

# Guidance for Flood Risk Analysis and Mapping

## Areas of Mitigation Interest

May 2016



Requirements for the Federal Emergency Management Agency (FEMA) Risk Mapping, Assessment, and Planning (Risk MAP) Program are specified separately by statute, regulation, or FEMA policy (primarily the Standards for Flood Risk Analysis and Mapping). This document provides guidance to support the requirements and recommends approaches for effective and efficient implementation. Alternate approaches that comply with all requirements are acceptable.

For more information, please visit the FEMA Guidelines and Standards for Flood Risk Analysis and Mapping webpage ([www.fema.gov/guidelines-and-standards-flood-risk-analysis-and-mapping](http://www.fema.gov/guidelines-and-standards-flood-risk-analysis-and-mapping)). Copies of the Standards for Flood Risk Analysis and Mapping policy, related guidance, technical references, and other information about the guidelines and standards development process are all available here. You can also search directly by document title at [www.fema.gov/library](http://www.fema.gov/library).

## Document History

Affected Section or Subsection	Date	Description
First Publication	May 2014	Initial version of new transformed guidance. The content was derived from the <u>Guidelines and Specifications for Flood Hazard Mapping Partners, Procedure Memoranda, and/or Operating Guidance</u> documents. It has been reorganized and is being published separately from the standards.
4.14 Other	May 2016	Added examples of additional Areas of Mitigation Interest (AoMIs) that could be included within the “Other” category, in part to address requirements resulting from Section 216 of the Biggert-Waters Flood Insurance Reform Act of 2012 (BW12), as amended by the Homeowner Flood Insurance Affordability Act of 2014 (HFIAA).

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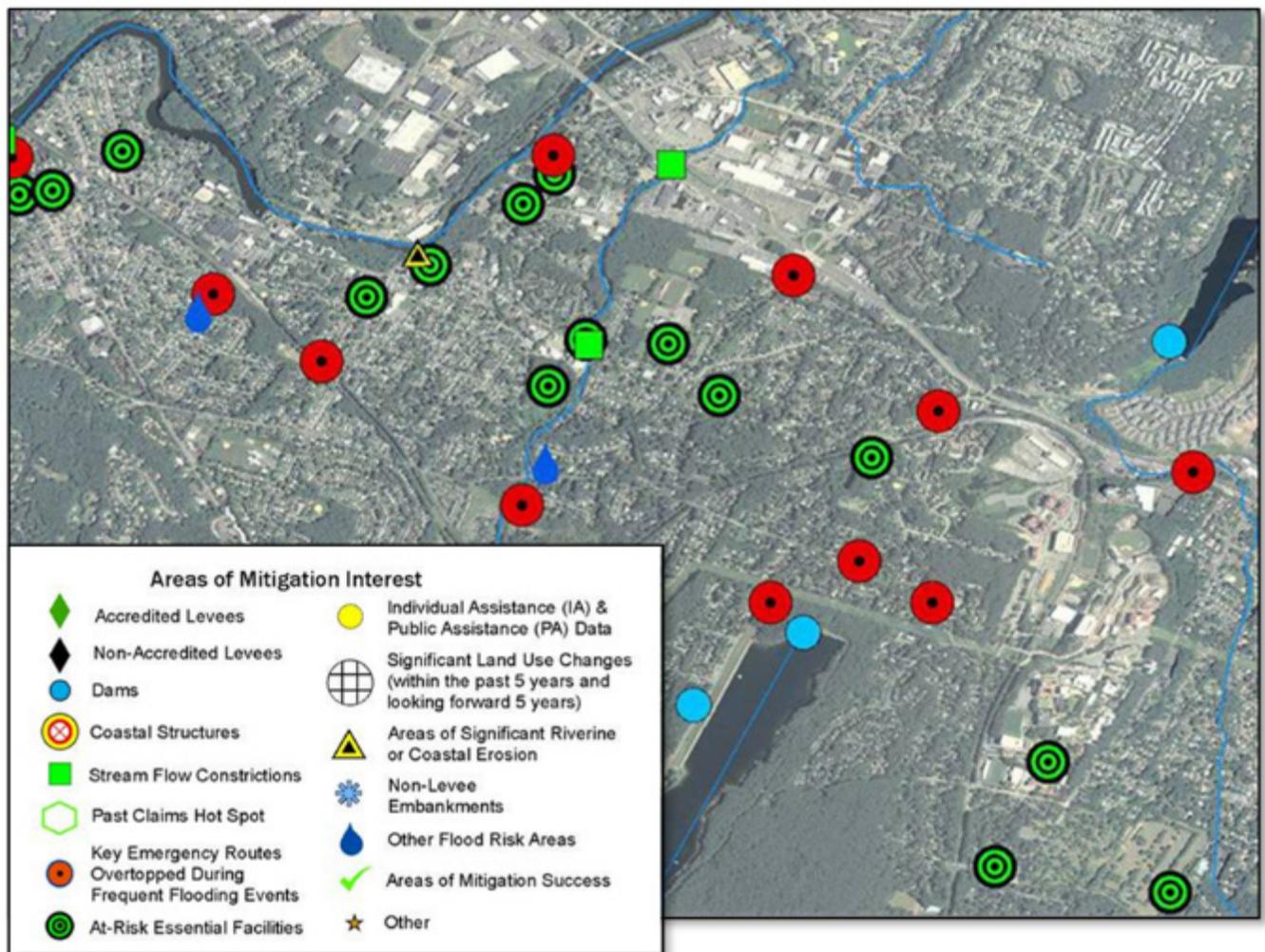
## 1.0 Definitions

The Areas of Mitigation Interest (AoMI) dataset is intended to be a tool to support ongoing conversations about flood risk reduction opportunities and/or success stories. This dataset allows local stakeholders to provide information about local mitigation successes, integrates available data relevant to mitigation, and adds key mitigation related findings from the Flood Risk Project team.

