

				Charter Bullets						
				Exchanging and utilizing FIM between IWRSS partners		Specifying metadata and geo-referencing standards		Capturing and conveying the understanding of mapping methodologies, assumptions, and known flood risks	Maintaining and sustaining FIM capabilities	
				Design Specification Logical Categories						
Section	Requirement #	IWRSS FIM Scoped Requirements	Design Specs	FIM Data	Model Data	Layer metadata (GIS style)	Library metadata (reports/docu- mentation)	Data standards	Change Mangement	Use Case
4.2 Information Services Framework	R007 -	Agency IT systems that are included within the ISF should meet the minimum requirements for interoperability. System interoperability between agency IT systems is a key requirement and the enabling technology necessary for the IWRSS joint collaborative operations.	Agency IT systems shall meet the minimum requirements for system interoperability between agencies and enable technology necessary for to share, consume, and exchange FIM amongst IWRSS member agencies.					Yes	Yes	
4.2 Information Services Framework	R008 -	Minimum requirements for IT system interoperability should be established.	Minimum requirements for IT system interoperability to be specified to maintain and sustain FIM.					Yes	Yes	
4.2 Information Services Framework	R009 -	Individual IWRSS agency IT system and security constraints should be considered as the ISF design is developed.	Individual IWRSS agency IT system and security constraints shall be specified in the final design document.					Yes	Yes	
4.4 Quality Management and Peer Review	R011 -	Each FIM library should have a proponent agency identified.	Each FIM library should have a proponent agency identified.				Yes	Yes	Yes	
4.4 Quality Management and Peer Review	R012 -	The IWRSS member proponent agency for FIM libraries would be responsible for certifying the quality of the product, and for defining purpose and use restrictions. Certification by the proponent agency would indicate that the products had been reviewed per proponent agency policies and meet defined IWRSS quality and content standards.	The IWRSS member proponent agency for FIM libraries would be responsible for defining purpose and use restrictions.				Yes	Yes		
4.4 Quality Management and Peer Review	R017 -	Time critical event-based maps will be certified by the proponent agency that the maps meet the existing IWRSS quality standards, and no additional peer review policy will be required.	Time critical event-based maps will be certified by the proponent agency that the maps meet the existing IWRSS quality standards with no additional peer review policy and made known in the metadata	Yes	Yes	Yes	Yes	Yes		
4.4 Quality Management and Peer Review	R022 -	Upon identification of a degraded mapping product, the map may be temporarily or permanently removed from public access, or permanently deleted depending upon circumstances.	Upon identification of a degraded mapping product, the IWRSS design shall allow maps to be temporarily or permanently removed from public access, or permanently deleted depending upon circumstances.				Yes		Yes	
4.4 Quality Management and Peer Review	R024 -	In addition, each map library should record the dates of production and the most recent review and revision, and this information should be published with FIM products.	Each map should have recorded date of production with the most recent review and revision in the metadata..			Yes	Yes	Yes	Yes	
4.5 Common Operating Picture	R026 -	Regardless, the key to ensuring common views of inundation maps is the ability to reference map library unique identification numbers and inundation map unique identification numbers managed within the ISF, and to use a generally consistent presentation of map layers within all FIM applications and products. This would allow multiple applications to support viewing inundation maps via passing of common URL parameters for accessing information in the ISF.	Each map library shall have a unique reference id	Yes		Yes	Yes	Yes		

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4.5 Common Operating Picture	R028 -	To function effectively, the common operating picture should be coupled to an information service framework that should include: (1) a data registry for the flood mapping products, (2) identification of the owner of each product, (3) the corresponding metadata, and (4) the data location (to which the registry would direct the user). The data could be provided by the respective IWRSS agencies via OGC-compliant web services. Figure 4.2 displays a diagram of the interaction between the common operating picture and components of the information services framework that include the data registry, the IWRSS agencies, and individual agency data sources.	Metadata should include the items identified in the requirement and be made available			Yes	Yes	Yes		
4.5 Common Operating Picture	R029 -	In addition, the database could be considered for posting through the Federal Geoplatform on data.gov to provide the IWRSS consortium and new stakeholders the ability to discover FIM services and products.	see #36				Yes	Yes		
