



FEMA

June 17, 2011

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Revised Procedure Memorandum No. 56

Amending the Guidelines and Standards for Flood Hazard Mapping Partners

Title: Revised Procedure Memorandum No. 56 — Guidelines for Implementation of Coordinated Needs Management Strategy (CNMS)

Effective Date: Effective immediately for use on all projects

Approval: Roy E. Wright
Acting Director, Risk Analysis Division
Federal Insurance and Mitigation Administration

Background: The Department of Homeland Security's Federal Emergency Management Agency (FEMA) is charged with administering the National Flood Insurance Program (NFIP) and providing reliable flood hazard data and maps for the United States. An important element in maintaining these maps is assessing FEMA's Flood Insurance Rate Maps (FIRMs) and identifying, or verifying, the status of remaining flood hazard mapping needs. Section 575 of the National Flood Insurance Reform Act of 1994 mandates that at least once every 5 years FEMA assess the need to review and update all floodplain areas and flood risk zones identified, delineated, or established under Section 1360 of the National Flood Insurance Act, as amended.

During Flood Map Modernization, this requirement was fulfilled through the Mapping Needs Assessment process. Other mechanisms such as the Mapping Needs Update Support System (MNUSS) and Scoping Reports were used to capture information describing conditions on the FIRMs and the potential for a map update. FEMA has developed a next-generation strategy that uses modern geospatial technologies within the parameters of current FEMA policies, requirements and procedures to consolidate the administration of mapping needs in a comprehensive approach referred to as the Coordinated Needs Management Strategy (CNMS). By using geospatial technologies, CNMS can leverage existing digital products and processes created in the Flood Map Modernization and Risk Mapping, Assessment, and Planning (Risk MAP) programs to improve existing flood map need management practices and production planning activities.

This Procedure Memorandum (PM) provides guidelines for the implementation of CNMS for operational management of mapping needs during Risk MAP. The PM outlines the objectives of CNMS implementation including the components, nomenclature, and validation categories and the complete CNMS lifecycle management process.

Issues: Floodplains are inherently dynamic, a characteristic that makes floodplain management and mapping a challenge. The underlying issue concerning FIRMs is that the flood hazard information reflected on those maps represent a static point in time, and mapping needs exist and will continue to evolve because of the changing nature of the physical environment, climate patterns, and engineering (hydraulic and hydrologic modeling) methods (PCE). The effective date of a FIRM does not reflect whether the engineering analyses have been or need to be updated to account for existing watershed characteristics that may influence current flood hazard information. Therefore, an evaluation must be conducted to determine whether the flood hazard information shown on a FIRM represents existing conditions and is therefore deemed to be “VALID” as described in the CNMS Database User’s Guide (Version 4.2 and any subsequent updates thereafter).

Actions Taken: While FEMA’s previous needs management system, MNUSS, met program needs at the time, it does not meet the needs of Risk MAP. Nonetheless, MNUSS contains valuable data and all appropriate data from MNUSS will be leveraged through the implementation of CNMS. MNUSS was decommissioned as of December 16, 2010.

The attached guidance document describes regional requirements and management of flood map update issues, as well as CNMS products, initial training endeavors, and frequently asked questions associated with CNMS implementation. Supporting documentation for this PM include the CNMS Database User’s Guide, which will serve as the technical reference guide for storing map update and engineering validation information, and the New, Valid, or Updated Engineering (NVUE) Summary Table, which summarizes FEMA’s map inventory with relation to status of engineering data.

How FEMA defines valid engineering flood studies is key to the design and implementation of CNMS:

FEMA defines validation as the confirmation of an adequate level of flood hazard data reflected on a community’s FIRM, given landscape, current historical climate information, and any significant advancement in the engineering methodology that may have occurred since the date of the effective analysis.

The results of the validation process or needs assessment will be stored as part of CNMS as described in the referenced CNMS Database User’s Guide. Flood studies for which flood hazard data are identified as having critical or significant secondary change characteristics as a result of

the methodology presented here will be labeled as “UNVERIFIED” in the CNMS database. CNMS records labeled “UNVERIFIED” are to be prioritized as part of the annual sequencing process and funded for updates as resources become available.

“UNVERIFIED” flood studies reflect a strong indication of change that may impact the delineation of the flood hazard or flood elevation represented on the FIRM, but warrant further engineering analysis to validate the impact of the change.

Community-specific requests to update the FIRM outside of the validation process will be documented in CNMS as mapping requests for regional review and consideration. CNMS-related data as defined in the CNMS Database User’s Guide will be maintained and coordinated through the FEMA Regional Offices.

FEMA will use CNMS as the reporting mechanism on a quarterly basis throughout Risk MAP to identify any NVUE-compliant studies that exist within the FEMA map inventory and are reflected on the FIRMs. FEMA Regions shall update and maintain the currency of the engineering study reference information, validation status, and map issues contained in CNMS throughout all pertinent phases of the Risk MAP project timeline in order to support Goal 1 of Risk MAP. At a minimum, NVUE for each project shall be updated within CNMS at 3 production stages: 1) at Risk MAP project initiation as defined by a geospatial scope of work reflecting the stream segments or coastline representing the extents of the updated engineering analyses, 2) at preliminary issuance of the FIRM and FIS report, and 3) at issuance of the Letter of Final Determination.

NVUE statistics will be collected and consolidated by each FEMA Regional Office through its respective Regional Support Center (RSC). Mapping Partners and Cooperating Technical Partners (CTPs) that are directed to collect and/or manage CNMS data shall provide all components of the CNMS data as described through this PM and CNMS Database User’s Guide to the RSC at regular intervals, no less than monthly, as defined by the Regional Office for periodic program reporting. As additional data and information become available through the production and map update processes that change or influence the historical background information or technical validity of the flood hazard information, Risk MAP partners will be required to incorporate these data into CNMS. The CNMS Inventory will be available through the FEMA Regional Offices.