The result helps local stakeholders gain a more holistic picture of flood risk related issues that may impact them, as well as allowing them to take a more systematic approach to addressing their community's overall flood risk.

The AoMI dataset is comprised of attributed point features stored in the Flood Risk Database (FRD) to represent items that warrant flood risk mitigation attention.

**Figure 1: Example of Areas of Mitigation Interest Dataset**



## 2.0 General Overview

Information collected for the AoMI dataset should start at the Discovery data mining process (through interactions with multiple stakeholders up until, during, and after the Discovery Meeting). It should be validated, processed and enhanced in post-Discovery activities, as the Flood Risk Project progresses and more or improved information becomes available. The AoMI data can be supplemented based on outputs from flood studies and risk assessments, information received or learned at community meetings, and from hazard mitigation plans. AoMI data may come from a variety of sources, although the following are the most common:

- Community- or State-supplied data from mitigation and floodplain management plans, discovery and other meetings, and surveys
- Federal government data (e.g., flood claims, disaster assistance claims, data from other Federal agencies like the United States Geological Survey (USGS), United States Army Corps of Engineers (USACE), National Oceanic and Atmospheric Administration (NOAA), etc.)
- Engineering data from the revised hydrology and hydraulics (H&H) and/or coastal analyses, other studies, or previous flood studies

Section 5.0 provides additional information regarding the types of data that is most likely to be obtained from these sources and guidance on its collection.

Of greatest importance is that the AoMI dataset be developed through conversations with the affected communities. FEMA and the entire Flood Risk Project team play key roles in the alignment of the AoMIs with the needs and mitigation opportunities within the community. The FEMA publication, Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards provides additional information regarding beneficial AoMIs that can be identified throughout the life of the project

## 3.0 Flood Risk Database (FRD) Related Guidance

The AoMI dataset is made up of the following tables in the FRD:

- S\_AoMI\_Pt
- L\_AoMI\_Summary

Guidance specific to each of these tables is below.

### 3.1 S\_AoMI\_Pt

Some AoMI features may be better represented by a line or a polygon. If so, there should still be a point added into the S\_AoMI\_Pt feature class, but a line or polygon may be created in the S\_Carto\_Ln or S\_Carto\_Ar layers respectively to represent the AoMI on the Flood Risk Map (FRM). For example, a non-accredited levee may be better illustrated on the FRM as a linear feature. A feature could be placed in S\_Carto\_Ln so the levee could be shown on the FRM.

Because of the length of the Notes field and the dBASE limitation of 254 character field width, when this feature class is exported to shapefile (SHP) format, the Mapping Partner should

create four fields to contain the data in the NOTES field (i.e., NOTES1, NOTES2, NOTES3, and NOTES4).

Additional guidance on the type of content to include in the AOMI\_INFO field of S\_AOMI\_Pt is contained in the tables in Section 3.0 of this document.

### 3.2 L\_AOMI\_Summary

This table is used to store the summary counts of AoMI points within the project area. It is further subdivided by the type of AoMI classification and community within which it lies. Additional information showing how this table is used to populate the tables in the Flood Risk Report (FRR) is contained in the [FRR Guidance](#) document.

## 4.0 Types of Areas of Mitigation Interest

Although there may be other data included in the AoMI dataset, the following table provides examples of the types of AoMIs that are most commonly collected, where the data comes from, when they are typically collected, and considerations to make when evaluating the data for inclusion or enhancement within the AoMI dataset. The types of examples provided in these tables are not intended to be all-inclusive, but rather are some of the most common examples. As opportunities are identified within the project area that either needs to be highlighted because of their high risk potential, or where mitigation opportunities exist, those can, and should, also be identified within the AoMI dataset. For example, mitigation actions that have already been identified in communities' multi-hazard mitigation plans should be included within the AoMI dataset.

### 4.1 Dams

**Table 1: Dam AoMIs – Description and Data Sources**

AoMI	Description	Potential Data Source(s)
Dams	An impoundment structure demonstrated to increase flood elevations upstream, and often intended to control downstream flows.	<ul style="list-style-type: none"> <li>• Discovery Data Mining and Discovery Meeting</li> <li>• National Inventory of Dams (USACE)</li> <li>• State Dam Safety Officers</li> </ul>

- Collection Points in the Project Lifecycle: Before the Discovery Meeting for verification at Discovery Meeting. Data may continue to be collected through the lifecycle, but it is anticipated that most Dam data will have been obtained shortly after the Discovery Meeting.
- Data Evaluation and Qualifying Criteria: All dams identified during Discovery should be included; field validation will normally not be necessary.
- Data Processing and Enhancement: Data will be captured as points for inclusion in the FRD and for display on the FRM. The AOMI\_INFO field within the FRD should indicate if an Emergency Action Plan (EAP) exists or not and when it was created (e.g., “EAP

created 02/13/2008” or “No known EAP”). Other information that could be captured in the AOMI\_INFO field would be the purpose and operation of the dam, especially if either may change in the future, or information related to the hazards posed if the dam overtopped or failed, if such information is available.