5.1 Flood Inundation Map End Products	R030 -	The ISF will host a collection of electronic map libraries, including: (1) stream reach maps, (2) event-based maps, and (3) historical flood documentation maps.	IWRSS member agencies will provide following flood inundation maps: (1) stream reach maps, (2) event-based maps, and (3) historical flood documentation maps.	Yes			Yes	Yes		
5.1 Flood Inundation Map End Products	R031 -	All flood mapping data should be accessible either for official use only or to the public in four common formats: (1) OGC standard web services for maps and data features; (2) maps may be viewed interactively online through a basic flood inundation web map applications; (3) electronic maps for download; and (4) complete supporting data, metadata and reports for download.	All flood mapping data should be accessible either for official use only or to the public in four common formats: (1) Open Geospatial Consortium (OGC) standard web services for maps and data features; (2) maps may be viewed interactively online through a basic flood inundation web map applications; (3) electronic maps for download; and (4) complete supporting data, metadata and reports for download.	Yes		Yes	Yes	Yes		
5.1 Flood Inundation Map End Products	R032 -	To the extent technically possible, format and content of flood inundation maps should be consistent across all end products. This provides consistency and continuity of information presentation that accelerates user understanding and reinforces that all products are produced through unified approaches and systems.	To the extent technically possible, format and content of flood inundation maps should be consistent. This provides consistency and continuity of information presentation that accelerates user understanding and reinforces that all products are produced through unified approaches and systems.	Yes				Yes		
5.1 Flood Inundation Map End Products	R033 -	All of the FIM end products should be categorized as D 4.1 Disaster Monitoring and Prediction Information Type from the National Institute of Standards and Technology Special Publication 800-600 for the purposes of infrastructure and security (U.S. Department of Commerce NIST, 2008). Security categories must be determined to satisfy the Federal Information Security Management Act of 2002.	All of the FIM end products should be categorized as D 4.1 Disaster Monitoring and Prediction Information Type from the National Institute of Standards and Technology Special Publication 800-600 for the purposes of infrastructure and security (U.S. Department of Commerce NIST, 2008). Security categories must be determined to satisfy the Federal Information Security Management Act of 2002.					Yes		
5.1.1 Map and Data Services	R034 -	OGC-compliant spatial web map and web feature services (web services) should be provided that allow stakeholders to utilize flood inundation maps and data/layers in desktop and web applications. An example of a desktop application that may consume OGC Services is presented in Figure 5.1 below.	IWRSS agencies shall provide OGC-compliant spatial web map and web feature services (web services) that allow stakeholders to utilize flood inundation maps and data/layers in desktop and web applications. An example of a desktop application that may consume OGC Services is presented in Figure 5.1 below.	Yes				Yes		
5.1.1 Map and Data Services	R035 -	The spatial web services should provide access to all flood inundation map data, segregating official use only data from public-accessible data.	The spatial web services should provide access to all flood inundation map data, segregating official use only data from public-accessible data.	Yes		Yes	Yes	Yes		

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5.1.1 Map and Data Services	R036 -	ISF spatial web map and web feature services should be made discoverable through the federal geoplatform on data.gov.	ISF spatial web map and web feature services to be made discoverable through the federal geoplatform on data.gov.	Yes		Yes		Yes		
5.1.1 Map and Data Services	R037 -	Map services should present features using a generally common map symbol standard, such as the recommended symbology defined in Appendix F. The symbology specified works currently with commonly available imagery, road/street, and topographic services but was optimized for use with ESRI topography and street map services.	Map services to present features using a generally common map symbol standard, such as the recommended symbology defined in Appendix F.	Yes				Yes		
5.1.3 Inundation Maps	R049 -	Flood extent and depth map layers and the supporting depth grid model outputs are the most critical information needed for effective use of flood inundation maps.	Flood extent, depth map layers, and the supporting depth grid model outputs to be provided.	Yes						