Supersedes/Amends: Revised Procedure Memorandum 56 supersedes Procedure Memorandum 56 (originally issued December, 2010) in its entirety. With this revision, a new term “UNVERIFIED” will replace the use of the old term “INVALID” as a category for streams in the CNMS database which are to be prioritized as part of the annual sequencing process and funded for updates as resources become available. It also clarifies that NVUE shall be updated or verified within CNMS at 3 production stages: 1) at Risk MAP project initiation as defined by a geospatial scope of work reflecting the stream segments or coastline representing the extents of

the updated engineering analyses, 2) at preliminary issuance of the FIRM and FIS report, and 3) at issuance of the Letter of Final Determination.

Attachments:

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1. Implementation of CNMS During Risk MAP

1.1. CNMS Implementation Objectives

- Establish CNMS as a long-term, regionally based mapping needs lifecycle management process;
- Provide a mechanism for data-driven planning and study selection processes;
- Establish CNMS as the voice of communities to identify and report mapping needs information to FEMA (replacement for MNUSS);
- Use CNMS to improve programmatic tracking and reporting of program milestones and metrics (NVUE);
- Use CNMS to achieve and maintain programmatic goals for data quality and quantity; and
- Develop CNMS data for use in other Risk MAP analytical analyses.

1.2. CNMS Implementation Plan

The plan for implementation is to establish CNMS as a long-term, regionally based mapping needs lifecycle management process. CNMS is intended to assist planning, support tracking, report on current mapping processes, and tabulate the validation status of FEMA's floodplain study inventory. The structure of CNMS originates from the innovative methodologies used by FEMA each year to perform floodplain mapping activities of the NFIP. CNMS provides a consistent structure and nomenclature for increased visibility, data supported planning, and standardized reporting. By replacing MNUSS with CNMS, the flood hazard production planning process will reflect the voice of communities as the Regional Offices integrate their requests into CNMS. Mapping need and risk evaluation and study planning will consider community contributions along with other pertinent factors.

The implementation of CNMS as FEMA's mapping-needs lifecycle management process involves a year-long process starting with an assessment of status types attributed to the stream centerlines in the CNMS Inventory. Some status types suggest that no further assessment is necessary and some indicate CNMS validation evaluation is necessary. A study in the CNMS Inventory, with a status type indicating CNMS evaluation is necessary, will be analyzed along with other inputs for associated watersheds like connectivity, community input, planning objectives, and impact on NVUE to feed into the study selection process. The decisions made here will be tracked and reflected in the reporting cycles that occur regularly throughout the year. The Inventory is to be maintained for changing status of existing records, new inventory added, status associated with studies in progress, and new input and requests from communities. Before the study planning process begins for the next fiscal year, CNMS data for each Region will be compiled for use in the process. Each Region will also be responsible for assisting with the consolidation of data at the national level. This consolidation will occur at least once per quarter for program reporting purposes.

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One of the goals of CNMS is to define the validity of the engineering study data within the CNMS Inventory at the stream reach and coastline segment level, regardless of study type. For the initial population of CNMS Records, each FEMA Regional Office coordinated with its respective RSC or CTPs to account for all flooding source centerlines in CNMS and categorize every stream reach and coastline segment in the Inventory. A related goal of CNMS is to summarize the contents of the Inventory in the context of all recognized stream reaches and coastline segments. This will help define the mapping need of each engineering study, determine and time-stamp the validity of the engineering study, and establish a national baseline record of NVUE reporting geospatially that will influence future program production planning activities. CTPs shall use CNMS as the sole source for reporting flood map update needs to the FEMA Regional Offices through the Annual Business Plan process. Other stakeholders outside of the CTP program can also contribute to CNMS by coordinating with the FEMA Regional Office and their respective RSC.

The components of CNMS include:

- CNMS Inventory Records (lines): The CNMS Inventory serves as spatial linework representing flooding sources within FEMA's map inventory. With attributes indicating CNMS validation status, these lines serve as the foundation for calculating mileages and percentages used in NVUE reporting.
- CNMS Studies (polygons) and Request (polygons, points) Records: These records store information on individual studies and map update issues logged as requests. The study validation checklist of critical and secondary elements is associated with the study records.
- Validation Process Documentation: This provides a summary of the specific mapping issues identified from a comprehensive technical assessment of an existing flood study. FEMA Regional Offices, through their RSCs, will be responsible for collecting and maintaining the current status of the CNMS components.
- NVUE Summary Table (Excel spreadsheet): This table provides a tabulation of miles and NVUE percentages calculated from the Inventory lines. The table is designed to report summaries at the State, regional, and national levels.

1.3. CNMS Lifecycle

The CNMS Lifecycle Flow Diagram (see Attachment A) outlines an ongoing operational maintenance strategy for CNMS. All Inventory types - modernized, paper, and unmapped - are addressed. On an annual basis, the Inventory and map update requests will be assessed to determine where floodplain mapping work needs to occur. The list of floodplain mapping work is then prioritized and either funded for evaluation or deferred until a later date based on regional assessment. The funded list progresses through CNMS evaluation to determine Validation Status and Status Type. All studies processed through CNMS evaluation will be categorized as 'Valid'/'NVUE Compliant' or 'Unverified'/'Being or To Be Studied'. More specifically, the CNMS Lifecycle illustrates:

- How validation status will be tracked and categorized.

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- How studies will be assessed to determine if CNMS evaluation is warranted.
- How the prioritized list of studies that need CNMS evaluation are either funded in the current year, deferred until next year, or deferred for reassessment in 5 years for instances of low risk and need.
- How studies in the CNMS Inventory migrate among the Validation Statuses and Status Types.

To achieve and maintain valid study status, Inventory type over time will migrate from the Paper and Unmapped categories to the Modernized category. Likewise, Validation Statuses and Status Types will fluctuate as Regions manage priorities to achieve their NVUE goals. Status Types have specific connotations. When studies from the Modernized or Paper Inventories are assigned to the Validation Status of “UNVERIFIED”, it is a commitment that a study is planned or underway. For studies to go from the ‘UNVERIFIED’ to “VALID” status, they must be restudied.