## 4.2 Levees

**Table 2: Levee AoMIs – Description and Data Sources**

AoMI	Description	Potential Data Source(s)
Accredited and Non-Accredited Levees	<p>Accredited: A levee that meets the criteria specified in Title 44 Code of Federal Regulations (CFR) Part 65.10 and/or a levee that is provisionally accredited</p> <p>Non-Accredited: A levee that does not meet 44CFR Part 65.10 criteria and/or has recently had its provisionally accredited status expire without evidence that it meets this specific accreditation criteria.</p>	<ul style="list-style-type: none"> <li>• Discovery Data Mining and Discovery Meeting</li> <li>• National Levee Database (NLD) – (USACE)</li> <li>• FEMA Levee inventories</li> <li>• Other agency inventories</li> </ul>

- Collection Points in the Project Lifecycle: Before the Discovery Meeting for verification at Discovery Meeting.
- Data Evaluation and Qualifying Criteria: All levees should be included.
- Data Processing and Enhancement: Existing inventory data should be captured as point features in S\_AOMI\_Pt in the FRD and displayed on the FRM. The midpoint of each levee can be used for this.

The AOMI\_INFO field should indicate if an EAP exists or not and when it was created (e.g., “EAP created 02/13/2008” or “No known EAP”), and/or whether specific mitigation measures or enhancements to the levee itself have been identified.

If information is available related to the hazards posed if the levee should fail, such information could also be included. If displaying the accredited levee on the FRM as a linear feature better communicates the location of the levee, a feature can be added to S\_Carto\_Ln representing the levee location.

### 4.3 Coastal Structures

**Table 3: Coastal Structure AoMIs – Description and Data Sources**

AoMI	Description	Potential Data Source(s)
Coastal Structures <ul style="list-style-type: none"> <li>• Jetties</li> <li>• Groins</li> <li>• Sea walls</li> <li>• Other coastal structures</li> </ul>	Coastal structures that “harden” the shoreline, interrupt the natural dynamic shoreline processes, and/or accelerate coastal erosion.	<ul style="list-style-type: none"> <li>• Discovery Data Mining and Discovery Meeting</li> <li>• Community input on structures known to cause erosion problems or those not providing intended protection.</li> <li>• NOAA National Shoreline Survey</li> <li>• State Coastal Zone Mgmt Programs’ Beach Mgmt Plans</li> </ul>

- Collection Points in the Project Lifecycle: Before the Discovery Meeting, when available from Coastal Zone Management Programs, for verification at Discovery Meeting.
- Data Evaluation and Qualifying Criteria: All structures will be included.
- Data Processing and Enhancement: Existing inventory data will be captured as points in S\_AOMI\_Pt and displayed on the FRM. The AOMI\_INFO field should be populated with pertinent information such as “Sea wall under-sized based on updated analysis” and/or whether specific mitigation measures or enhancements to the coastal structure have been identified. If displaying the coastal structure on the FRM as a linear feature better communicates the location of the structure, a feature can be added to S\_Carto\_Ln representing the structure.

### 4.4 Stream Flow Constrictions

**Table 4: Stream Flow Constriction AoMIs – Description and Data Sources**

AoMI	Description	Potential Data Source(s)
Stream Flow Constrictions <ul style="list-style-type: none"> <li>• Undersized culverts or bridge openings</li> </ul>	Hydraulic structures intended to carry flood discharges that are too small to function effectively and that cause increased flood elevations within the vicinity and in upstream areas.	<ul style="list-style-type: none"> <li>• Discovery Data Mining, Discovery Meeting, and H&amp;H Analysis</li> <li>• State/Local Hazard Mitigation Plans</li> <li>• State Stormwater Management Programs per Environmental Protection Agency (EPA) 310 Program</li> <li>• Engineering models</li> <li>• Local drainage reports</li> </ul>

- Collection Points in the Project Lifecycle: Data can be collected prior to the Discovery phase from existing models and verified at Discovery with community officials. Further

evaluation and technical validation should occur in cases where new modeling is conducted in areas where stream flow pinch points are identified.

- Data Evaluation and Qualifying Criteria: Work with community after engineering to determine what criteria are most appropriate to qualify the area for inclusion in the AoMI dataset.
- Data Processing and Enhancements: Data will be selectively collected as points in S\_AOMI\_Pt and displayed on the FRM (as room allows). If the structure overtops, the AOMI\_INFO field in S\_AOMI\_Pt should indicate the most frequent event at which the structure is overtopped (e.g., “Road overtopped at 5 percent-annual-chance event”). Additionally, the discharge at which the structure overtops could also be indicated if known.

#### 4.5 Key Emergency Routes Overtopped

**Table 5: Key Emergency Route AoMIs – Description and Data Sources**

Item	Description	Potential Data Source(s)
Key emergency routes overtopped during frequent flooding events	Key emergency routes that the hydraulic analysis indicate are overtopped during the 4 percent flood frequency or more frequent event, plus those that are noted by community officials as being frequently overtopped will be identified	<ul style="list-style-type: none"> <li>• Discovery Data Mining and Discovery Meeting</li> <li>• Flood Profiles</li> <li>• Hydraulic models</li> </ul>

- Collection Points in the Project Lifecycle: Data collected at Discovery Meeting from community and during engineering.
- Data Evaluation and Qualifying Criteria: Limited to routes identified as key emergency routes at Discovery and verified by modeling or existing profiles as overtopped by the 4 percent flood frequency or more frequent event. Communities, however, may choose to use a different set of criteria to identify the overtopped routes. For example, a community may want to know where a major highway is overtopped by the 1 percent-annual-chance event.
- Data Processing and Enhancements: Data will be collected as points in S\_AOMI\_Pt and displayed on the FRM. The AOMI\_INFO field should indicate the most frequent event at which the structure is overtopped (e.g., “Overtopped at 5 percent-annual-chance event” or “Local Public Works Department indicates the road is frequently overtopped”).

