

# Guidance for Flood Risk Analysis and Mapping

## Discovery

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For Reference Only.**

May 2014



**FEMA**

This guidance document supports effective and efficient implementation of flood risk analysis and mapping standards codified in the Federal Insurance and Mitigation Administration Policy FP 204-07801.

For more information, please visit the Federal Emergency Management Agency (FEMA) Guidelines and Standards for Flood Risk Analysis and Mapping webpage (<http://www.fema.gov/guidelines-and-standards-flood-risk-analysis-and-mapping>), which explains the policy, related guidance, technical references, and other information about the guidelines and standards process.

Nothing in this guidance document is mandatory other than standards codified separately in the aforementioned Policy. Alternate approaches that comply with FEMA standards that effectively and efficiently support program objectives are also acceptable.

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## 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</u> , Procedure Memoranda, and/or Operating Guidance documents. It has been reorganized and is being published separately from the standards. |
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Figure 1. Discovery Process Steps.



## 1.0 Introduction

This document describes the activities involved in the “Discovery” of flood hazards and associated flood risk and mitigation activities in Regionally-prioritized areas. Discovery activities include data collection; engagement with local stakeholders, the State, Tribal nations, Other Federal Agencies (OFA), non-profit entities, and others; one or more Discovery Meetings; and post-meeting activities.

Discovery occurs after FEMA’s planning and budgeting cycle, when watersheds of interest have been selected for further examination in coordination with Federal and State-level stakeholders. This guidance does not describe the activities that occur as part of the planning and budgeting cycle, as these are part of national planning activities that may be revised each fiscal year.

Discovery is essential to successful Flood Risk Projects. It provides for the exchange of information among the various stakeholders involved and includes one or more meetings with stakeholders to better understand the watershed, deciding whether a Flood Risk Project is appropriate and, if so, collaborating on the scope of the project in detail.

This document provides guidance for conducting Discovery activities; describes required elements and the additional elements that may be desirable depending on State, Regional, or community preferences or requirements; and summarizes the interim and final outputs of Discovery, which include a Discovery Map, a Discovery Report, and a project scope.

This guidance also provides a basic overview of what should be included in the Discovery Report and on the Discovery Map. The required data, analysis, reporting and other points noted in this document are presented as a foundation, not an all-inclusive, starting point of information that might be included in the Discovery documents.

When developing Discovery materials, Project Teams are encouraged to consider any number of subjects that could or may impact the evaluation of a watershed mapping or flood hazard mitigation needs. Possible data include political boundaries, socioeconomic needs, media, other scientific data sets, watershed infrastructure, and any other topic deemed relevant to explaining the circumstances, realities, and priorities of the watershed.

This document covers specific required Standards (SIDs) from FEMA's Knowledge Sharing Site (KSS). These specifications must be met in the completion of Discovery activities as well as in the development of the Discovery Map and Report.

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## **2.0 Initiating a Discovery Project**

When a community is initially considered for a Flood Risk Project involving a new or revised flood hazard analysis, FEMA must establish and maintain a community case file per 44 Code of Federal Regulation (CFR) 66.3. Therefore, at the start of a Discovery Project, a Mapping Information Platform (MIP) task number must be created with a budget, start date, and end date; as all Flood Risk Projects and Letters of Map Change (LOMCs) must be tracked in the MIP.

In addition, a Project Team must be formed as soon as a Flood Risk Project is initiated. This team will manage the project for its entire lifecycle. FEMA's Coordinated Needs Management Strategy (CNMS) is the repository for current, needed, and requested areas of mapping updates. Results from both flood hazard validation and needs assessment processes must be stored within the national CNMS database. The CNMS database will be used for all updated engineering reference information, validation status, and map issues throughout all pertinent phases of the Flood Risk Project. Furthermore, New, Validated or Updated Engineering (NVUE) statuses must be reported by each FEMA Region to FEMA Headquarters (HQ) at least quarterly.

When reviewing or cataloging flooding sources, if the last assessment date of the modernized or paper inventory exceeds five years, the validation status shall be changed by FEMA HQ or its designee to 'Unknown' and shall require reassessment. For a studied flooding source to go from "UNVERIFIED" to "VALID" status within the CNMS database, the flooding source must be reanalyzed. For more information on verifying the Validation Status of flooding sources, please see FEMA's KSS.

Frequent and accurate reporting to the CNMS is critical as all Regional decisions to prioritize, assess, and perform engineering analyses along various flooding sources must be supported by the data contained in CNMS. As noted above, each flooding source must be evaluated in CNMS at least once within a five year period. For that reason, each fiscal year, the Regions shall have a plan to evaluate all CNMS flooding sources within a five year period.

A CNMS database that is compliant with the CNMS Technical Reference must be updated and submitted at the completion of Discovery or Project Initiation based on the information and data collected.

### 3.0 Timing and Geographical Extent of Discovery

Discovery is required for all new and updated Flood Risk Projects. Discovery will be used for determining whether a Flood Risk Project is appropriate and will provide visibility to stakeholders as FEMA and Cooperating Technical Partners (CTPs) initiate flood risk and mitigation discussions and deliver flood risk information. Discovery is completed prior to the development of a Flood Risk Project. Flood Risk Projects will not be appropriate in all watersheds in which Discovery occurs. A Flood Risk Project includes any combination of the following activities: flood hazard mapping (such as the formation of new Flood Insurance Rate Maps (FIRMs) and Flood Insurance Studies (FISs)); Flood Risk Assessments (such as Hazus runs or refined Hazus analysis); and/or mitigation planning, technical assistance (such as training, outreach, assistance in understanding risk data, and/or improving mitigation plans, especially risk assessments and mitigation strategies).

Except for coastal and limited area level accreditation status change projects, Discovery must occur on a watershed basis in accordance with the watershed approach.