5.1.3 Inundation Maps	R050 -	Inundation map layers defined in this report, other than extent and depth, are useful information and any implementation of national flood inundation mapping services should provide the ability to store and display all of them, although most are not required.	Agencies to store and display Inundation map layers defined in this report.	Yes						
5.1.3 Inundation Maps	R051 -	Map layers are to be categorized as required, desired, optional or provided.	The map layers are to be categorized as required, desired, optional or provided .	Yes	Yes	Yes	Yes	Yes		
5.1.3 Inundation Maps	R052 -	These map layers, defined below, should be managed by the ISF: flood extent [required], study extents/limits of inundation model [required], flood depth [desired], flood extent in leveed areas [optional], potential inundation area [optional], stream centerline [optional], model cross-sections [optional], river station/river mile [optional], water surface elevation contours [optional], U.S. National Grid (USNG) zones [provided], USNG 100,000 meter grid ID [provided].	These map layers are to include:: flood extent [required], study extents/limits of inundation model [required], flood depth [desired], flood extent in leveed areas [optional], potential inundation area [optional], stream centerline [optional], model cross-sections [optional], river station/river mile [optional], water surface elevation contours [optional], U.S. National Grid (USNG) zones [provided], USNG 100,000 meter grid ID [provided].	Yes		Yes		Yes		
5.1.3 Inundation Maps	R053 -	These map layers, defined below, should be acquired from sources outside the ISF: levee centerlines [provided], leveed area [provided], active streamgages [provided], flood forecast locations [provided], base map layers [provided], radar [provided] and other flood warning services [provided], georeferenced flood impact statement points [provided], and flood warning polygon [provided].	These map layers are to include: levee centerlines [provided], leveed area [provided], active streamgages [provided], flood forecast locations [provided], base map layers [provided], radar [provided] and other flood warning services [provided], georeferenced flood impact statement points [provided], and flood warning polygon [provided].	Yes		Yes	Yes	Yes		
5.1.4 Data and Reports	R054 -	Users should have the capability to export flood inundation maps and related reports as well as their supporting data, based on FOUO or public designation.	Users should have the capability to export flood inundation maps and related reports as well as their supporting data, based on FOUO or public designation.	Yes	Yes	Yes	Yes	Yes		
5.1.4 Data and Reports	R055 -	Supporting data, that should be available for download, includes the hydraulic models used to produce flood inundation maps and data layers managed by the ISF.	Supporting data to be available for download, including the hydraulic models used to produce flood inundation maps and data layers.		Yes	Yes	Yes			
5.1.4 Data and Reports	R056 -	The complete project data, including layer metadata and project report or project report metadata, should be made available for download via the services and applications.	The complete project data, including layer metadata and project report or project report metadata, to be made available for download via the services and applications.	Yes	Yes	Yes	Yes			
5.1.4 Data and Reports	R058 -	In addition to flood inundation maps, the ISF should support the ability to generate consistent FIM technical reports available for electronic viewing and printing.	The consistent FIM metadata are to be made available for electronic viewing and printing			Yes	Yes	Yes		

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5.1.4 Data and Reports	R060 -	Reports should also include a unique IWRSS FIM report identification number for citation and tracking purposes and based on information in the ISF. An example summary report, presented as a flood inundation map information page is shown in Figure 5.4 and in Appendix F.	Report are to be citable and trackable via a unique identifier.				Yes			
5.1.4 Data and Reports	R061 -	The map information page/summary report should be a concise 1-page summary of a more detailed project report. Appendix F summarizes recommended project report content. The advantages of this strategy are:	Information in the metadata is to also support one-page summary			Yes	Yes	Yes		
5.3 Hydraulic Modeling Requirements	R071 -	The hydraulic modeling software used for the analysis should be well documented, well established, and widely accepted in the hydraulic engineering community.	The hydraulic modeling software used for the analysis is to be well documented in the project metadata and is to be widely accepted in the hydraulic engineering community.		Yes		Yes	Yes		