## 4.6 Past Claims Hot Spots

**Table 6: Past Claims Hot Spot AoMIs – Description and Data Sources**

Item	Description	Potential Data Source(s)
Past Claims Hot Spot	Indicators of repeated flood-related insurance claims within a focused geographic area. This shall be included as generalized point data (not claim-specific)	<ul style="list-style-type: none"> <li>FEMA NEXTGEN database</li> <li>National Flood Insurance Program (NFIP) State Coordinator</li> </ul>

- Collection Points in the Project Lifecycle: Data to be collected and presented during Discovery, both prior to and at the Discovery Meeting.
- Data Evaluation and Qualifying Criteria: Areas with five or more repetitive loss (RL) or severe repetitive loss (SRL) properties in close proximity, sufficient to indicate that the area has a higher frequency of damage than other areas in the community. Evidence of claims or damages should be apparent from more than one event.
- Data Processing and Enhancements: Data will be collected as a point location in S\_AOMI\_Pt at the centroid of the census block in which they reside and displayed on the FRM. The AOMI\_INFO field should indicate the number of structures, number of claims, RL vs. SRL, when the claims occurred, aggregate claims amounts represented by that point (e.g. “From 2004~2010, 42 Claims affecting 44 structures, totaling \$8.2 million, of which six were RL and one was SRL”).

## 4.7 Individual Assistance (IA) or Public Assistance (PA)

**Table 7: IA/PA AoMIs – Description and Data Sources**

Item	Description	Potential Data Source(s)
Individual Assistance (IA) and Public Assistance (PA) Data	Indicators of past flood flood-related damage where IA/PA funds were used. This shall be included as generalized point data.	<ul style="list-style-type: none"> <li>Existing FEMA data source (contact the FEMA Region or State to gain access to the data)</li> </ul>

- Collection Points in the Project Lifecycle: Data to be collected and presented during Discovery, both prior to and at the Discovery Meeting.
- Data Evaluation and Qualifying Criteria: Areas with five or more PA or IA claims in close proximity, sufficient to indicate that the area has a higher frequency of damage than other areas in the community. Evidence of claims or damages should be apparent from more than one event. Note: IA data contains Privacy Act-protected information in it, so it must be generalized to avoid the release of personally identifiable information (PII). PA data, on the other hand, should generally be able to release details of each project since they are public infrastructure, although it depends on the specific PA data. Data included will also be limited to that which is available digitally.

- Data Processing and Enhancements: Data is collected as a point location in S\_AOMI\_Pt at the centroid of the census block in which they reside. The AOMI\_INFO field should indicate number and types of claims, claims dates, and aggregate claims amount (e.g., “From 2000-2009, 23 IA claims totaling \$1.2 million and two PA claims totaling \$15.2 million”).

#### 4.8 Significant Land Use Change

**Table 8: Significant Land Use Change AoMIs – Description and Data Sources**

Item	Description	Potential Data Source(s)
Significant Land Use Changes (within the past five years and looking forward five years) <ul style="list-style-type: none"> <li>• Proposed and recent development (verified with the community)</li> <li>• Areas with current or projected population growth</li> </ul>	Development and population growth (through the building of structures) normally decreases the ability of a watershed to absorb flood waters which results in potentially significant increases in flood water runoff (and velocity) and damages to the downstream built environment	<ul style="list-style-type: none"> <li>• Discovery Data Mining and Discovery Meeting (direct community interviews/discussions)</li> <li>• Community Comprehensive Plans</li> <li>• State Growth Management Plans</li> <li>• Real Estate Trends</li> </ul>

- Collection Points in the Project Lifecycle: Data collected prior to or at Discovery Meeting.
- Data Evaluation and Qualifying Criteria: Limited to areas where plans or community officials indicate growth in past five years or anticipated in the next five years. Data should not identify specific projects or developments.
- Data Processing and Enhancements: Data will be collected as a point location in S\_AOMI\_Pt and displayed on the FRM. The AOMI\_INFO field should give a brief description of the land use change (e.g., “400 homes constructed in the last two years 2008~2009, with 200 additional homes anticipated in the next four years in 2010~2013”; or “300 acres of agricultural land has been recently converted to a commercial park in 2009” or “Projected area of population growth in next three years due to planned residential development”). If displaying the areas of land use change on the FRM as a polygonal feature better communicates the location of the land use change area or projected areas of growth, a feature can be added to S\_Carto\_Ar representing the area of land use change.

## 4.9 Areas of Significant Erosion

**Table 9: Areas of Significant Erosion AoMIs – Description and Data Sources**

Item	Description	Potential Data Source(s)
Areas of significant riverine or coastal erosion	Areas that have historically experienced erosion, or where erosion is likely to occur	<ul style="list-style-type: none"> <li>Discovery Data Mining and Discovery Meeting</li> <li>State Hazard Mitigation Officer (SHMO)</li> <li>County and Stormwater Engineer</li> <li>Director of Planning</li> <li>Footprint of recent wildfires in the area</li> </ul>

- Collection Points in the Project Lifecycle: Data collected prior to or at Discovery Meeting.
- Data Evaluation and Qualifying Criteria: Limited to areas identified by the communities where erosion poses a threat to the built environment.
- Data Processing and Enhancements: Data will be collected as a point location in S\_AOMI\_Pt and displayed on the FRM. Information about the erosion area should be listed in the AOMI\_INFO field (e.g., “Long Term Erosion Hazard Area”). If displaying the areas of significant erosion on the FRM as a linear or polygonal feature better communicates the location of the area of significant riverine or coastal erosion, a feature can be added to S\_Carto\_Ln or S\_Carto\_Ar representing the erosion area.