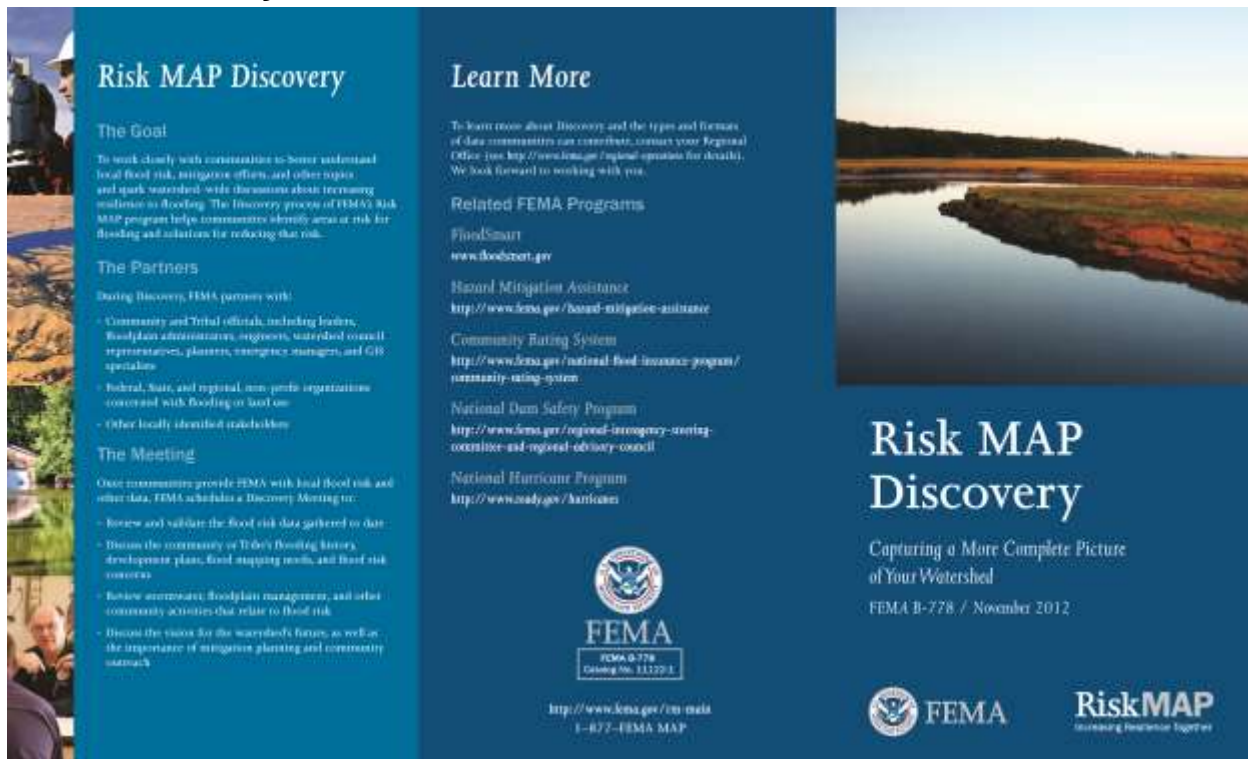
The Discovery area will consist of an entire Hydrologic Unit Code (HUC) 8 level watershed, regardless of political or other Regional, State, County, Municipal, or other borders. Information on HUC-8 watersheds may be found at <http://water.usgs.gov/GIS/huc.html>. Discovery at a watershed level means that all stakeholders within the watershed are involved. The guidance presented herein shall be applied at an appropriate geographic extent for coastal projects, which are not performed on a watershed basis. See "Coastal Considerations" for other requirements associated with coastal projects. Regions will work to determine how to handle multi-Regional or multi-State watersheds during Discovery.

### 4.0 Scalability

Discovery is flexible and scalable to the watershed under review. In watersheds with urban areas, Discovery may be completed differently than in rural watersheds. The watershed stakeholders involved will vary based on State, Region, and community type. The data collected will reflect the types of data that are appropriate to the watershed and will vary by project area.

The implementation of the Discovery process is likewise flexible to accommodate the varied political and physical landscapes across the nation and within the project area. The objectives and outcomes of Discovery are provided in this document, and flexibility is granted in the implementation as long as the intent of the objectives and outcomes are met.

## 5.0 Discovery Process Overview

A poster titled "Risk MAP Discovery" with a blue background. The left side features a vertical strip of four small images: a person in a hard hat, a flooded field, a person in a boat, and a group of people. The main text is organized into sections: "The Goal", "The Partners", "The Meeting", and "Learn More". The "Learn More" section lists related FEMA programs with their respective websites. At the bottom, there is a FEMA logo, a date stamp "FEMA 9-778 Dated Nov. 11, 2013", a URL, and a phone number. On the right side, there is a large image of a river and the title "Risk MAP Discovery" in large white letters, followed by the subtitle "Capturing a More Complete Picture of Your Watershed" and the date "FEMA B-778 / November 2012".

**Risk MAP Discovery**

**The Goal**

To work closely with communities to better understand local flood risk, mitigation options, and other topics, and spark watershed-wide discussions about increasing resilience to flooding. The discovery process of FEMA's Risk MAP program helps communities identify areas at risk for flooding and solutions for reducing that risk.

**The Partners**

During Discovery, FEMA partners with:

- Community and Tribal officials, including leaders, floodplain administrators, engineers, watershed council representatives, planners, emergency managers, and GIS specialists
- Federal, state, and regional, non-profit organizations concerned with flooding or land use
- Other locally identified stakeholders

**The Meeting**

Once communities provide FEMA with local flood risk and other data, FEMA schedules a Discovery Meeting to:

- Review and validate the flood risk data gathered to date
- Discuss the community or Tribe's flooding history, development plans, flood mapping needs, and flood risk concerns
- Review emergency, floodplain management, and other community activities that relate to flood risk
- Discuss the vision for the watershed's future, as well as the importance of mitigation planning and community outreach

**Learn More**

To learn more about Discovery and the types and formats of data communities can contribute, contact your Regional Office (see <http://www.fema.gov/regional-operations> for details). We look forward to working with you.