In certain situations, the assessment can temporarily be deferred. When the last assessment date of the Modernized or Paper Inventory exceeds 5 years, the Validation Status will revert to ‘Unknown’ and require reassessment. The assessment can be deferred to the next fiscal year or can be deferred for a maximum of 5 years. The 5-year deferment will be applied to studies in areas of low risk and low need as determined by engineering judgment by the Regional Offices. Individual studies are not to be perpetually deferred until the next fiscal year without due cause. The option to defer an assessment for 5 years must be held to a minimum and requires discussion with the National office during each fiscal year production planning process.

1.4. CNMS / NVUE Nomenclature and Categories

The CNMS Inventory data is organized using three tiers of categories to distinguish all stream miles in the Nation: Inventory Type, Validation Status, and Status Type. Each of the Inventory Types, Validation Statuses, and Status Types is illustrated in Figure 1. Inventory Type is the top-tier category that separates stream miles based on whether they are Modernized, Paper Inventory, or Unmapped. The Modernized inventory includes all studied and mapped stream miles, regardless of study type, that have a Flood Insurance Rate Map (FIRM) database. The Paper Inventory includes all studied and mapped stream miles, regardless of study type, that do not have a FIRM database. Finally, the Unmapped Inventory includes all stream miles that do not currently have a mapped study.

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Figure 1. Table of Inventory Types, Validation Statuses, and Status Types in the CNMS Lifecycle

Inventory Type	Validation Status	Status Type	Inventory Type	Validation Status	Status Type	Inventory Type	Validation Status	Status Type
Modernized Inventory	Unknown	To Be Assessed	Paper Inventory	Unknown	To Be Assessed	Unmapped	Unknown	Being Assessed
		Being Assessed			Being Assessed			Not Being Assessed
		Deferred			Deferred			
	Unverified	To Be Studied		Unverified	To Be Studied		Assessed	To Be Studied
		Being Studied			Being Studied			Being Studied
		NVUE Compliant			NVUE Compliant			Deferred

The second tier of organization is Validation Status. This tier identifies whether the engineering analysis behind a studied stream mile in the Modernized or Paper Inventory has been classified as Valid, Unverified, or Unknown. The Validation Status tier is referenced to provide the official NVUE percentage statistics through the formula $[NVUE = \text{total 'Valid' stream miles} / \text{total studied stream miles}]$. For all Unmapped Inventory, the second tier is defined as Assessed or Unknown, where Assessed indicates that the stream miles in question have been investigated by the Regional Office for consideration of a possible mapping project.

The third tier of organization is Status Type. This tier identifies the action that has been designated for the corresponding stream mileage. Modernized and Paper Inventory classified as 'Unknown' will be categorized as one of the following:

- To Be Assessed – Regional Office must provide input to determine whether to fund a CNMS evaluation, defer due to low risk/priority, or convert to Zone A.
- Being Assessed – CNMS evaluation was funded and/or is in progress.
- Deferred – Prior regional assessment determined low risk/priority; study is deferred for a maximum of 5 years before re-assessment is required.

Modernized and Paper Inventory that is classified as 'UNVERIFIED' will automatically enter a queue for funding to be restudied and will be categorized as one of the following:

- To Be Studied – Stream miles have been prioritized by Regional Office to receive out-year funding and will go through sequencing.
- Being Studied – New or revised analysis has been funded and/or is in progress.

Modernized and Paper Inventory that is classified as "VALID" will have the following status:

- NVUE Compliant – Stream miles meet NVUE criteria and will be re-assessed after a maximum of 5 years.

Unmapped Inventory that is classified as "UNKNOWN" will be categorized as one of the following:

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- Not Being Assessed – Includes all stream miles that FEMA has not investigated. This status will contain the majority of stream miles that are not in FEMA’s mapped SFHA inventory (approx 3.1M miles, as of September 2010, are not in FEMA’s mapped SFHA inventory).

Unmapped Inventory that is classified as ‘Assessed’ will be categorized as one of the following:

- To Be Studied – Stream miles have been prioritized for funding to be mapped as a SFHA during Risk MAP.
- Being Studied – New engineering analysis is in progress.
- Deferred – Stream miles were investigated by the Regional Office and determined to be low risk/priority.

1.5. Timetables/ Trigger Points

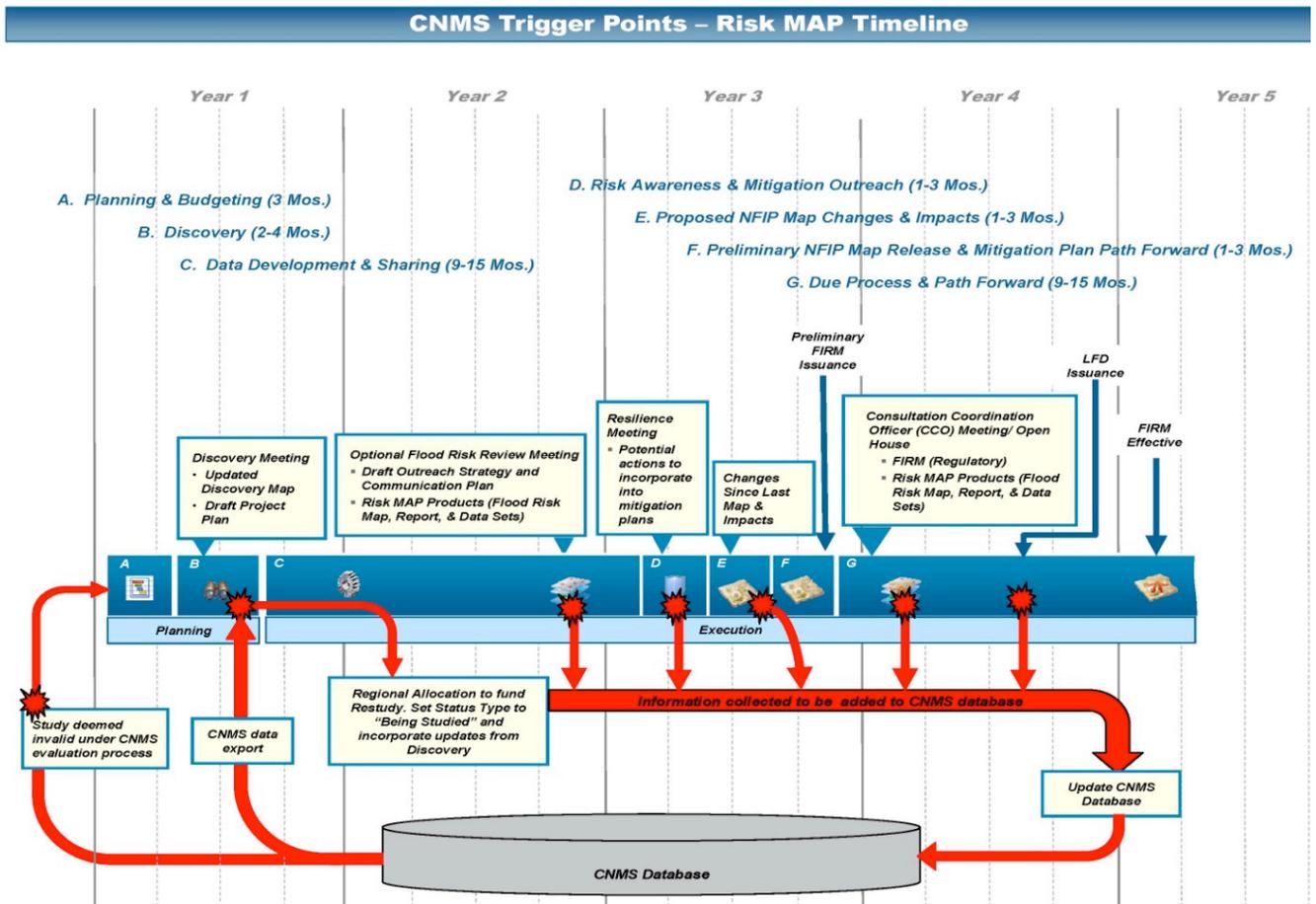
A Region’s Inventory is to be assessed on an ongoing basis, and reported at least quarterly. Several trigger points in the lifetime of a segment of CNMS Inventory will require the Inventory to be re-assessed.