## 4.10 Non-Levee Embankments

**Table 10: Non-Levee Embankment AoMIs – Description and Data Sources**

Item	Description	Potential Data Source(s)
Non-Levee Embankments	Structures not designed for flood control, but which have an impact on flooding, such as railroad embankments and roadways.	<ul style="list-style-type: none"> <li>Discovery Data Mining and Discovery Meeting</li> <li>Hydraulic Models</li> </ul>

- Collection Points in the Project Lifecycle: Data collected at Discovery Meeting and during engineering analysis.
- Data Evaluation and Qualifying Criteria: Structure should be visible in terrain data or identified from modeling in re-study areas with engineering judgment applied to community claims of flooding or protection level.
- Data Processing and Enhancements: Data will be collected as a point location in S\_AOMI\_Pt and displayed on the FRM. If displaying the non-levee embankment on the FRM as a linear feature better communicates the location of the non-levee embankment, a feature can be added to S\_Carto\_Ln representing the embankment.

#### 4.11 At-Risk Essential (or Critical) Facilities

**Table 11: At-Risk Essential Facility AoMIs – Description and Data Sources**

Item	Description	Potential Data Source(s)
At Risk Essential Facilities	Essential facilities, sometimes called “critical facilities,” are those whose impairment during a flood could cause significant problems to individuals or communities, such as a flooded community wastewater treatment facility or hospital.	<ul style="list-style-type: none"> <li>• Discovery Data Mining and Discovery Meeting (community provided)</li> <li>• State Databases/Inventories</li> <li>• Locally-supplied Geographic Information System (GIS) data</li> </ul>

- Collection Points in the Project Lifecycle: Before the Discovery Meeting, when available from local or State sources, for verification at the Discovery Meeting. In the absence of any inventory, at the Discovery Meeting.
- Data Evaluation and Qualifying Criteria: Work with community officials at the Discovery Meeting to ensure that the structures meet the definition and that the inventory used is complete and current. S\_AOMI\_Pt should generally only include critical facilities within the mapped flood hazard areas. However, critical facilities that are in close proximity to the mapped floodplain, or those that could be isolated during a flood, may also be included.
- Data Processing and Enhancement: Existing locations will be captured as points in S\_AOMI\_Pt and displayed on the FRM. The AOMI\_INFO field should be populated with pertinent information such as “St Joseph Hospital is subject to flooding during frequent flooding events. This hospital serves as a critical trauma unit.”

#### 4.12 Other Flood Risk Areas

**Table 12: Other Flood Risk AoMIs – Description and Data Sources**

Item	Description	Potential Data Source(s)
Other Flood Risk Areas	Other flood risk areas are those that are not identified as Special Flood Hazard Areas (SFHAs) because they do not meet NFIP) mapping criteria, but are identified locally as areas of concern. These could include drainage or stormwater-based flood hazard areas, or areas known to be inundated during storm events.	<ul style="list-style-type: none"> <li>• Discovery Data Mining and Discovery Meeting</li> <li>• Local Hazard Mitigation Plans</li> <li>• Local planning or public works departments</li> <li>• Floodplain managers</li> </ul>

- Collection Points in the Project Lifecycle: Data collected prior to and at Discovery Meeting.
- Data Evaluation and Qualifying Criteria: Community-provided data.
- Data Processing and Enhancements: Data will be collected as a point location in S\_AOMI\_Pt and displayed on the FRM. The AOMI\_INFO field should indicate the nature of the flood risk (e.g., “Storm drain that overflows during the 10 percent and less frequent events and floods several properties”). If displaying the flood risk area on the FRM as a polygonal feature better communicates the risk associated with the area, a feature can be added to S\_Carto\_Ar representing the flood risk area.

#### 4.13 Areas of Mitigation Success

**Table 13: Areas of Mitigation Success AoMIs – Description and Data Sources**

Item	Description	Potential Data Source(s)
Areas of Mitigation Success	Any flood mitigation strategies, tactics, and/or projects that have been demonstrated to reduce losses associated with flooding events	<ul style="list-style-type: none"> <li>• Discovery Data Mining and Discovery Meeting</li> <li>• SHMO and Local Emergency Management</li> <li>• Public Works</li> <li>• Hazard Mitigation Plans</li> </ul>

- Data Collection Points in the Project Lifecycle: At any point during or after the Discovery Meeting.
- Data Evaluation and Qualifying Criteria: All successfully completed projects will be included.
- Data Processing and Enhancements: Data will be compiled as point data in S\_AOMI\_Pt and attributed with a brief description of the project and the project owner in the AOMI\_INFO field (e.g. “42 homes purchased by the City of Chicago with FEMA Hazard Mitigation Grant Program (HMGP) grant in 2003”).

#### 4.14 Other

**Table 14: Other AoMIs – Description and Data Sources**

Item	Description	Potential Data Source(s)
Other	Other types of mitigation actions or opportunities that are not captured under one of the previously defined categories.	<ul style="list-style-type: none"> <li>• Discovery Data Mining and Discovery Meeting</li> <li>• SHMO</li> <li>• Local Emergency Management</li> <li>• Public Works</li> </ul>

- Data Collection Points in the Project Lifecycle: At any point during or after the Discovery Meeting.
- Data Evaluation and Qualifying Criteria: Community-provided information.
- Data Processing and Enhancements: Data will be compiled as point data in S\_AOMI\_Pt and attributed with a brief description of the action or opportunity. If losses were avoided in a post-project flooding event they should be described and quantified to the extent reliable data is available (e.g., “project constructed in 2008 for \$800k; more than \$2 million in damages avoided in 2010 flooding”).