**Related FEMA Programs**

**FloodSmart**  
[www.floodsmart.gov](http://www.floodsmart.gov)

**Hazard Mitigation Assistance**  
<http://www.fema.gov/hazard-mitigation-assistance>

**Community Rating System**  
<http://www.fema.gov/national-flood-insurance-program/community-rating-system>

**National Dam Safety Program**  
<http://www.fema.gov/regional-intoagency-coordinating-committee-and-regional-advisory-council>

**National Hurricane Program**  
<http://www.ready.gov/hurricanes>

**Risk MAP Discovery**

Capturing a More Complete Picture of Your Watershed

FEMA B-778 / November 2012

FEMA 9-778  
Dated Nov. 11, 2013

<http://www.fema.gov/rm-main>  
1-877-FEMA-MAP

FEMA RiskMAP  
Increasing Resilience. Together.

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Discovery is the process that allows FEMA and watershed stakeholders a more comprehensive and holistic understanding of the flood risk and flood mitigation capabilities and opportunities of communities within a watershed. Data gathered during Discovery includes information that influences flood risk decision-making, historical flooding information, existing flood hazard data and information, and mitigation activities. Among other data and information, State, local, and Tribal Hazard Mitigation Plans must be obtained and reviewed in order to document existing flood risk; mitigation capabilities; hazard risk assessments; and mitigation strategies that are planned, underway, or completed within the watershed. Data and information collected must also include information about projects, programs, and data that may support flood risk communications, outreach, and flood mitigation actions.

Based on the particular needs of a watershed, one or more Discovery Meetings will be held after an analysis of the collected information is completed. This analysis will be summarized in the draft Discovery Report. During the meeting(s), the project team will work with watershed stakeholders to determine if a Flood Risk Project is appropriate. If a Flood Risk Project is appropriate and flood hazard mapping will be included, data and information collected during Discovery will be used to evaluate the potential effects of the study. This evaluation must be discussed with the watershed stakeholders to set expectations about the outcomes of the Flood Risk Project. The final project scope must be coordinated with the watershed stakeholders. A Project Charter, if used, describes the project scope, summarizes the expected results, sets the roles and responsibilities of all parties involved, identifies mitigation opportunities including mitigation planning technical assistance to be provided, and describes other assistance (outreach, communications, etc.) that are needed.

## **5.1 Coastal and Levee Considerations**

Discovery efforts in coastal areas and for levee projects may be conducted differently than Discovery for watershed projects. See separate guidance regarding coastal and levee projects on FEMA's KSS.

## **5.2 Tribal Considerations**

Because of the special relationship that Federally-recognized Tribal Nations have with the Federal Government, when Tribal lands are included in a watershed under evaluation, special considerations will apply. Consultation with Tribal Nations must be coordinated with the FEMA Regional Offices to ensure that an effort is made, during the Discovery process, to determine if the Tribal Nation has the land-use authority necessary; desire; State or Federal status; or other issue that may cause the Tribal Nation to not participate in the National Flood Insurance Program (NFIP) or otherwise decline to participate in a Discovery effort.

The Regional Office must be consulted as to whether or not Tribal Nations should be included in the watershed-wide Discovery efforts and in general Discovery Meetings or if there should be a separate meeting with the Tribe(s). This will depend on established working relationships between the Regional Offices and the Tribes within that Region.

Due to the complexity and varied nature of Federal/Tribal Agreements concerning the ownership of property on Tribal lands, extra effort must be made to acquire Tribal land boundaries during Discovery. Tribal and surrounding territorial boundaries may be difficult to determine and Regional Offices must use the best information that is available, with the understanding that some Tribal lands will inadvertently be shown in unincorporated areas of counties or vice versa. Counties and Tribal Nations must be given an opportunity to make any corrections necessary to their territorial boundaries.

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Only FEMA Regional Office staff can work directly with Federally-recognized Tribes, unless specific arrangements and coordination have been made to allow mapping partners or other contractors to directly contact a Tribe.

## 6.0 Watershed Stakeholder Coordination



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In order to gather the information necessary to conduct a productive and meaningful Discovery Meeting, stakeholder contact prior to the Discovery Meeting must occur in order to collect pertinent flood risk and mitigation data and other community information that will help streamline and facilitate the Discovery Meeting. This up-front coordination may take the form of conference calls, web meetings, or other means of two-way communication.

FEMA's Community Information System (CIS) should be consulted to obtain initial community contact information. However, data found in CIS should be verified and updated as required to insure that the information is correct and current. See separate guidance on stakeholder engagement on FEMA's KSS for more information.

### 6.1 Watershed Stakeholders

The types of stakeholders engaged in a Flood Risk Project will vary for different watersheds or regions. Floodplain management stakeholders and Chief Executive Officers (elected officials) that have traditionally been engaged for flood hazard mapping projects will continue to be included in Flood Risk Project engagement. However, a much wider array of community, county, and Regional stakeholders, public, private, and non-profit must also be engaged for Flood Risk Projects, including, but not limited to:

- State or Regional groups with a vested interest in water resources (e.g., levee boards, Regional partners, conservation districts, watershed/river basin commissions, etc.)
- Geographic Information System (GIS) managers and specialists, community and Regional planners, local and State water authorities, levee and dam owners, county land use departments, etc.