Three trigger points, falling into two categories, are indicated on the lifecycle diagram. The first category involves a situation where 5 years have elapsed since a segment of Inventory was last assessed in the CNMS lifecycle process. The other category exists when at least 1 year has elapsed since allocation of resources for new studies had been determined necessary under the CNMS process, but was deferred.

Other trigger points that require updates to the CNMS Inventory are not indicated on the diagram. One is described here. If a specific request for a restudy has been received from a community, the request should be logged into the CNMS database and the data supporting the request used to assess the corresponding Inventory for validity. Numerous other trigger points exist within the Risk MAP production process. Figure 2 illustrates CNMS trigger points and the interaction between the parallel processes of Risk MAP production and CNMS maintenance.

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Figure 2. Risk MAP production timeline with CNMS interaction and trigger points.



Because CNMS provides one element in the foundation for prioritizing new study selection, CNMS and the Risk MAP production process interact immediately. Once a watershed is selected for study, the Discovery activities shall involve collecting and analyzing data on which the available CNMS validation status were based. This information is brought to the Discovery meetings and can serve as discussion points. Conversely, the Discovery process may yield new information that will then be brought to, and incorporated into, the CNMS database. This new information may be community requests for new study or information that, when considered under the CNMS evaluation process, may warrant a change in validation status of a stream segment within the CNMS Inventory. Information gathered during Discovery is used to develop a Statement of Work and corresponding allocation of funds for a new study. The funding of a new study is a trigger point that requires changing the affected Inventory Status Type to “Being Studied,” and incorporating the information revealed during Discovery into the CNMS database.

Similar to the Discovery tasks, meetings and data development tasks performed during the Execution phase may also generate information pertinent to CNMS. Under existing Risk MAP

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production procedures, information on mapping needs must be documented in meeting summary reports, Technical Support Data Notebooks, and other project documentation. Therefore, collection of this information requires no change in the current Risk MAP production process. This information, once documented, awaits the next CNMS update trigger, the Letter of Final Determination (LFD) issuance.

At LFD issuance, the CNMS Inventory will be updated to reflect the newly-developed FIRM database, as well as any new requests submitted by the community during the Execution phase.

1.6. Regional Responsibilities

Ultimately, the FEMA Regional Offices are responsible for the data inputted into CNMS to ensure that an accurate depiction of the Region's inventory is reflected and maintained over the course of the Risk MAP program. Regional decisions to prioritize, assess, and perform engineering studies along various flooding sources must be supported by the data contained in CNMS.

The Regional CNMS work plans completed under Risk MAP Standard Operations Task Order 2, CNMS Phase 2.5, will serve as a road map for the assessment, scheduling, and prioritizing of CNMS evaluation of studied streams during CNMS Phase 3. These work plans are to be considered living documents. The contents are therefore dynamic and may change to reflect refinements and efficiencies realized during the course of the project. Using these Regional CNMS work plans, the FEMA Regions shall work with their RSC and/or CTPs to manage and communicate assessment decisions illustrated in the CNMS lifecycle flow diagram.

The assessment decision to defer CNMS evaluation of studied streams with validation status 'Unknown' shall be coordinated with the FEMA Regions and documented in the CNMS database. Regions will need to re-assess streams in the deferred category at least every 5 years with the understanding that assessment may be required sooner because of circumstances such as watershed connectivity issues, and as risk and need factors change over time. Likewise, the assessment decisions for unmapped streams requiring a SFHA shall be carefully considered and coordinated with the FEMA Regions. Studied stream segments with the validation status of 'Invalid' are to be prioritized and funded for updates. Therefore, as CNMS data are rolled up to each Region by the RSC for quarterly reporting, Regions will need to review the list of newly invalidated studies and initiate assessment as to how these invalid studies will be prioritized and funded for updates.

