



Flood Inundation Mapping Program

Instructions for submitting data to the online mapper FOR STUDIES WITH SINGLE GAGE INPUTS

Last Update: September 23, 2015

Projects wishing to include their data on the USGS FIM Program Mapper need to follow the process and meet the specifications for data submission listed here. If you have any questions or a unique library, please contact Moon Kim (mkim@usgs.gov or 317.600.2787) or Marie Peppler (mpeppler@usgs.gov or 703.648.5314).

Data Submission Process

1. Prepare your files using the submission guidelines below for posting in the peer-review mapper (<http://wim.usgs.gov/fimireview/>). You are encouraged to use the peer-review mapper to assist your reviewers. Submit your files to allow for two weeks processing time before your reviewers need to access the maps.
2. Fill out the SharePoint form: <https://xcollaboration.usgs.gov/wg/wiWSC/FIMI/>, being sure to fill in ALL required fields (*) for the review mapper submission. Missing information can result in delays. If you need permissions on the SharePoint to submit your data, please email Moon.
 - Zip all of your organized files together and place them on a public FTP site. Submit the public FTP location to WiM via the SharePoint form.
 - Please attach the “Page 1 text template” to your SharePoint submission. You are also encouraged to submit this text to your peer reviewers and editorial review. Strict character limits will be enforced.
 - Processing will begin as soon as your data is complete. Please contact us as soon as possible if you have a strict deadline you need to meet. Normal processing time for complete submissions is two weeks.
3. Once peer-reviews are completed and any revisions completed, you may resubmit your files, once, as a final mapper version, via public FTP. If no updates are needed or if the revisions and resubmission of files are ready for a final mapper version, please fill out the remaining fields in the SharePoint form. You must have all relevant fields completed before final publishing on the mapper.
 - Approved Report number and link to Pubs Warehouse and location of data download files
 - Names, URLs and logos for the parties involved in creating and reviewing the maps (partners and OFA)
 - Basic logos are on file (USGS, NWS, and USACE) but please let us know which ones to post, and upload any additional logos that should appear on the “Services and Data” tab. Logos should be a maximum height of 150 pixels to fit in the lower left side of the tab.
4. Once the depth grids are finalized, the HAZUS loss-estimation can be completed on your final depth grids. Please allow for additional time and planning for publishing.
5. The final mapper upload and proofing can happen concurrently with your SPN layout but the final links to pubs warehouse are needed before the maps can be published on the mapper.



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Requirements for Mapper Submission

Flood extent areas

Flood extent areas should be submitted as a single shapefile. Each flood stage should be a single, distinct polygon within the shapefile (multi-part if necessary), appropriately attributed with stage, elevation, discharge, associated grid ID, and the USGS gage ID. The shapefile has been formed correctly if there is one row in the attribute table for each flood stage. For instance, if there are 10 flood-extent polygons for 10 stages in the study, there should be 10 rows in the shapefile attribute table. This may require merging separate polygons into one shapefile. See Appendix A for guidance on merging multiple shapefiles.

Naming Convention: The shapefile should be named ShortName.shp, where “ShortName” is a logical, unique name for the library that is no more than 10 characters in length. The ShortName must start with a letter, and end with the 2-letter state abbreviation for the state where the library is located. If feasible, incorporate the name of the stream/river in addition to the location. For example, an ideal ShortName for a library based on a gage on the Yahara River in Madison, Wisconsin would be “yahmadWI.” Be sure each site submitted has a unique ShortName.

Attributes: The required attribute fields are STAGE, ELEV (elevation), QCFS (discharge), USGSID, and GRIDID. Please be sure to make the USGSID field a text type (this allows for the leading zero present in USGS gage IDs). See Table 1 for the required table schema. See Figure 1 for example attribute table. See Appendix B for general instructions on editing an attribute table.

Projection: The Spatial Reference required for shapefile mapper submission is WGS 1984 Web Mercator Auxiliary Sphere (WKID 3857). See Appendix C for detailed instructions on projecting to Web Mercator.