- Community and State emergency management officials such as county offices of emergency management, fire districts, fire departments, fire chiefs, etc.
- Building officials, local floodplain administrators, county and local engineering departments, highway departments, etc.
- Members of Tribal Communities, as defined through consultation and coordination with Tribal Officials
- Representatives of any other appropriate Non-Government Organizations (NGOs) (environmental groups, recreational groups, etc.)
- Economic development and commerce representatives
- Other key stakeholders as appropriate (e.g., developers, realtors, insurance agents, lenders, etc.)

At least one representative from every community and area of influence should be contacted. Community officials contacted should represent a holistic view of flood risk management and mitigation of flood risk within the community. Please consult FEMA's KSS on stakeholder engagement during the Discovery Phase for more information.

## **6.2 Other Federal Agency, State, and Local Coordination**

Unnecessary duplication of Federal, State or local mapping efforts must be avoided. Therefore, coordination with Federal, State, and local level partners, such as the U.S. Army Corps of Engineers (USACE), U.S. Environmental Protection Agency (EPA), U.S. Geologic Survey (USGS), NFIP Coordinators, State Hazard Mitigation Officers (SHMOs), State Dam Safety Officials, State Transportation Departments, National Weather Service (NWS), Natural Resources Conservation Service (NRCS), State or Regional authorities, non-municipal local authorities and boards, and others, will occur on a State or Regional level and informs project prioritization and sequencing. In addition, large State or Federal government landholders, such as the U.S. Forest Service, the National Park Service, and branches of the military with significant landholdings (such as a large base) should be contacted and included in any coordination. While these State or Federal lands may not be mapped for flooding hazards, they are integral to, and often cover large areas of a watershed. These entities are FEMA partners; therefore, the coordination must be continuous and ongoing. In this cooperative spirit, FEMA will provide technical and programmatic assistance and prepare responses to inquiries received from Mapping Partners, NFIP constituents and other interested project stakeholders.

## 7.0 Data Collection

The types of data and information obtained during Discovery should demonstrate a holistic picture of flooding issues, flood risk, and flood mitigation capabilities within a watershed. The data collected should provide an understanding of the geography, demographics, infrastructure presence, and other critical elements of the watershed that will provide a full understanding of the basin. This information must be both sufficient and firmly understood before suggesting possible elements of Flood Risk Projects including flood hazard mapping, communication and outreach, mitigation planning technical assistance, and flood risk assessments.

FEMA has specific Geospatial Data Coordination Procedures which outline sources of geospatial data and contact information, preferences for base map data in Flood Insurance Studies, information for the project Discovery stage, and other useful information. To implement the Geospatial Data Coordination Procedures, each Region maintains State Standard Operating Procedure (SOP) documents that detail how specific datasets within each State should be used for flood hazard mapping and Discovery projects. Some of the data to be used in those projects can be retrieved from national data suppliers, which are typically OFAs.

To supplement the Discovery element of the Geospatial Data Coordination Procedures, project teams should follow the guidance in the National Discovery Data Coordination Procedure document, which provides instruction on the most appropriate data to collect on a national scale for Discovery. This information, in conjunction with the State SOPs, is intended to help reduce the level of effort needed to find appropriate data.

Project teams must communicate to watershed stakeholders which data and information can be used for Flood Risk Projects including the appropriate format and specifications. In conjunction with required data from CNMS (such as “mapping needs” information), the data and information obtained during this process will be used to make the draft Discovery Map, and will contribute to regulatory products (FIRMs and FISS) and non-regulatory Flood Risk Products (Flood Risk Reports, Flood Risk Maps, and Flood Risk Databases). Non-regulatory products and datasets are further described in FEMA’s KSS.

The types of information that must be collected prior to a project’s first Discovery Meeting include information about:

- The community or Tribe’s planning capabilities and the timing and level of any needed technical assistance for mitigation planning
- Regional and/or National Geospatial Data Coordination data sets
- The status of a local or Tribal Hazard Mitigation Plan
- Current stormwater activities such as culvert or ditch cleaning
- Current outreach programs to residents about stormwater issues
- Stormwater Best Management Practices, programs for reducing flows, etc.
- Risk and flood study needs
- Flooding issues, including (where applicable) ice jams, historical flooding, and declared flood disasters

- Participation in the Community Rating System (CRS)
- Actionable projects identified in the Hazard Mitigation Plan
- Community development plans and comprehensive plans
- Prior proactive mitigation actions and planning efforts resulting in reduced losses
- Community interest/ability to provide elevation data or pursuing partnership opportunities
- Community priorities in order to focus mitigation discussions through knowledge of what is important to the public
- Community-identified mitigation opportunities
- Regional or State information about communities and flooding within a watershed, such as information from Community Assistance Visits (CAVs)
- Community correspondence, and other data that the FEMA Regional Office, State NFIP Coordinator, or SHMO possesses
- Information from OFAs, NGOs, and other watershed stakeholders
- Data from the Mapping Information Platform (MIP), the FEMA library, etc.

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Project teams must also evaluate local Hazard Mitigation Plans and prior local mitigation projects for insight into the stakeholder's participation in proactive mitigation initiatives, and information on a community's or Tribe's capability and/or desire to implement mitigation actions and to communicate flood risk to citizens. Because the above noted data may be included on the Discovery Map, if a data-sharing (release) agreement is required for use of community, Tribal, or other third party data, this should be discussed before the start of the Discovery Meeting(s).

Geospatial data that is collected will be used in the Discovery Map. When appropriate, data not provided in geospatial format by communities must be converted to a geospatial format for visualization on the Discovery Map. For example, the status of a community or Tribe's mitigation plan is not geospatial data; however, the area covered by the plan can be shown on a map, and highlighted appropriately to show the plan status. Information that cannot be displayed on a map (such as information about stormwater ordinances) will be compiled into a Discovery Report, along with a listing of all of the data collected, the stakeholders involved, and other information. The draft Discovery Map will be used as a reference and as a discussion starter during the Discovery Meeting. One objective of the Discovery Meeting is to validate the information collected and determine whether a Flood Risk Project is appropriate for the watershed under consideration.