Additional examples of AoMI types that could be assigned to the “Other” category include:

- Locations experiencing or prone to land subsidence
- Areas where lake levels are changing
- Additional mitigation opportunities, such as identifying where there is open space that could be expanded upon, pump stations that could potentially be upsized, large lots that could be used for detention basins, areas where flow bypass might be effective, etc.

## 5.0 Sources of AoMI Data

AoMI data has multiple sources, and is one of the few non-regulatory flood risk datasets whose collection and creation happens at multiple times throughout the lifecycle of a Flood Risk Project. AoMIs can be collected as early as the Discovery stage, and may be revised or updated throughout the data development stage and beyond, as outlined in Figure 2.

As a major part of the “Data Mining” process referenced in the graphic, Mapping Partners should follow the appropriate State and National Standard Operating Procedures (SOPs), as defined within the Geospatial Data Coordination (GDC) Guidance document, when gathering AoMI data. These SOPs provide valuable information regarding the data sources, contact information, and State preferences that are unique to each different data type.

As part of the overall stakeholder engagement process, an AoMI questionnaire for community leaders can also be provided at the Discovery phase to facilitate the process of data collection for data that was not able to be obtained through other measures. The “Tools & Links” tab on FEMA’s Mapping Information Platform (<https://hazards.fema.gov>) contains additional resources that identify State contacts (“Geospatial Data Coordination Contacts by State”) and procedures (“National and State Data Coordination Procedures”) that should be referenced to assist with this process.

Although there are many inputs that feed the AoMI creation process, the finalization of the AoMI dataset should be the outcome of a collaborative process between the community and FEMA, with the primary focus being upon identifying actionable mitigation activities and opportunities for improving risk awareness.

### 5.1 Community, State, and Other Local Data

State and local officials experienced at responding to, regulating, and addressing the impacts of flood hazards have the best knowledge of their jurisdiction’s flooding problems. Often this

information is captured in local Multi-Hazard Mitigation Plans, stand-alone Floodplain Management Plans or a community's comprehensive plan.

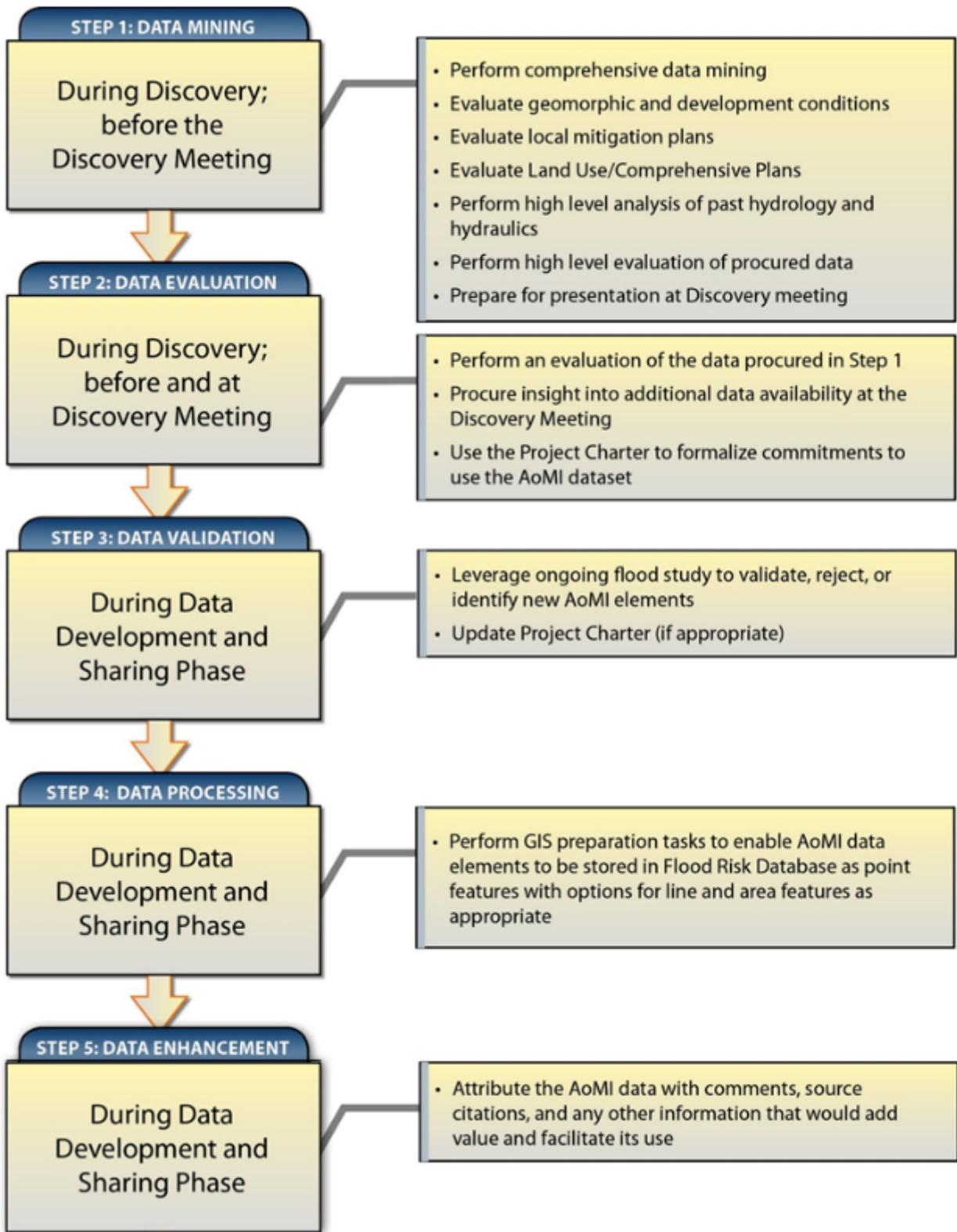
Prior to initiating contact with the communities in the project area, Mapping Partners should review the plans for potential AoMIs to discuss with community officials and other stakeholders. The AoMI topic should be introduced to local officials early on in the Flood Risk Project process to build a productive working relationship to gain buy-in from the communities during the development of their AoMI data and to determine which AoMIs to mine data for, focusing on those areas that are of interest to the affected communities.