1.7. CNMS Reporting Requirements

FEMA Regional Offices through their RSCs will be responsible for reporting CNMS data population, maintenance updates, and NVUE status to FEMA HQ on a quarterly basis. Validation status assigned to the CNMS Inventory network will be sourced from the CNMS Studies dataset. As study validation categories are updated or changed in the CNMS Studies records (polygons), these changes are imprinted on the respective flooding source centerlines in the CNMS Inventory. NVUE reporting of stream miles in each validation status category will be calculated from the CNMS Inventory linework. A summary of the Region's progress will be requested for quarterly program reviews by FEMA HQ in a format consistent with NVUE reports. CTPs managing the

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population and reporting of CNMS and NVUE data shall serve the three data components of CNMS to the appropriate FEMA Regional Office for consolidation to meet this reporting requirement. RSCs will support the FEMA Regions to collect and store all CNMS data, and RSCs will report progress to their respective Regional Office and the Program Management contractor at regular intervals.

The RSCs and/or CTPs will be responsible for incorporating any new or updated inventory data that become available through the production and map update processes and communicating these updates to the Region. FEMA Regions and Mapping Partners shall continue to monitor newly identified and unresolved mapping needs that result from the post-preliminary process via protests or appeals. Any outstanding issues that will not be incorporated into the final effective DFIRM for the project shall be documented in CNMS, as the issue will serve as a potential trigger for 'Unverified' or as a 'Request' to be sequenced and prioritized by the FEMA Regional Office when it decides where resources should be spent for future map updates.

1.8. CNMS Training

It is important that the CNMS process is consistent to the extent possible for all FEMA Regions. Many rules and multiple steps in the study evaluation process require consistent methods to create an accurate database that reflects needs throughout the Nation. Therefore, it is imperative that nationally developed training materials include a standardized process to be used by the Regions, Production and Technical Services (PTS) contractors, CTPs and their subcontractors.

CNMS has been and will continue to be a dynamic initiative that will evolve to best serve the goals of Risk MAP. National training materials defining the purpose, uses and implementation of CNMS will be developed and provided in FY11. As updates are needed, these materials will be distributed throughout Risk MAP and used for training stakeholders of the CNMS lifecycle process. Official training sessions dedicated to Regional staff, CTPs, RSCs, PTS and other stakeholders involved in the implementation and management of the CNMS lifecycle will be provided as needed.

CNMS will ultimately be the tool that the Regions will use for managing needs during Risk MAP. The Regions also require a deep understanding of CNMS. They will be responsible for the status of all miles depicted in CNMS and managing the long-term implementation and prioritization of CNMS. The Regions will be briefed regularly by their respective PTS or RSC on the current status of the CNMS through the reporting process.

2. Frequently Asked Questions

What is a ‘Valid’ Study?

A ‘Valid Study’ meets FEMA’s current validity standards and, until otherwise noted, the information shown on the FIRM does not need to be updated.

What is an ‘Unverified’ Study?

An ‘Unverified’ Study is identified when a mapping needs assessment determines that flood hazard information reflected on the FIRM, regardless of study type, reflects a strong indication of change that may impact the delineation of the flood hazard or flood elevation represented on the FIRM, but warrants further engineering analysis to validate the impact of the change. It is also a commitment that a restudy is currently underway, or resources for a restudy will be allocated in the future. An ‘Unverified’ validation status changes to ‘Valid’ when that stream segment is restudied.

What is the difference between an ‘Unverified’ study and a ‘Request’?

While an ‘Unverified’ Validation Status for existing flood hazard studies is identified to indicate a potential change to the flood hazard information, ‘Requests’ describe a desire to address mapping needs based on the lack of existing engineering studies, cartographic concerns, or labeling issues.

What is the NVUE metric and what does it track?

NVUE stands for New, Validated, or Updated Engineering. The NVUE metric allows FEMA to track and report the percentage of their mapped SFHA inventory that meet FEMA’s current validity standards.

What are the minimum required deliverables for those participating in CNMS implementation?

- The populated CNMS Studies Database
- Updated CNMS Inventory
- Validation Process Documentation Checksheet

Required deliverables do not include backup data referenced in the Checksheet.

When should I update CNMS?

CNMS consists of a process, methodologies, and associated tools. It is an ongoing approach that tracks the lifecycle of mapping needs. When a needs assessment determines that flood hazard information reflected on a FIRM does not adequately convey current risk conditions, a CNMS update is warranted. Certain milestone events that should also trigger CNMS update activity:

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- The Discovery process and preliminary issuance of a DFIRM
- Issuance of a LOMR that updates the engineering data of an effective study
- Community input identifying needs
- Major flood events
- Repetitive loss recorded at flooding sources
- Statutory requirements
- Availability of new data

Do I use the Validation Checklist for approximate studies?

The Validation Checklist should be utilized for detailed and approximate engineering studies. It may not be appropriate to utilize the entire Validation Checklist for effective approximate studies unless the technical data, methodology, and basis for the study is known. Therefore, for approximate engineering studies, the Validation Checklist should be used to the extent possible and practical without far exceeding expected costs. The FEMA Regional office can provide guidance to Mapping Partners to ensure this is met. For an approximate analysis to be categorized as a ‘Valid’ study, FEMA must have determined the approximate floodplains utilizing engineering methods and/or technical data.

Do I need to answer every question in the Validation Checklist?

Although an ‘Unverified’ status can be triggered with one critical element, a full understanding of the situation is strongly recommended. All Checklist questions for which data are readily available are expected to be answered.

Can I customize the Data Model to fit individual issues within my area of concern?

Yes, but compliance with the existing CNMS data model should be preserved. Alterations should not prohibit roll-up activities of the CNMS database in the published format.

Does this replace MNUSS?

Official release of this CNMS procedure memorandum marks decommissioning of MNUSS.

What is the CNMS Inventory and does it contain the unmodernized and unmapped stream miles?

The CNMS Inventory refers to FEMA’s inventory of data representing mapped floodplains, including unmodernized stream miles. Inventory records represent FEMA’s digital flood hazard data inventory in the form of a set of flooding source centerlines. These centerlines will enable tracking of the portions of FEMA’s inventory that attain status as NVUE studies and those that do not. The CNMS Inventory can also include unmapped stream miles. The ‘Unmapped Inventory’ helps calculate stream mileage in areas where request records are generated.

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How is the CNMS Inventory used?

FEMA will use the CNMS Inventory as the sole mechanism for tracking and reporting NVUE metrics. The CNMS Inventory may also be used for:

- Spatial analysis to assess needs of geographies at a regional, State, county, watershed, stream reach level, etc.;
- Conveyance of needs information for Discovery and community outreach purposes; and
- Sequencing and planning processes.