## 8.0 Data Analysis

A robust, thoughtful analysis of the data and information obtained during stakeholder coordination is required in order to prepare for and conduct the Discovery Meeting. The collected information will be distributed to stakeholders prior to the Discovery Meeting in order to enable meeting attendees to focus on discussions about the watershed characteristics, flood

risk, flood hazard communications, hazard mitigation, and outreach. While additional data and information may become known at the meeting, and there will be some data collection post-meeting as a result of meeting discussions, the Discovery Meeting will not be solely a data-collection meeting. There is no mandatory format or guidance for analyzing the data as the data collected will differ based on several factors and is dependent on the watershed.

## **9.0 Discovery Map**

A draft Discovery Map will be created using the data and information collected during Discovery and will be presented to communities in order to prompt further discussion about the watershed. The draft Discovery Map will be provided to the communities and Tribes prior to the Discovery Meeting and presented at the Discovery Meeting as a facilitation tool. A Discovery Map Prototype is shown below.

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**MAP SYMBOLLOGY**

**Avg. Annualized Loss**  
(1982-1998)

- Very Low
- Low
- Medium
- High
- Very High

**CHWS Data**  
(Based on 1982 Report)

- Unflooded
- Regional Subsegment
- Sub Segment

**Other Symbols**

- ALCIS Watershed Boundary
- ALCIS Watershed Boundary
- Water
- Unincorporated
- Boundary

**WATERSHED LOCATOR**

**NATIONAL FLOOD INSURANCE PROGRAM**  
**Discovery Map: Trifecta**

**SAMPLE WATERSHED**

|                         |         |
|-------------------------|---------|
| Stream Miles            | 8,452   |
| Studied Stream Miles    | 1,308   |
| Detailed Study Miles    | 328     |
| Approximate Study Miles | 979     |
| Population              | 775,676 |

**FEMA**

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The data and information may be presented either electronically or as a printed map or set of maps. The minimum required data and information to show on the draft Discovery Map is listed below. Other data and information collected may be shown on the map at Regional or CTP discretion that would benefit the discussion within the watershed. The amount of data and information collected will likely not be reasonably shown on one map. This would require map layers, which can be manipulated and depicted electronically. Multiple maps at various scales may be developed and brought to the Discovery Meeting to facilitate the meeting discussion and for readability. As noted above, final Discovery Maps will be provided to the communities and Tribes after the Discovery Meeting.

In addition, a final Discovery Map will be created following the Discovery Meeting(s) to illustrate the decisions that were made at the Discovery Meeting.

To ensure privacy, sensitive data, such as data that may name a unique address or person, will be aggregated and/or generalized at the centroid of the census block and represented as a point or generalized area.

See FEMA's KSS for a description of the data capture standards (e.g. description, naming, format and content) for Discovery.

## 9.1 Required Discovery Map Information

The information required to be shown (if applicable to watershed) on the draft Discovery Map includes:

- Base data reflecting watershed boundaries, jurisdictional boundaries, Tribal land boundaries, State lands, Federal lands, major roads, and stream lines
- Coastal Barrier Resource Areas and Otherwise Protected Areas from U.S. Fish and Wildlife Service (USFWS)
- Mapping needs from CNMS
- Topographic and bathymetry data status and availability, locations of future topographic and/or bathymetric data acquisition
- Hazus-based annualized loss estimates from the Average Annualized Loss study
- The coverage areas of known community or Tribal risk assessment data
- Reference to the status of local, State, and Tribal Hazard Mitigation Plans (status of plan in mitigation cycle)
- Flood control structure location data from National or Regional inventories (e.g. the National Inventory of Dams, levee inventories, etc.) and accreditation status information, including information from Dam Emergency Action Plans (if available)
- Locations of stream gauges
- Location of past flood claims and repetitive loss properties (to be shown using the centroid of the census block to maintain privacy requirements)

- Location of clusters of Letters of Map Change
- Known flooding issues not represented on effective FIRMs or listed in CNMS
- Areas of ongoing or planned development and areas of high growth or other natural land changes (e.g. wildfires, landslides, or subsidence)
- Locations of other ongoing studies or projects and studied stream reaches that have been modified since the effective map and require an updated study (e.g. highway improvements)
- In coastal areas, the locations of wave and tide gauges; wind stations; the proposed inland limit of the Primary Frontal Dune, if present; the location of any beach nourishment or dune restoration projects; a comparison of preliminary stillwater elevations with effective stillwater elevations
- Available effective study data
- Available orthophotography
- Proposed discussion areas, problem areas, areas of proposed mitigation projects, and other areas of interest to discuss based on Regional knowledge and analysis of the data collected during Discovery

## 9.2 Other Data

Information that may be shown on the draft Discovery Map at Regional or CTP discretion may include, but is not limited to:

- Land use and soil information (such as information from the Urban Change Land Use Map, existing or future land use maps, zoning maps, or other sources)
- Land ownership in the watershed
- Reference points to locate areas with flooding issues
- Hydraulic structures such as bridges or culverts, with inspection status, if available
- Coastal structures, including flood protection structures (e.g. levees), shoreline structures (e.g. jetties, groins, seawalls, etc.), man-made embankments (e.g. elevated roads, railroads, etc.), surge conveyance pathways and shoreline change data
- Local structure and topographic data from the existing hazard mitigation plans, if applicable. The data that may be available for use in risk assessment products and enhanced Hazus analysis include GIS-formatted building stock/inventory information, tax assessor records, high-quality terrain data, local building footprint or parcel data, essential facility data, number of stories, usage, assessed value, etc.
- Inundation areas of historic major flood events and declared disasters and high water marks