Table 1. Required schema

Field Name	Data Type	Description
STAGE	Double	USGS stage associated with the flood-extent polygon
ELEV	Double	NAVD88 elevation that correlates with the stage
USGSID	Text	USGS station ID number, including leading zeroes
GRIDID	Integer	Code to match the appropriate grid with the flood depths. Please double check your numbers and data.
QCFS	Double	Discharge in cfs



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Figure 1. Example flood extent file attribute table

	OBJECTID *	Shape *	STAGE	ELEV	QCFS	USGSID	GRIDID
	1	Polygon	5	774.03	200	04100500	5
	2	Polygon	6	775.03	250	04100500	6
	3	Polygon	7	776.03	300	04100500	7
	4	Polygon	8	777.03	350	04100500	8
	5	Polygon	9	778.03	415	04100500	9
	6	Polygon	10	779.03	425	04100500	10
	7	Polygon	11	780.03	435	04100500	11
	8	Polygon	12	781.03	450	04100500	12
	9	Polygon	13	782.03	475	04100500	13

Depth Grids

One raster grid for each stage is required. Please place grids together in a folder named “grids” within the zip file placed in the public FTP folder.

Naming Convention: Each grid should be named ShortName_GridID. “ShortName” should be the same from the name of the flood extent polygon shapefile outlined on page 2. GridID is the number of the grid which correlates with the GRIDID of the respective stage from the flood extent polygon attribute table. For example, the accompanying grids to the “yahmadWI” example from page 2 would be “yahmadWI_01”, “yahmadWI_02, etc.

Projection: Grids **DO NOT** need to be re-projected. Grids are not displayed visually so there is no need to project them for the sake of the FIM application. The application queries the grids in the background.

Study boundary lines

Lines representing the extent of the study area should be submitted as a shapefile of a line feature type with same projection information as the flood extent area polygons. In most cases, you will have more than one line (top and bottom of the extent). The lines for a site should be dissolved into a single multi-part feature. Use the "Dissolve" tool in ArcMap. The only field needed is USGSID. See Figure 2 for example study boundary attribute table. See Appendix B for general instructions on editing an attribute table.

Figure 2. Example study boundary file attribute table

Table			
Study_limit			
FID	Shape *	OID_	USGSID
0	Polyline	0	04181500



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Levee extent areas (optional)

Leveed flood extent area polygons should mimic the regular flood extent polygons. They need to have the same table structure with the 4 required fields being STAGE, ELEV, USGSID, and GRIDID. Like the regular flood extents, there should be a polygon for each distinct level you want to represent. They should also have the same projection: WGS 1984 Web Mercator Auxiliary Sphere (WKID 3857).

If you would like the same polygon to represent multiple stages above a threshold, please copy and attribute that polygon the appropriate number of times. Each breach extent which corresponds to a stage level should have its own line in the attribute table. For example, if you have a library with stages 1-9, but the breached area begins at stage 5, you would submit a file that has that has breached flood area polygons for stages 5, 6, 7, 8 and 9, with the respective stage and elevation for each level. This is true whether all of those above the threshold are different or the same.

If you have grids for the leveed areas, submit those just like the other grids, with the same naming convention applied to the regular grids (ShortName_GridIDb), with a letter "b" appended to the end of the grid number. "ShortName" should be the same from the name of the flood extent polygon shapefile outlined on page 2. Example: yahmadWI_01b

Naming Convention: The shapefile should be named ShortName_breach.shp. The grids should be zipped together and named ShortName_breachgrid.zip.

Attributes: Same as regular flood extents area polygons

Projection: Same as regular flood extents area polygons - WGS 1984 Web Mercator Auxiliary Sphere (WKID 3857). Grids do not need to be reprojected.

Levee Centerlines (optional)

Lines representing levees should be submitted as a shapefile of a line feature type. If there is more than one contiguous levee represented, the lines for single site should be dissolved into a single multi-part feature. Use the Dissolve tool in ArcMap. The only field needed is USGSID. See Figure 3 for example the levee shapefile's attribute table for an example.

Figure 3. Example levee centerline file attribute table

Table		
muncin_levee_line		
FID	Shape *	USGSID
0	Polyline	03347000



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Data download files

Data download zip files should be on your publications webpage in Pubs Warehouse. The SPN has a webpage template for FIM reports and download libraries.

Required files include:

Shapefiles of flood extent areas – as above or in local coordinate system

Shapefiles of study boundary lines – as above or in local coordinate system

Grids – named as described above

Metadata – FGDC compliant, including the FIM disclaimer, contact information, and use restrictions.