5.3 Hydraulic Modeling Requirements	R072 -	The development of geometric data used in the hydraulic model, model version, geometric parameters selected, flow and boundary conditions used, and modeling decisions should be well supported through documentation that is submitted with the completed maps. Further discussion of hydraulic modeling to support flood inundation mapping is provided in Appendix H.	The development of geometric data used in the hydraulic model, model version, geometric parameters selected, flow and boundary conditions used, and modeling decisions to be well documented and submitted with the completed maps. Further discussion of hydraulic modeling to support flood inundation mapping to be provided see Appendix H.		Yes		Yes	Yes		
5.5 Bridge Requirements	R079 -	When possible, within the scope and constraints of a project, it is suggested that, in addition to populating bridge flood impact statement points as described in Section 5.4, bridge decks should be clipped from the inundated area polygons and/or depth grids once the hydraulic model indicates that water obstructs the opening beneath the low chord of the bridge. This step is necessary because elevation models typically do not incorporate bridge decking elevations or low-chord elevations, rather they depict the "bare earth" channel or surface elevation below the bridge.	Metadata for the bridge inundation mapping approach shall be documented.			Yes	Yes			
5.6 Levee Requirements	R081 -	Levee centerlines should be available for display in online and map sheet products.	Levee centerlines to be available for display in online and map sheet products.	Yes			Yes			
5.6 Levee Requirements	R082 -	The entire spectrum of levee systems, which may range from a federally constructed/maintained levee system to an agricultural levee system, accredited or non-accredited, certified or not certified should be treated equally as hydraulic features.	The entire spectrum of levee systems, which may range from a federally constructed/maintained levee system to an agricultural levee system, accredited or non-accredited, certified or not certified to be treated equally as hydraulic features.	Yes	Yes		Yes	Yes		
5.6 Levee Requirements	R083 -	Levee centerlines should be acquired and displayed from the National Levee Database (NLD) and should not be redundantly stored in the ISF. The NLD levee centerline to be displayed is an aggregate of the horizontal alignment of all levees, floodwalls, and closure structures throughout a study extent.	Levee centerlines should be acquired and displayed from the National Levee Database (NLD). The NLD levee centerline to be displayed is an aggregate of the horizontal alignment of all levees, floodwalls, and closure structures throughout a study extent.	Yes	Yes	Yes		Yes		
5.6 Levee Requirements	R084 -	If a levee within the FIM project scope does not exist in the NLD, it is the responsibility of the project to submit the necessary data to the NLD for proper display in FIM end products. Information on how to submit data to the NLD is available from the NLD Help Desk, contact information is provided at nld.usace.army.mil.	If a levee within the FIM project scope does not exist in the NLD, it is the responsibility of the project to submit the necessary data to the NLD for proper display in FIM end products.	Yes			Yes	Yes		

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5.6 Levee Requirements	R086 -	If a map distinguishes inundation in leveed areas from inundation in non-leveed-areas, the inundation polygons should be displayed in a separate layer as the potential flood extent in leveed areas.	If a map distinguishes inundation in leveed areas from inundation in non-leveed-areas, the inundation polygons to be displayed in a separate layer as the potential flood extent in leveed areas.	Yes		Yes		Yes		
5.6 Levee Requirements	R087 -	Care must be taken to ensure that for maps developed at stages above the effective elevation of the levee, areas behind levees are not shown as “flood extent in leveed areas” but rather as inundation in a non-leveed area.	Maps developed at stages above the effective elevation of the levee, areas behind levees are not shown as “flood extent in leveed areas” but rather as inundation in a non-leveed area.	Yes				Yes		
5.6 Levee Requirements	R088 -	There should be three main layers that depict flooding around levees, as defined below: levee centerline, leveed area and leveed area flood extent.	There should be three main layers that depict flooding around levees, as defined below: levee centerline, leveed area and leveed area flood extent.	Yes		Yes		Yes		
5.6 Levee Requirements	R091 -	Once flooding occurs, or is forecast to occur behind a levee (overtopping or breach), the landward levee profile of a stream reach map library should be activated and displayed according to the event forecast information.	A leveed area feature shall accompany documentation in the metadata as to the levee breach or overtopping conditions.	Yes				Yes		
5.7.1 Elevation Data	R092 -	The best available topographic data referenced to the North American Vertical Datum of 1988 (NAVD88) should be used for the development of geometric data for hydraulic model inputs and the generation of flood inundation map products from hydraulic model results.	The best available topographic data referenced to the North American Vertical Datum of 1988 (NAVD88) should be used for the development of geometric data for hydraulic model inputs and the generation of flood inundation map products from hydraulic model results.	Yes	Yes	Yes	Yes	Yes		