- Clusters or locations of Individual Assistance/Public Assistance grants and locations of grant projects completed, planned, or underway; locations of projects and structures completed or planned for FEMA Hazard Mitigation Assistance (HMA) grant programs or mitigation funds from other agencies or entities, such as the Small Business Administration
- Whether the community or Tribe has received, is currently using, or intends to apply for Federal grants to achieve mitigation planning or mitigation projects, including whether applications for mitigation planning or project grants are under review. If using Federal funds, whether the community or Tribe hires a contractor to assist with the development of mitigation plans or whether they need FEMA or CTP assistance
- Whether the previously-approved hazard mitigation plan indicated any data deficiencies for flood hazards that could be addressed through a flood study
- Information from FloodSmart on market penetration
- The locations and outcomes of recent Community Assisted Visits (CAVs) or Community Assistance Contacts (CACs), especially noted violations
- Community Rating System (CRS) class information
- Information from OFAs (such as USFWS, National Oceanic and Atmospheric Administration, USGS, NRCS, EPA, USACE, U.S. Forest Service, Bureau of Land Management, Federal Highway Administration, military bases, etc.)
- Information from State agencies (such as Departments of Transportation or Natural Resources, etc.), information obtained from non-profit organizations (including grass-roots watershed groups), other professional associations (such as the Association of State Floodplain Managers, American Water Resources Association, American Society of Civil Engineers, etc.), universities, etc.
- Current community plans, ordinances, or programs to alleviate flooding or manage stormwater
- Other known hazards with geographical boundaries (e.g. earthquake faults, landslide hazard areas, storm surge inundation zones, wildfire hazard areas, etc.), in order to review hazard risk assessments and mitigation strategies that have already been completed within the watershed, slosh zones, wildland-urban interface areas, etc.
- Whether there is an active disaster in the watershed
- Campgrounds/recreational areas, emergency access routes, etc.
- Any other data that may be appropriate

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## 10.0 Discovery Report

A Discovery Report must be completed and will include a section listing the data and information collected including what data and information were received, when they were received, data sources, and an analysis of the data and information. A draft Discovery Report will be shared with communities and Tribes prior to/in preparation for the Discovery Meeting. The final version of the Discovery Report will include meeting documents such as meeting notes, attendee list, etc. and will be provided to communities and Tribes after the Discovery Meeting. The Discovery Report template and prototype Discovery Report may be found on FEMA's Website.

The template provides a format and instruction for preparation of the Discovery Report, while the prototype serves as an example of how the addition of data and the unique characteristics of a particular watershed can be assembled to create a final product. The Discovery Report template was developed to allow the Mapping Partner flexibility in reporting. The Discovery Report template contains numerous sections for the compilation of particular community facts and data findings throughout the Discovery Process. The sections listed should be included and thoughtfully expanded as required to present a complete profile of the watershed, its communities, needs, and expectations in the final Discovery Report.

Both draft and final versions of the Discovery Report will be produced for all project participants. The versions will reflect the following:

- First Iteration (Draft): During the Watershed Stakeholder Coordination and Data Analysis phases of Discovery, the draft Discovery Report will house all information and data compiled by the Mapping Partner in preparation for the Discovery Meeting. This first version of the Discovery Report will be shared with the watershed stakeholders prior to the Discovery Meeting.
- Second Iteration (Final): The final Discovery Report is a result of the successful completion of the Discovery Meeting(s) held in the watershed. This second iteration will be finalized following a review of an interim draft report by stakeholders who attended the Discovery Meetings. At its completion, the final Discovery Report will be provided to watershed stakeholders and will include information about the meeting (including the meeting agenda, meeting announcement and publication, sign in sheets, discussion topics, decisions made, etc.)

Each version of the Discovery Report should be delivered to stakeholders as a Portable Document Format (PDF). In addition, the Mapping Partner should also deliver the Word File Document to the final MIP location for future reference and for future update.

The Discovery Report Prototype provides an example of watershed (non-coastal) Discovery, which includes watershed, county, and community details for Mapping Partner reference. Discovery for coastal projects are not typically watershed based; therefore, this prototype can be further refined at the Region's discretion for coastal projects. The following section provides guidance per report element.

### 10.1 Discovery Report Elements and General Format

The Discovery Report should be prepared at the watershed level or at the Region's discretion for coastal projects. The Discovery Report is designed to be flexible to the needs of the watershed. At the beginning of each report section, the template includes instructions in bold

italic font. Prior to completion of the Discovery Report, the italic text should be removed. The Discovery Report's sections and sub-sections (as applicable) are described below.

## **10.2 Report Cover**

The report cover shown in the template is considered the standard cover for the Discovery Report and it lists the communities in the watershed. If the Mapping Partner wishes to list the communities but there are too many communities to list on the cover, then the Project Area Community List, found on the first inside page of the Report, can be populated.

The cover should include the watershed name and HUC-8 code for the watershed area on which Discovery is being performed. The Watershed Boundary Dataset naming convention should be used to name the Discovery Report in order to maintain geographic clarity as future watersheds are developed.

In alphabetical order, list the counties within the project area. Then, list the independent communities and incorporated jurisdictions within the project area in alphabetical order. If spanning States, identify State(s) in alphabetical order. Specific characteristics of a community, such as non-participation in the NFIP, or other information deemed relevant to the project may be noted with this table of jurisdictions.

Include the Draft or Final version, as appropriate.

Update the report date to indicate the following dates:

Draft – Date initial Discovery Report is sent out to stakeholders in advance of the Discovery Meeting

Final – Date of final Discovery Report sharing the Discovery Meeting findings with watershed stakeholders

## **10.3 General Information**

In this section, include a watershed or project area description, including, for instance, physical land description, mention major lakes and rivers, large communities, and other topics of interest, as applicable and deemed necessary.

