions and HQ as directed in the most recent release of the Geospatial Annex of the All Hazards OPORD, reference 4.b.

a. Timing. While every event is different, FIM shall be created under the following conditions using the MMC MCX Flood Inundation Standard Operating Procedure.

1. During an inland flooding event, USACE shall be prepared to create FIM to monitor and manage USACE water management infrastructure once one of the following has occurred:

a. Stafford Act (reference 4.e) is enacted

b. District Emergency Operation Command (EOC) is activated

c. When the pool level of a USACE reservoir is expected to exceed normal operating limits and result in some uncontrolled release of flood pool via spillway(s) or in events where flood control releases would be expected to be perceived as elevated beyond normal limits in the downstream reach(es).

d. Releases from USACE facilities are expected to result in river levels above flood stage or authorized control levels, whichever is greater.

e. At the discretion of the district commander.

2. NOAA and FEMA produce predictive storm surge models associated with hurricane surge events. USACE Civil Works Districts will produce maps showing potential storm surge effects on CW projects/infrastructure and/or Army installations within the projected hurricane path. These storm surge FIM for hurricanes should begin at 3 days before the National Hurricane Center's projected landfall. The next FIM is produced at 2 days before landfall, and then at least every 12 hours until 1 day after landfall.

b. Mapping, Modeling and Consequence (MMC) Mandatory Center of Expertise (MCX) Support. If a district office cannot support the creation of FIM, the MMC MCX shall support the creation of FIM.

c. Geospatial Flood Fight Data. In addition to FIM, geospatial data is often created in support of flooding events. As directed in reference 4.a., all geospatial data shall be provided to UOC for inclusion into CorpsMap. This includes, but is not limited to, georeferenced data; such as, lock closure locations, flood fighting staging sites, potential levee breach locations, etc. Any data used by district or MSC to generate a map/slides presented at UOC updates shall be provided to UOC for inclusion into CorpsMap.

d. FIM Requested by Stakeholders. Occasionally, FIM are requested by state and local entities for areas that are not under USACE water management control. At the discretion of the district, FIM can be created by the district office or the district office can delegate the task to the MMC MCX, but must comply with policy, data standards and processes outlined in this EC.

10. FIM Standards and Data Management. All FIM produced by USACE shall follow the standards and guidelines outlined in 4.d. This includes, but is not limited to, creating data that is compliant with Spatial Data Standards for Facilities, Infrastructure and the Environment (SDSFIE) with the appropriate geospatial metadata. FIM data features in the SDSFIE are compliant with the Integrated Water Resource Science and Services (IWRSS) data model. Once the FIM have been produced, the model data, geometry and pdf files shall be uploaded to the USACE FIM database as outlined in 4.d.

11. Disclaimer for Release. Depending on the quality and accuracy of the source data, inundation model results vary greatly in quality and accuracy. Sharing those results with the state and local emergency response authorities, community and public, even when preliminary, promotes preparedness, emergency response, and recovery efforts. Before sharing, products shall have appropriate caveats, such as: "This data/map was created on dd/mm/yyyy by USACE

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using the best available data at the time. It may or may not accurately reflect existing conditions.”

12. Hosting FIM Data and Maps for Public Consumption. If FIM are produced in response to a real time flood event, the FIM can be hosted from the district or division web sites or the FIM can be hosted at the USACE Geospatial Platform (<https://geoplatform.usace.army.mil>). If the flooding event is of national significance, UOC may choose to host the geospatial and flood inundation data from the USACE Geospatial Platform as a web service to communicate the situation to the public and expedite its release.

13. Funding. During flood events, districts should request FCCE or MR&T funds to support geospatial product generation to include FIM. If MMC MCX is producing FIM, districts should request FCCE or MR&T funds as appropriate in order to fund MMC MCX labor.

14. Proponent. The HQUSACE proponent for this interim guidance is the Engineering and Construction Division, Directorate of Civil Works.



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