The following information should be requested from each community, using the AoMI questionnaire or similar outreach tool, once an initial collection of publicly available AoMI-type data has been performed. This allows the community to be able to react to the data already collected, respond with corrections if they have more up-to-date information, and provide additional AoMI data that may not have been identified yet.

- Locations of successful mitigation projects
- Areas of significant erosion (both riverine and coastal)
- Coastal structures of interest
- Significant recent or proposed development (or land use changes)
- High risk essential facilities

The outreach and data collection process should be initiated once the study begins (see Figure 2). Due to the wide range of detail, format, and quality of data that will be submitted to FEMA, a minimum test of relevance, or application of qualifying criteria should be applied when deciding to include the AoMI. The entry into the FRD is flexible to account for the range of information that may be provided. The FRR should indicate the source of the data.

Figure 2: AoMI Data Creation Lifecycle



The following are the most common types of community, State, and local data from which AoMIs could be identified:

- Base map: Boundaries, Hydrography, Transportation
- Flood study needs, risk, elevation data
- Flooding issues, historical flooding, disasters
- Mitigation activities, Community Rating System (CRS), Community Assistance Visits (CAVs), grant projects, mitigation plans
- Local development, floodplain management plans
- Regional watershed plans
- Infrastructure: culverts, dams, bridges, levees
- Building footprints or parcel data
- Community stormwater or drainage flooding “hot spots”, within the Special Flood Hazard Area (SFHA) or outside the SFHA, where drainage issues are contributing to flooding

## **5.2 Federal Government Data**

FEMA and other Federal agencies responding to flood events have data that reflects damages to buildings and infrastructure, and other expenditures resulting from the floods. This data is useful in establishing a pattern of flooding based on actual events that sometimes may occur outside of SFHAs. It can also help FEMA, flood management officials, and planners understand the frequency and magnitude of flood events in the areas where data is available. It can also help focus flood mitigation efforts. This data will primarily be obtained from the appropriate agency or FEMA Division.

In addition, information on successful mitigation projects will be included as a way of showing the public, neighboring communities in the project area or study area, and other stakeholders examples that may work as solutions to some of their problems. Much of this information is Privacy Act-protected and therefore must be handled carefully during the collection, storage, transfer, and display of this information. Information on Repetitive Loss (RL), Severe Repetitive Loss (SRL), Individual Assistance (IA), Insurance Claims, or any other similarly protected data that could be used to identify specific individuals or properties cannot be included within the FRD as individual points.

That type of information must be generalized prior to its inclusion within the FRD. For example, a cluster of repetitively flooded properties should be represented by a single point at the centroid of a census block, rather than at the specific property locations so that the identity of individual property owners is protected. The following are the types of Federal information that Mapping Partners should look to collect as part of the AoMI development process:

- Locations of successful mitigation projects
- Clusters of Repetitive Loss / Severe Repetitive Loss properties
- Clusters of Public Assistance Project Worksheets for past floods

- Clusters of Individual Assistance grants for past floods
- Clusters of Small Business Administration (SBA) Loans from Past Floods
- Other post-disaster data including high-water marks, post-disaster debris lines, Advisory Base Flood Elevation data, and coastal inundation maps
- Cluster of flood prone areas where damage and losses are significant but may not be enough within the whole community to warrant an Individual Assistance or Public Assistance declaration

A “cluster” will be defined as a number of claims, damage reports, or assistance locations sufficient to indicate that the area has a higher frequency of damage than other areas in the community. Evidence of claims or damages should be apparent from more than one event. For RL and SRL claims, five or more from at least two events is considered sufficient. For IA/PA sites, five or more from at least two different events is considered sufficient.

Standard and well-defined limitations on the use, presentation, distribution, and storage of this type of data should be provided for consistency among FEMA Regions and Mapping Partners. Overall, the purpose of repackaging and providing the AoMI dataset to communities on the FRM and in the FRR is not to verify that the factors are impacting flood conditions, but rather to help direct the attention of planners to areas warranting further investigation. By providing the AoMI dataset on a project extent basis, attention is able to be drawn to the necessity of coordinating with upstream/downstream neighbors in planning to reduce losses.