This section of the Discovery Report is initially prepared prior to holding the Discovery Meeting. This section can be further updated in any following document versioning of the Discovery Report to describe the Discovery process and the completed and/or up-coming steps to allow external stakeholder interaction.

The Project Team may also include additional data for informational and educational purposes with the external stakeholder audiences in mind.

The Project Team is advised to remember that most end users of the Discovery Report will likely not be experts in floodplain mapping or mitigation and should describe FEMA processes in laymen's terms. Therefore, a table explaining acronyms and abbreviations and/or a Glossary of Terms may be appropriate to aid the end user in understanding the language and themes of the Discovery Report.

## 10.4 Watershed Stakeholder Coordination

This section of the Discovery Report details the activities that occurred during the Stakeholder Coordination phase.

The template allows the Mapping Partner to provide headings as appropriate. Section titles may include a description of how the data and information were collected, who was contacted, and may include a list of watershed contacts for possible future Risk MAP project use.

This section, based on the number of contacts, should include a list of stakeholders contacted—either as a table, a reference to a Discovery Report appendix, an attached list, or by referencing a table in the Discovery Map.

A record of conversations, emails, call logs, and other communication should be photocopied or scanned and included as an appendix.

## 10.5 Data Analysis

This section should be populated for the draft version. This section should be divided into two subsections: Data that can be used for Flood Risk Products (regulatory and non-regulatory) and Other Data and Information.

Subsection i. *Data that can be used for Flood Risk Products* section will be used for listing topographic data availability and other data that can be used in Flood Risk Products (such as building footprints that can be used for refined Hazus analysis).

Subsection ii. *Other Data and Information* section will be different for each watershed, and should contain thoughtful analysis of the data and information as opposed to lists of data and information. Types of information include economic, demographic, growth, industry, etc. information which may be helpful to inform a communication and/or outreach strategy.

For each type of data collected, a brief summary and analysis should be provided.

The summaries may be watershed-specific with individual Community Briefings included as an appendix to the report providing summaries for each community.

This section may be completed using one page per data type, with a brief summary at the top of the page and the bottom half of the page showing a map or screen shot of data.

Some section examples are provided below. The list is not exhaustive, nor does it imply a requirement of topics that must be addressed in a Discovery Report. Rather is intended to demonstrate the breadth of subjects that may be appropriate to discuss within the Discovery Report. Therefore, this section will be different for each watershed.

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|  |   |
|--|---|
| Communities and Tribal Entities within the project area                              | General Information found prior to Stakeholder Contact  |
| Effective Flood Insurance Studies and Flood Insurance Rate Maps                      | Flood Hazard Mitigation and All Hazard Mitigation Plan Information  |
| Demographics and Industry  | Historical Flooding/High water marks  |
| CRS  | Other Historical Hazards  |
| Flood Insurance Policies and Repetitive Loss   | Declared Disasters  |
| Levees (include description of adjacent floodplain areas)                            | Mitigation Projects (completed, current, and identified)  |
| Flood Control Structures   | Mitigation Projects (completed, current, and identified)  |
| Endangered Species Act Considerations  | CAVs/CACs   |
| Emergency Action Plans (Dams, Levees)  | Stream Gauges   |
| Topographic Data Availability  | CNMS  |
| Hazus Data and Building Stock Information  | Ordinances  |
| Coastal Barrier Resources System Areas (COBRAs) and Otherwise Protected Areas (OPAs) | Information regarding Federal, State, and local representation (names, offices, district maps, and other relevant data) |
| NFIP Policies  |   |

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## 10.6 Discovery Meeting(s)

This section should include the Discovery Meeting date(s), location, organizations represented, agenda, and meeting notes (located in this section or as an appendix). Because the draft Discovery Report is completed before the Discovery Meeting, this section will not be completed in the Draft version, however, a note indicating that a review of the Discovery Meeting(s) will be included in the final Discovery Report may be placed in this section as a place keeper in the draft report.

This section may also include a description of the Discovery Map with a table or list showing the data included and pre- and post-Discovery Meeting notes and analysis. At a minimum, the final Discovery Report should include action items and decisions made at the meeting.

## 10.7 Appendix and Tables

This section is to be used at the Mapping Partners' discretion. This is also an opportunity to include items such as stakeholder lists and individual/community contact preferences (e.g. email vs. phone), meeting notes, data tables, and other items that are referenced in the report without duplicating the effort made during the Stakeholder Engagement, Data Analysis, and other phases of Discovery.

## 11.0 Discovery Meeting

A Discovery Meeting is likely the first face-to-face meeting that the project team will have with watershed stakeholders. To achieve a better understanding of the needs of the watershed, members of the study team, including FEMA Regional office staff, State representatives, and the mapping partner, may wish to meet before a Discovery Meeting to discuss and review what material may already be available and what strategies may be useful in optimizing the success of the Discovery Meeting(s) with local communities and other stakeholders.

A broad representation of watershed stakeholders are to be invited to a Discovery Meeting. For some watersheds, it may be desirable or necessary to hold multiple Discovery Meetings to facilitate stakeholder attendance. Reasons for multiple Discovery meetings might include watersheds with a large number of communities; geographically large watersheds; have topographic impediments (such as large lakes, etc.); are located in multiple States (out of State travel restrictions); or any other reason that the project team and stakeholders find valid. All data and information collected prior to the Discovery Meeting will be analyzed and summarized in the draft Discovery Report. The draft Discovery Map and Report will be used to aid discussions of the data and provide meeting attendees an overview of flood risk in the watershed.

Decisions to perform additional analyses, data development activities, and/or community engagement within the Flood Risk Project area must be supported by the outcomes from Discovery. These decisions shall be communicated to project stakeholders prior to executing those activities.