5.7.1 Elevation Data	R093 -	Further, the vertical accuracy of the terrain model used for analysis should be appropriate for the intended use of the underlying river hydraulics model and the topography of the study area.	Vertical accuracy of the terrain model(s) will be documented.	Yes	Yes		Yes	Yes		
5.7.1 Elevation Data	R094 -	The horizontal and vertical data accuracy of the elevation data should be clearly documented according to Federal Geographic Data Committee (FGDC) standards (Federal Geographic Data Committee, 1998).	Horizontal accuracy of the terrain model(s) will be documented.		Yes	Yes	Yes	Yes		
5.7.2 Projections and Datums	R095 -	All flood mapping products, models and reports should be submitted to the IWRSS FIM system according to a documented and common measurement system, geodetic datum and projection.	The standard unit for measurement of flood mapping products, models and reports shall be specified and the recommended measurement shall be in English units.	Yes	Yes	Yes	Yes	Yes		
5.7.2 Projections and Datums	R096 -	All mapping products should use a common vertical datum, the North American Vertical Datum of 1988 (NAVD88).	All mapping products should use a common vertical datum, the North American Vertical Datum of 1988 (NAVD88).	Yes	Yes	Yes		Yes		
5.7.2 Projections and Datums	R097 -	All mapping products should use a common horizontal datum, the North American Datum of 1983 (NAD83).	All mapping products should use a common horizontal datum, the North American Datum of 1983 (NAD83).	Yes	Yes	Yes		Yes		
5.7.2 Projections and Datums	R098 -	All mapping projects should be submitted with a defined projection that is appropriate for the study. Albers Equal Area Conic USGS is recommended as a suitable model projection projects within the continental U.S.	All mapping projects should be submitted with a defined projection that is appropriate for the study. Albers Equal Area Conic USGS is recommended as a suitable model projection projects within the continental U.S.	Yes	Yes	Yes		Yes		
5.7.2 Projections and Datums	R099 -	All flood inundation map services hosted by the ISF should use a common projection for map data and mapping services; recommended is the World Geodetic System (WGS) 1984 Web Mercator (Auxiliary Sphere) projection.	All flood inundation map services should use a common projection for map data and mapping services; recommended is WGS 1984 Web Mercator (Auxiliary Sphere).	Yes	Yes			Yes		

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5.7.3 Project Documentation and Metadata	R100 -	When a flood map is submitted to the IWRSS ISF, a minimum standard for project documentation should be met as identified in Appendix G. Projects should be encouraged to submit as much documentation as necessary to conduct a proper peer review and ensure scientific reproducibility of the effort.	Minimum standard for project documentation should be met as identified in Appendix G.	Yes	Yes	Yes	Yes	Yes		
5.7.3 Project Documentation and Metadata	R101 -	All spatial data submitted should include Federal Geographic Data Committee (FGDC) compliant metadata in addition to the project documentation (Federal Geographic Data Committee).	All spatial data submitted should include Federal Geographic Data Committee (FGDC) compliant metadata in addition to the project documentation (Federal Geographic Data Committee).	Yes	Yes	Yes	Yes	Yes		
5.7.3 Project Documentation and Metadata	R102 -	Common ISF metadata elements need to be standardized specific to IWRSS services, specifying required minimums for the data submission process.	Common ISF metadata elements need to be standardized specific to IWRSS services, specifying required minimums for the data submission process.			Yes	Yes	Yes		
5.7.5 Data Submission	R108 -	When agencies and partners complete studies the project data submissions will need to include the following information in order for the minimum ISF capabilities to be available: digital elevation model location for review and/or retrieval, hydraulic model location for review and/or retrieval, location of cross-sections or mesh used to create the model for review and/or retrieval, inundation mapping layers required/optional per Section 5.1, documentation and metadata, optional loss estimation information, QA/QC checklist documentation, and certification by agency proponent that product has been reviewed.	Data submission will include: digital elevation model, hydraulic model, cross-sections or mesh used to create the model, inundation mapping layers required/optional per Section 5.1, documentation and metadata.	Yes	Yes	Yes	Yes	Yes		
5.7.5 Data Submission	R112 -	Detailed requirements should be developed for populating pertinent FGDC metadata tags. These requirements may restate existing FGDC requirements for metadata tags or may introduce IWRSS specific requirements on how to populate specific elements of the metadata.	Detailed requirements should be developed for populating pertinent FGDC metadata tags. (see R114)			Yes	Yes	Yes		