### **5.3 Engineering Data from H&H and Coastal Flood Analyses**

This data will primarily be obtained during the Flood Insurance Rate Map (FIRM) production process (H&H modeling) and will include the following:

- Significant stream flow constriction locations (e.g., undersized bridges and culverts) that create backwater conditions, or other findings from the engineering analysis that indicate possible changes that would have significant impacts on the built environment or major evacuation and response transportation routes
- Major roads overtopped by higher frequency flooding events
- Major embankments
- Dams, levees, and coastal structures that contribute to flooding conditions

The FIRM production team should be briefed at the beginning of the study on the types of information needed for the AoMI dataset, much of which will have already been collected during Discovery but will still require validation during the ongoing Flood Risk Project.

## **6.0 AoMI Data Evaluation and Validation**

Discretion should be applied regarding which AoMIs to include in the FRD and FRR based on dialogue with the communities before, during and after the Discovery Meeting. The goal is to include data that is endorsed by the communities with some level of commitment to use the data. After initial data collection or creation, the Mapping Partner should evaluate the collected data for potential use, as described in Section 6.1.

## 6.1 AoMI Data Evaluation

All data procured should be evaluated for potential use in the AoMI dataset. This evaluation should include the condition, age, veracity and integrity of the data received to determine approximate level of effort for its preparation to be used as an AoMI element.

After the initial evaluation of the data, the Mapping Partner should engage with the communities in the project area, FEMA Regional representatives, State Hazard Mitigation Officer, and State and local Floodplain Managers offices to:

- Discuss findings of the evaluation of the data and include recommendations on items to include in the dataset.
- Gain consensus from the community on data that will be useable to them for planning and project development.

Concurrent with this evaluation stage will be a data selection process that should be satisfied before data elements are included in the AoMI dataset. The following evaluations are typically made:

- Compatibility for use within the FRD
- Completeness
- Currency
- Source and integrity

If the AoMI data procured during Discovery meets these criteria, they will move into the AoMI data validation step.

## 6.2 AoMI Data Validation

Although some of the AoMI elements are subjective, many are based on objective engineering data that should be validated during the course of the Flood Risk Project. An example would be where a culvert was anecdotally cited by local stakeholders as being of insufficient capacity to efficiently carry the 1 percent-annual-chance flood discharge. During the Flood Risk Project, it is expected that assumptions of this nature will be validated with engineering data to validate anecdotal citations and thereby preserve integrity in the final dataset.

For those AoMI elements that are not impacted by the Flood Risk Project (such as significant changes in land use), engineering judgment should be applied when considering whether to add these features to the AoMI dataset.

See Section 3.0 for additional guidance in terms of qualifying criteria for inclusion of AoMI elements in this dataset.

## 7.0 AoMI Data Processing and Enhancement

The major focus of AoMI is to take existing data compiled from a variety of sources and add value so that it is easily retrievable, easy to use and more widely available for outreach, awareness, planning and loss reduction activities. It is not the intention of this dataset to simply

repackage existing data, unless value can be added. Processing of the data is significantly different than all of the other datasets, since raw data will be available from multiple sources with varying levels of completeness, formats, and quality.

## **8.0 AoMI Information on the Flood Risk Map**

AoMI information is generally included on the Flood Risk Map (FRM). While each AoMI point can be shown on the FRM, certain AoMIs can have larger callouts on the map to show additional information. Since space on the FRM is limited, a decision on which AoMIs are considered to be the most note-worthy, or of greatest interest to the community, will need to be made prior to finalizing the FRM. The [FRM Guidance](#) provides additional information related to how this information may be depicted.

## **9.0 AoMI Information in the Flood Risk Report**

AoMI information is also included in the Flood Risk Report (FRR). AoMI data is summarized at the project and community level for reporting within the FRR. The [FRR Guidance](#) provides additional information related to how this information is reported.

## **10.0 Dataset Spatial Extents**

AoMIs are only collected and delivered in the FRD within the extents defined by the project footprint (S\_FRD\_Proj\_Ar in the FRD). Since project footprint boundaries (especially watershed-based) often do not align with community boundaries, it is possible that a community may supply AoMI data for locations outside of the project footprint. This data should not be included within the FRD. The only exception to this rule is if sensitive information on flood-prone properties (such as RL, SRL, IA, etc.) is generalized to the centroid of a census block, but the centroid of that census block is outside of the project footprint, then it is acceptable to include that information within the FRD. In this scenario, a note clearly explaining this situation should be added into the attributes of the AoMI dataset.

## **11.0 Data Delivery Timeline**

The [Flood Risk Database Guidance](#) provides recommendations as to when the AoMI dataset should generally be provided to communities during the life of a Flood Risk Project, and the conditions under which it should be updated after its initial delivery.

## **12.0 Uses in Outreach, Collaboration, and Flood Risk Communication**

The whole goal of the AoMI dataset is to raise awareness of potential flood risk mitigation opportunities (including specific flood risk mitigation projects), encourage local collaboration, and communicate how various mitigation activities can successfully reduce flood risk. This is most effectively accomplished in direct conversations with community and watershed stakeholders, while looking at the AoMI dataset within GIS.

The FRM may help support these conversations, as it should highlight some of the more prominent or important AoMIs within the project area. However, successful conversations that lead to action are more likely to be realized by talking about specific AoMIs and what they reveal, and using the other flood risk data in the vicinity to enhance those conversations.

For example, it is good practice to use the AoMI dataset to highlight roads that are overtopped during more frequent flood events, as it may reveal locations where culverts should be resized, or areas whose road access would be cutoff during high flows. However, it would be better to use this data in conjunction with other flood risk datasets that are available, such as the flood depth grids and velocity grids just upstream of the road crossing, to help fully understand the impacts of potential mitigation vs. the implications of no action at all.