### 11.1 Meeting Objectives and Invitees

Information on the objectives of the Discovery Meeting and who should be involved can be found in separate guidance for Stakeholder Engagement during Discovery.

## 12.0 Finalizing Discovery

If a Flood Risk Project is not necessary for the watershed, the Discovery process is complete once the final, post-Discovery Meeting version of the Discovery Map and Report has been received by the watershed stakeholders.

If a Flood Risk Project will move forward, Discovery efforts will continue. Efforts moving forward will include working with communities and Tribes to complete a scope of work for the watershed.

If it has been determined that a Flood Risk Project including a flood hazard mapping element is appropriate for the watershed, FEMA will review pertinent data and information in coordination with communities to determine the expectations of the results. Specifically, the community stakeholders will be interested in knowing where Special Flood Hazard Areas and Base Flood Elevations will change and how (increase or decrease), what areas of the community will be impacted and other information. In order to provide this information to communities the project team should conduct a First Order Approximation (FOA) engineering analysis. There are no mandatory guidelines for how the FOA analysis should be conducted; it is dependent on the availability and format of the engineering data, topographic information, and other inputs.

For example, if the information collected during Discovery and discussed at the Discovery Meeting reveals that significant development has occurred since the original flood study that has increased discharges, then a first order engineering assessment should be completed and the

discussions should focus on areas where the flood elevations are likely to increase if a new study is initiated. The post-Discovery meeting coordination must occur prior to initiating a Flood Risk Project, and will assist in determining whether the impacts are significant enough that a new regulatory product is necessary. The discussions must include an explanation of the expected impacts of potential study results (i.e. increase/decrease in flood hazard area delineations, flood elevations, etc.). Those expectations will also be documented in the Project Charter, if used. The project scope and Project Charter (if used) should be developed concurrently through coordination with communities and Tribes.

In coastal areas where an updated surge model is available, data from the model should be used to foster these FOA discussions with communities. The surge study occurs in advance of the Discovery effort and this information is reviewed and discussed at the Discovery Meeting.

## **12.1 Scope Refinement**

After the discussions on study expectations, a scope of work must be developed in coordination with communities, Tribes, and State partners.

In coordination with watershed stakeholders, the scope of the Flood Risk Project will be refined, including a decision about the regulatory and/or non-regulatory products to be provided, the mitigation planning technical assistance that may be offered, and the communications and outreach assistance to be provided.

In addition, a discussion of a datum conversion (if needed) should be included at this point in the Discovery process. It is FEMA's goal to have the entire inventory of flood hazard products referenced to North American Vertical Datum of 1988 (NAVD88). Please see the KSS for full requirements. Project teams should discuss the datum conversion process with communities including information about the benefits of converting to NAVD88. Communications should also note that full documentation of the datum conversion will be shared with communities during the process.

## **12.2 Project Determination**

When considering final project parameters, it is important to note that FEMA's standards require that no flooding source receive a lower level of regulatory flood map product than what currently exists on effective maps. The demands of this standard must be considered in discussions of the project's final scope. There are several other standards and other considerations for project scoping that are outlined in the companion to this document, *Guidance for Stakeholder Engagement during the Discovery Phase*. Please see that document for more details about working with communities and other stakeholders to define the project scope.

At the time the decision is made whether to move forward with a Flood Risk Project in the watershed, the following actions must also take place:

- Update or populate CNMS
- Add community-requested project or flooding areas to CNMS
- Populate or update National Digital Elevation Program information
- Populate or update National Digital Orthophoto Program information
- Update and upload data (final Discovery Map, Discovery Report, etc.) to the MIP

## 13.0 Final Outputs

The final outputs of Discovery in a watershed that will receive a Flood Risk Project are a project scope and, if desired, a Project Charter.

### 13.1 Project Scope and Project Charter

If a Flood Risk Project is appropriate for the watershed, a project scope will document the regulatory and non-regulatory products that the community will receive and will specify the mitigation technical assistance to be provided. This information may be documented in a Project Charter to be developed in coordination with watershed stakeholders.

A Project Charter, if used, can also be used to identify roles and responsibilities for the Project Team, communities and Tribes, the State, FEMA, and other stakeholders; list the data to be provided with associated deadlines and expectations of the study results; and provide a projected timeline and an explanation of what is expected from FEMA or CTRPs and communities or Tribes at each major milestone.

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A Project Charter provides documentation of FEMA's commitment to the watershed and the commitments of the communities and Tribes at each major milestone of a Flood Risk Project. If communities or Tribes express interest in natural hazard data in addition to flood data, appropriate sources of such data will be identified. In addition, if funding is needed to generate such data, leverage opportunities should also be identified.

If a Flood Risk Project will include flood hazard mapping, the charter should document the expected changes to the flood hazard boundaries and flood elevations, and the impact these changes will have on the communities or Tribes. This outline of expected conditions can support the need for a community outreach plan early in the process to ensure that the final product delivered meets the community expectations.

A Project Charter should be created in coordination with communities and Tribes in the watershed (sent for their review, collectively revised, finalized, and signed). The Project Charter may have to be drafted after the scope of work has been completed and the project scope has been decided.

It is important to note that the Project Charter is not a binding agreement, but rather a tool to convey a clear understanding of the scope and its impact in a community. The Charter is also a way for the Protect Team to assist communities in developing a sense of "ownership" in the project. Therefore, while not required, communities should be encouraged to sign and return a final Project Charter. If used, Project Charters should be signed by as many impacted communities as possible.

The project scope should be finalized in conjunction with the Project Charter. Whether or not a charter is used, the final scope must be shared with watershed communities.

Once the scope of work has been defined and discussed with the affected communities, a Mapping Activity Statement or Task Order (MAS/TO) will be created to formally initiate the work portion of the project. Information about Project Charters and MAS/TO's can be found in FEMA's KSS.

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