Metadata template files (.XML format) can be downloaded from the FIM Library Tools webpage, under “Mapping Application Tools.” A single metadata file may be created for all the grids and shapefiles in your project, or individual files may be created for each layer. Open the XML file in ArcCatalog and edit by selecting the “FGDC” icon in the toolbar.

Optional Files include:

Additional shapefiles of leveed areas and centerlines – as required by your study

ReadMe – file describing the file names and any additional information that didn’t go into the metadata.



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HAZUS Flood Loss Data Submission (optional)

The Eastern Geographic Science Center (EGSC) is available to run either a level 1 or level 2 HAZUS analysis for a FIM library. Those interested in a) having a HAZUS analysis conducted for a new FIM site, or b) having a HAZUS analysis they've already completed added to a FIM site should contact: Dave Strong, Eastern Geographic Science Center, USGS Reston, VA, 703-648-6193, dstrong@usgs.gov.

Figure 4. Summary of Data Requirements for Level 1, 2 and 3 HAZUS Analyses

Option	Level 1		Levels 2 & 3	
	Depth Grids	.HPR Files	Contact EGSC	
1) EGSC Does Analysis	x			x
2) Customer Runs Analysis		x	x	

Level 1 Data Requirements

Option 1: EGSC runs the analysis

Depth Grids required: One raster grid for each stage is required. Naming convention, file organization and projection requirements are as described above on page 3.

Option 2: Customer runs the analysis

.HPR file required: An .hpr file from the output for the run for each stage should be submitted, clearly indicating the site and stage. A suggested naming convention is ShortName_Stage.hpr

Level 2 and 3 Data Requirements

Option 1: EGSC Runs the Analysis

Those interested in having EGSC run a level 2 or 3 analysis should contact Dave Strong.

Option 2: Customer Runs the Analysis

.HPR file required: An .hpr file from the output for the run for each stage should be submitted, clearly indicating the site name and stage. A suggested naming convention is ShortName_Stage.hpr.



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APPENDIX A: Merging multiple polygon shapefiles into one

1. Access the Merge tool: ArcToolbox > Data Management Tools > General > Merge.
2. For “Input Datasets” individually browse to and select each flood extent shapefile. Each time you add one, it will appear in the list below.
3. Select a name and location for the “Output Dataset”, following the ShortName.shp convention described on page 2.
4. Click OK, and the new, merged shapefile should be ready wherever you saved it.

APPENDIX B: Editing an attribute table in ArcMap

The attribute table can be edited by viewing the shapefile in ArcMap, opening the table, and beginning an editing session with the Editor toolbar.

1. Click Customize on the top row of menu options, then Toolbars>Editor.
2. Once the Editor toolbar is open, click Editor>Start Editing.
3. Make changes to table as necessary.
4. When finished making changes, select “Save Edits” and then “Stop Editing” (Note that edits to the table must be saved within the Editor toolbar. Saving the MXD file WILL NOT save your changes to the table).

APPENDIX C: Steps for projecting flood-extents shapefile to Web Mercator

1. Access the Project tool in ArcMap: ArcToolbox> Data Management Tools> Projections and Transformation>Feature > Project
2. Select the flood extents shapefile as “Input Dataset”
3. Name and select a location for output in the “Output Dataset or Feature Class” field. Click on “Output Coordinate System” browse icon.
4. In “Spatial Reference Properties”, click “Select”, then “Projected Coordinate Systems”> “World”> “WGS 1984 Web Mercator (Auxiliary Sphere).prj”, click Add. Click “OK” in “Spatial Reference Properties” window.
5. Select appropriate Geographic Transformation. If converting from NAD1983 to WGS84 for a site within the lower 48 states and Alaska (most common case), use the transformation #5 (NAD_1983_To_WGS_1984_5). If your version of ArcGIS automatically pick a transformation for you, keep that transformation value.
6. Click OK at bottom of “Project” tool window.



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For more information on Geographic Transformation, or if you are unsure of which to use, see the Esri links below, which include a link to a document listing the appropriate transformation for every region of the world. You may wish to consult your local GIS specialist if the appropriate transformation is unclear.

<http://blogs.esri.com/esri/arcgis/2009/05/06/about-geographic-transformations-and-how-to-choose-the-right-one/>

<http://support.esri.com/en/knowledgebase/techarticles/detail/21327>