Who created the CNMS Inventory and who will maintain it?

FEMA created the CNMS Inventory for NVUE metrics tracking and reporting. Contracted service providers, CTPs, and others conducting evaluation of mapping needs via CNMS are responsible for maintenance of the CNMS Inventory in coordination with the FEMA Regional Office. Ultimately, the FEMA Regional Office is responsible for the data contained within CNMS and owns the validation status of miles depicted in their respective inventory.

How do I obtain the CNMS Inventory?

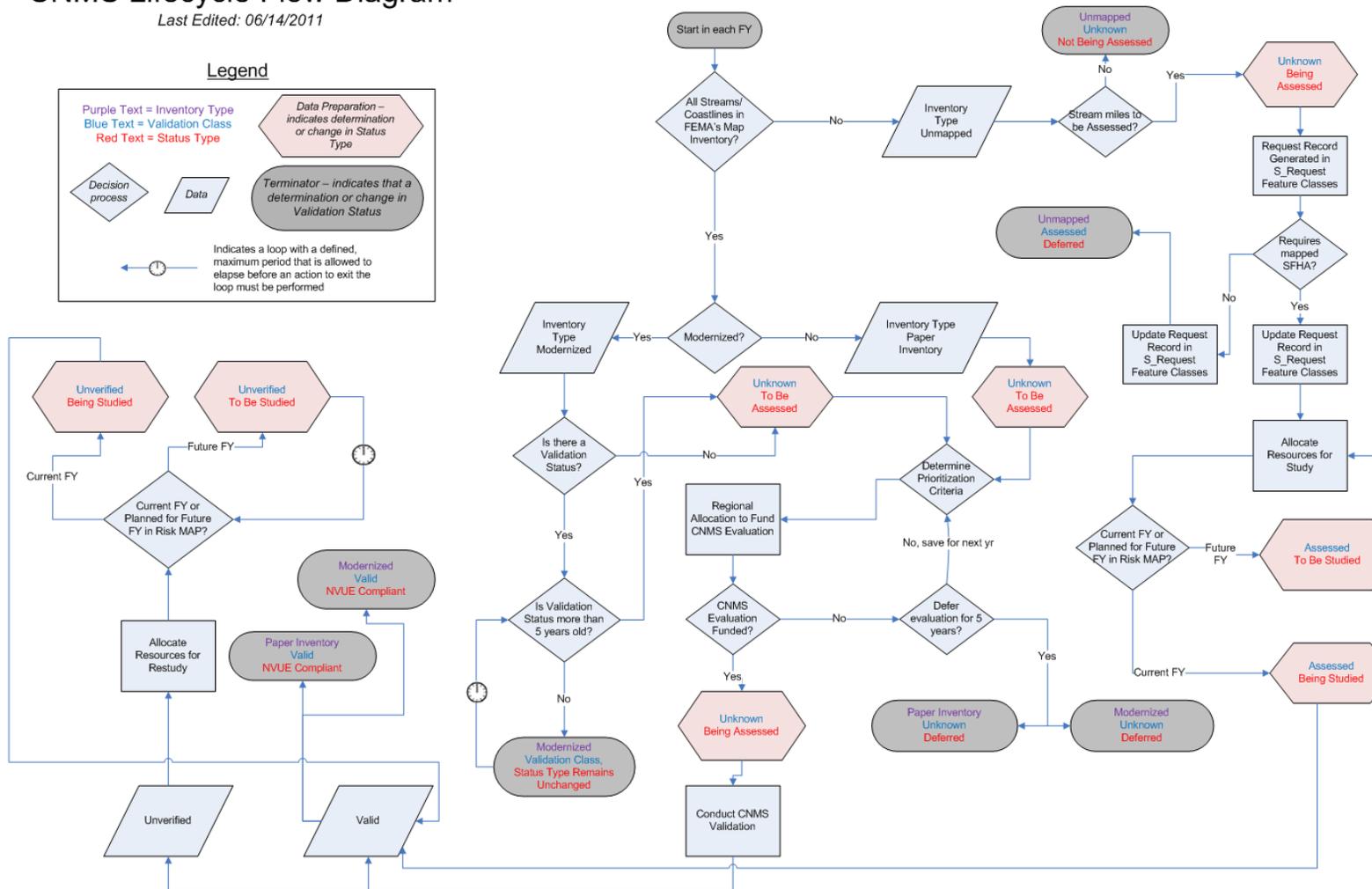
The FEMA Regional Offices are the custodians of the CNMS Inventory. The Inventory may be procured through data exchange agreements with the FEMA Regional Office.

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Attachment A. CNMS Lifecycle Flow Diagram

CNMS Lifecycle Flow Diagram

Last Edited: 06/14/2011



Coordinated Needs Management Strategy (CNMS)

Database User's Guide

Version 4.3

June 2011



FEMA

Document History

Document Location

Location
<p>File Path: FEMA Risk MAP sharepoint site – http://pm.riskmapcds.com/riskmap_usergroups/CNMS/Shared%20Documents/Forms/AllItems.aspx CNMS Team\CNMS_Package\ - CNMS_User'sGuide_V4_3_20110617.doc - CNMS_Sample_Validation_Process_Documentation_Checksheet_V1.0_20100510.xls - CNMS_FGDB_SCHEMA_20110617.xml - CNMS_Procedure_Memo_20110617.doc - CNMS_NVUE_National_Table_20110531.xlsx</p>