5.7.5 Data Submission	R113 -	A set of detailed examples of completed metadata should be developed for each database element and made available alongside the QA/QC checklist and other tools.	A set of detailed examples of completed metadata should be developed for each database element and made available alongside the QA/QC checklist and other tools.	Yes	Yes	Yes	Yes	Yes		
5.8.2 Flood Depth	R117 -	Depths should be symbolized consistently within all map libraries and end products using a range of blue shades with transparency as defined in Appendix F.	Depths should be symbolized consistently within all map libraries and end products using a range of blue shades with transparency as defined in Appendix F.	Yes		Yes		Yes		
5.8.2 Flood Depth	R118 -	Depths to be mapped should be defined by the study provider, because appropriate depth ranges must be based on considerations of map purpose and usability as well as underlying elevation data and model accuracy considerations.	Depths to be mapped should be defined by the study provider, because appropriate depth ranges must be based on considerations of map purpose and usability as well as underlying elevation data and model accuracy considerations.	Yes	Yes	Yes		Yes		
5.8.2 Flood Depth	R119 -	Depth ranges should be consistently represented in all products within a map library, both exported versions and those presented in applications.	Depth ranges should be consistently represented in all products within a map library, both exported versions and those presented in applications.	Yes	Yes	Yes		Yes		
5.8.3 Conveying Uncertainty	R120 -	Uncertainty should be displayed on maps via the potential inundation area feature as defined in Appendix F.	Uncertainty should be displayed on maps via the potential inundation area feature as defined in Appendix F.	Yes						
5.8.3 Conveying Uncertainty	R121 -	The potential inundation layer should be available as an option, and not as part of the standard presentation of an inundation map.	The potential inundation layer should be available as an option, and not as part of the standard presentation of an inundation map.	Yes		Yes				

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5.8.3 Conveying Uncertainty	R122 -	Documentation must be captured regarding the sources of uncertainty used to define the area (terrain, model, forecast, and other considerations). The intent is to convey an area of uncertainty bounding the "best guess" extent of inundation. This feature can be displayed with the depth layer, but there is no intent to visually depict depth uncertainty, other than via the depth ranges provided in depth queries.	Documentation must be captured regarding the sources of uncertainty used to define the area (terrain, model, forecast, and other considerations). The intent is to convey an area of uncertainty bounding the "best guess" extent of inundation. This feature can be displayed with the depth layer, but there is no intent to visually depict depth uncertainty, other than via the depth ranges provided in depth queries.	Yes	Yes	Yes	Yes			
5.8.4 Exportable and Printable Maps	R124 -	A national tiling scheme based on existing USGS 7.5 minute quadrangles should be used for the controlled map sheets.	The USNG geospatial layer will be reviewed to verify its attributes meet the use case defined in R-125, R-135, R-139 and R-161.	Yes						Yes
5.8.4 Exportable and Printable Maps	R134 -	Printed and exported maps should be uniquely identified by the bounding box defined by their USNG 1,000 meter identifiers per the following examples: 1:31,680 scale map - 15SUD59713238; 1:15,840 scale map - 15SUD60653638.	The USNG geospatial layer will be reviewed to verify its attributes meet the use case defined in R-125, R-135, R-139 and R-161.	Yes						Yes
5.8.4 Exportable and Printable Maps	R138 -	Map sheets should present all information needed to uniquely identify locations based on the USNG: USNG Grid Zone, e.g. 15S; 100,000 meter grid unique identification numbers, e.g. YC, BH; and 1,000 meter tics.	The USNG geospatial layer will be reviewed to verify its attributes meet the use case defined in R-125, R-135, R-139 and R-161.	Yes						Yes
5.8.6 Map Purpose	R143 -	For each map presented, a narrative describing the map purpose should be made available, on the map or map information page for map sheets, via a menu option in online interactive maps and via either attribute or metadata from map services. Example purpose statements are provided in Appendix F.	A narrative describing the map purpose should be made available as part of the metadata. Example purpose statements are provided in Appendix F.			Yes	Yes			
5.8.7 Dates	R144 -	All dates should be presented in format DDMONYYYY, for example, 01MAY2005.	All dates should be presented in format DDMONYYYY, for example, 01MAY2005.	Yes		Yes	Yes	Yes		
5.8.7 Dates	R145 -	Dates should be consistently represented in all versions of maps, both exported versions and those presented in applications.	Dates should be consistently represented in all versions of maps, both exported versions and those presented in applications.	Yes		Yes	Yes	Yes		