Revision History

Version Number	Version Date	Summary of Changes	Team/Author
1.0	April 2008		CNMS Team
2.0	April 29,2008	Update of Data Model and Data Dictionary	CNMS Team
2.1	April 30, 2008	Update to Section 3	FEMA
2.2	May, 2008	General text editing, Data Model Diagram replacement, Data Dictionary editing	CNMS Team
2.3	November 2008	Restructuring and completion of document framework	CNMS Team
2.4	January 2009	Major review and edit based upon internal development team review	CNMS Team
2.5	January 2009	Addition of content from the State of Alabama	CNMS Team
2.6	February 2009	Comments from review by FEMA HQ	Beth Norton
2.7	March 2009	Addition of data expected, potential source, and anticipated use rows for each attribute in every table	Michael Bishop
2.8	July 2009	Added new database updates & revise based upon input from stakeholder review	CNMS Team
3.0	March 2010	Added material related to CNMS Inventory and updated Data Model	CNMS Team
3.0	April 2010	Address of E&M IPT Comments	CNMS Team
3.1	May 2010	Address of E&M IPT Comments for final delivery	Mohan Rajasekar
4.0	August 2010	Address of NVUE and PM guidance updates	CNMS Team
4.1	September 2010	Address of NVUE and PM guidance updates	Mohan Rajasekar
4.2	October 2010	Address of NVUE and PM guidance updates	Mohan Rajasekar
4.3	June 2011	Address of PM guidance update	Erik Danielson

Client Distribution

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List of Acronyms

BFE	Base Flood Elevation
CE	Critical Element (reference the NVUE check list)
CNMS	Coordinated Needs Management Strategy
CTP	FEMA Cooperating Technical Partners
DFIRM	Digital Flood Insurance Rate Map
ESRI	Environmental Systems Research Institute
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FY	Fiscal Year
GIS	Geographic Information System
LOMR	Letter of Map Revision
MIP	Mapping Information Platform
NAIP	National Agricultural Imagery Program
NFIP	National Flood Insurance Program
NHD	National Hydrography Dataset
NVUE	New, Validated, Updated Engineering
SE	Secondary Element (reference the NVUE check list)
SFHA	Special Flood Hazard Area
USGS	United States Geologic Survey

Alphabetical List of Definitions

“ASSESSED” Validation Status	A “ASSESSED” validation status is assigned to flooding source centerlines in unmapped areas when they are considered for a new study. The outcome of the consideration may be the allocation of resources for a new study in the current or a future Fiscal Year, or a deferment of the requested new study.
Bathymetry	The study of the underwater depth or third dimension of water bodies like lakes or oceans.
CNMS	Coordinated Needs Management Strategy (CNMS) is comprised of the processes and data used to track New Validated Updated Engineering (NVUE), Unverified study reaches with identified deficiencies, and Requests for the flood mapping program. The CNMS Database is comprised of CNMS Studies, CNMS Requests, and the CNMS Inventory.
CNMS Inventory	CNMS Inventory includes the flooding source centerlines representing FEMA’s modernized inventory of Flood Insurance Rate Maps (FIRMS), its unmodernized inventory of FIRMS, and unmapped areas. These centerlines will enable tracking of the portions of FEMA’s inventory that attain status as New, Validated or Updated Engineering (NVUE) studies and those that do not. The feature class associated with CNMS Inventory is S_Studies_Ln.
CNMS Record	A CNMS record includes records of the type “Studies” or “Requests,” in the form of polygons or points. The associated feature classes are S_Studies_Ln, S_Requests_Ar and S_Requests_Pt.
CNMS Request Record	A CNMS Request Record is a record for which the information available to describe the ground condition related to the depiction of flood hazards are insufficient to evaluate the critical and/or secondary elements (ex. Non-model-backed A Zones, D Zones; areas with no SFHAs) in the validation process. Request Records are categorized as either a flood data or cartographic request. Furthermore, Request Records will be, in most instances, determined by the lack of an existing floodplain model. Requests Records will typically focus on areas that remain unstudied and/or SFHAs with Approximate A designations for which models are not available. Specific

cartographic issues with FIRM panels also fall under this category. The feature class associated with CNMS Request Records are S_Requests_Ar and S_Requests_Pt.

CNMS Study Record

A CNMS Study Record is a record of a situation, primarily, for which a model exists and an existing flood study must be updated and reflected on a FIRM for the map content to represent the most current knowledge of a mapped floodplain. The core of a CNMS Study Record is the new, validated, updated engineering (NVUE) checklist which, step by step, reviews and evaluates flood studies to determine if the details of the study are still valid or if a deficiency has been identified. CNMS Study Records will typically focus on existing detailed studies and some studies for which Approximate A SFHAs have been designated. The feature class associated with CNMS Study Records is S_Studies_Ar.

Critical Element

One of seven elements reviewed within the engineering study validation process. Individually, if any one of these elements evaluated to “Yes” as a result of the identification of a deficiency, it is significant enough to trigger an “Unverified” validation status.

“UNVERIFIED” Validation Status

An “UNVERIFIED” validation status is assigned to existing detailed flood hazard studies for which at least 1 critical or more than 4 secondary deficiencies have been identified. See definition for the “VALID” validation status to note exceptions. An “UNVERIFIED” study may either be assigned resources for restudy in a future FY, or is currently being restudied.

Raster Data

Data that are arranged in a continuous grid typically associated with imagery or terrain data.

Reach

The geographic extent, or up and down stream limits, affected by the CNMS Record.

Secondary Element

Ten additional elements reviewed within the engineering study validation process. These elements, if evaluated to “Yes” as a result of identification of a deficiency and totaling four or more, are significant enough to trigger an “Unverified” validation status.

Stream Centerline	A geometric approximation of a flooding source centerline (most commonly representing the center of a stream). If a stream centerline is available in the DFIRM database, it should be utilized. Other sources can be used if one is not available in the DFIRM database. Additional recognized sources for stream centerline data are the varying resolutions of the National Hydrography Dataset (NHD).
Validation Status	A validation status is assigned for each flooding source centerline representing FEMA’s mapped and unmapped inventory after it has been evaluated under CNMS. While the CNMS evaluation is relevant only for FEMA’s mapped SFHA inventory, validation statuses are also assigned to flooding source centerlines in unmapped areas which have been considered for a new study, or a new study in such areas is currently underway.
“VALID” Validation Status	A “VALID” validation status is assigned to existing detailed flood hazard studies for which no critical and less than four secondary deficiencies have been identified. Approximate flood hazard studies are also considered “VALID” if backed by a model or documentation exists detailing methods used for the approximate engineering analysis. Some approximate flood hazard studies may be considered “VALID” even if the studies are not model-backed, if a FEMA Regional office, at its sole discretion, decides to defer CNMS analysis and considers those studies as being “VALID” despite the CNMS guidelines on what is considered a “VALID” study. All “VALID” studies are considered NVUE compliant.
Vector Data	Typical forms of GIS vector data - polygons, points, and polylines - are composed of vertices with relative or geospatially referenced coordinates sometimes containing a vertical component.
“UNKNOWN” Validation Status	A “UNKNOWN” validation status is assigned to existing detailed and approximate flood hazard studies for which a CNMS evaluation is planned and in queue, currently being assessed under CNMS, or when CNMS evaluation is deferred. A “UNKNOWN” validation status is also assigned to those studies for which non-availability of information results in an incomplete evaluation of the 17 CNMS elements. The “UNKNOWN” validation status

may only be assigned after due diligence research has been performed.