5.8.7 Dates	R146 -	Times when appropriate should be 24-hour and reference time zone, e.g. 1200 EST.	Times when appropriate should be 24-hour and reference time zone, e.g. 1200 EST.	Yes		Yes	Yes	Yes		
5.8.7 Dates	R147 -	The study date should always be presented in the map title. The study date is the publication date of the map.	The study date should be tagged within the metadata.	Yes		Yes	Yes	Yes		
5.8.7 Dates	R148 -	The forecast date should be presented in the map title for all event-based maps that predict flooding at a future time based on a forecast river stage profile.	The forecast date should be tagged within the metadata.	Yes		Yes	Yes	Yes		
5.8.8 Map Titles	R149 -	Map titles should have a summary title and detailed sub- title component consistent with the following examples. Information included in the [brackets] is specific to each map generated.	The map titles should have a summary title and detailed sub-title component tagged within the metadata.				Yes			
5.8.8 Map Titles	R150 -	Map titles should be consistently represented in all versions of maps, both exported versions and those presented in applications.	Map titles should be consistently represented in all versions of maps, both exported versions and those presented in applications.				Yes			
5.9.2 Depth Layers and Queries	R157 -	Disclaimers or accuracy statements for depth maps and depth queries should display the accuracy of the result; the statement should state that the accuracy of results are limited by the quantified accuracy of the terrain dataset and the uncertainties inherent in the hydraulic model and river forecast.	A disclaimer shall be posted with the maps: The accuracy of results are limited by the quality of the terrain dataset, the uncertainties inherent in the hydraulic model, and/or river forecast. The users should refer to the metadata for accuracy of flood depths.	Yes		Yes	Yes	Yes		

				Charter Bullets						
				Exchanging and utilizing FIM between IWRSS partners		Specifying metadata and geo-referencing standards		Capturing and conveying the understanding of mapping methodologies, assumptions, and known flood risks	Maintaining and sustaining FIM capabilities	
Design Specification Logical Categories										
Section	Requirement #	IWRSS FIM Scoped Requirements	Design Specs	FIM Data	Model Data	Layer metadata (GIS style)	Library metadata (reports/docu- mentation)	Data standards	Change Mangement	Use Case
5.9.3 Exporting Maps	R159 -	Exported maps should also be accessible via URL hyperlink requests that include latitude/longitude, USNG coordinate, USNG bounding box and/or unique map library identification numbers.	The USNG geospatial layer will be reviewed to verify its attributes meet the use case defined in R-125, R-135, R-139 and R-161.	Yes			Yes	Yes		Yes
5.9.4 Clearly Identifying Event-Based Maps	R161 -	There shall be one federal event-based map for a reach of river during a flood event. During a significant flood event, it will be important to ensure that the best available map representing the forecast conditions, should it exist, be clearly identified to assist users in a flood-warning situation.	Metadata must be sufficient to identify the event map layer(s) from any existing library	Yes		Yes	Yes	Yes		Yes
5.9.4 Clearly Identifying Event-Based Maps	R163 -	Stream reach maps and historical flood documentation maps will be made available to the public stakeholders at all times, in addition to the one federal event-based map that is designated for a reach of river.	Metadata must be sufficient to identify the stream reach and historical flood documentation map layer(s)	Yes						Yes
5.9.4 Clearly Identifying Event-Based Maps	R164 -	A mechanism to quickly display the event-based map for active flood events, and provide a level of visibility that gives the event map primary focus, should be considered. It should be different from the standard workflow for selecting layers from map libraries, as it would keep users from having to manually select the most appropriate map layer(s) representing an ongoing flood event from all those that exist in available map libraries. An event-based map could be identified from an event-based map library created based on a recent forecast, or an existing stream reach map library inundation layer most near to the current stage or forecasted flood stage. The most current and best- available map scenario should be presented to the user.	Metadata must be sufficient to identify the event map.	Yes		Yes	Yes	Yes		Yes
5.9.5 Displaying Multiple Flood Extent Layers	R168 -	When multiple flood extents are displayed on one map, they should be symbolized in a manner to ensure they are clear and distinct, possibly as lines rather than filled polygons with differing line weights, line styles and colors.	When multiple flood extents are overlayed onto a composite map, they should be symbolized in a manner to ensure they are clear and distinct.	Yes				Yes		Yes