Executive Summary

Under Title 42 of the Code of Federal Regulations Chapter III Section 4101(e) FEMA is to revise and update all floodplain areas and flood risk zones identified, delineated, or established, based on an analysis of all natural hazards affecting flood risks on a five-year cycle. Revisions to floodplain risk zones are dependent upon the identification of instances where information on Flood Insurance Rate Maps does not reflect current risks in flood-prone areas. The Coordinated Needs Management Strategy (CNMS) is a FEMA initiative to update the way FEMA organizes, stores, and analyzes flood hazard mapping needs information for communities. CNMS defines an approach and structure for the identification and management of flood hazard mapping needs that will provide support to data-driven planning and flood map update investment process in a geospatial environment. CNMS tracks the lifecycle of needs, specifying opportunities to capture needs and proposing methods for their evaluation to inform planning, tracking, and reporting processes. CNMS establishes a geospatially enabled effective means for users to enter, monitor, and update their inventory of floodplain studies. In addition, CNMS will be used to document the areas across the Nation where flood studies meet FEMA's current validity standards and, until otherwise noted, do not need to be updated on the FIRM. Validity of flood hazard studies is determined by identifying critical and secondary deficiencies. Deficiencies are evaluated for seven critical elements and ten secondary elements. One or more critical deficiencies or four or more secondary deficiencies would classify a flood hazard study as having an "UNVERIFIED" validation status. Critical and secondary elements are evaluated for detailed flood hazard studies and this information captured as CNMS study polygon records. A second piece of CNMS is an inventory of stream centerlines that should capture validation statuses determined in the CNMS study polygon records. "UNVERIFIED" studies may either be assigned resources for restudy in the current Fiscal Year (FY), a future FY, or are currently being restudied. The CNMS Inventory is designed to capture the validation statuses determined in the CNMS study polygon records. The CNMS Inventory should also include validation statuses of approximate studies and those unmapped areas that have been considered for a new study, making it a stream centerline representation of FEMA's mapped and unmapped areas. FEMA will utilize the CNMS Inventory as the sole mechanism for reporting New, Validated or Updated Engineering (NVUE) percentage. The NVUE percentage is a ratio of the miles of validated flood hazard studies to the miles of all FEMA flood hazard studies.

This document details the FEMA CNMS Data Model and its uses, providing an overview of its purpose and structure. Definitions, descriptions of all database fields, and data population guidelines are included to ensure the database can be populated consistently and accurately as well as used properly for analysis. This CNMS User Guidance document is intended to provide perspective on CNMS to local, State, regional and national users. This document also presents context, instruction and guidance to CNMS users in the development, management, tracking, and reporting of data related to suggested improvements and validity of flood hazard data nationwide.

1. Introduction

Flood Insurance Rate Maps (FIRMs) are FEMA's most widely distributed flood hazard identification product. Flood hazard data presented on FIRMs is based on historic, meteorological, hydrologic, and hydraulic data, as well as open-space conditions, flood control works, and development. Due to the changing nature of the landscape from the influences of physical, engineering, and climatological processes, timely updates to SFHA information on FIRMs become necessary to maintain accuracy and relevance. For successful maintenance of flood hazard information across the Nation, one must effectively identify and manage flood hazard mapping requirements expressed by individuals at the local, state, regional, and national levels.

FEMA's Coordinated Needs Management Strategy (CNMS) is collection of procedures for the identification and management of flood hazard mapping requirements utilizing a standard database model. In addition to recording and validating studies, CNMS defines an approach for the identification and management of flood hazard mapping needs and requirements that will provide support to a data driven planning and the flood hazard information production planning process. By utilizing and maintaining GIS and relational database technologies FEMA has designed CNMS to track the lifecycle of flood studies from origination of a CNMS flood study record as a need or request to its resolution as a new, valid, or updated study. As such, CNMS allows analysis of archived, ongoing, and future studies. Analysis of CNMS records provides important information for FEMA's fiscal year planning process but also allows reporting updates of ongoing studies as well as historical summaries. GIS technology adds the capability of spatial analysis allowing communities and FEMA an effective means to visualize, enter, review, and update a needs inventory and how studies relate spatially to other features. The terms and use of CNMS as it relates to other FEMA initiatives will be dictated and directed by FEMA policy.

This document details the FEMA CNMS Data Model, providing an overview of its purpose and structure. Definitions, examples of all database fields, and population guidelines are included to ensure the database can be populated correctly and accurately, as well as used properly for analysis after it is compiled. Some elements of the data model are based on a FEMA checklist designed to assist with flood study validation. The central purpose of the validation exercise is to outline a consistent process that should be used to determine and document the validation status of flood studies and whether they should be categorized as "VALID", "UNVERIFIED", or "UNKNOWN". The category of "UNKNOWN" is to be used only as a placeholder during the time that a CNMS evaluation is in que, in progress, deferred or is found insufficient to assess its validity and should transition into one of the other two categories listed above as soon as warranted. The CNMS Data Model also has the provision for storing information for unmapped areas which have been considered for a new study. Such stream centerlines are stored in the CNMS Inventory and assigned a validation status of "ASSESSED" to indicate that the stream has been assessed for a new study. The outcome of such consideration may be that resources are allocated in the current or a future Fiscal Year, or that the request for new study has been deferred.

In order to consolidate the data reporting process, a CNMS geodatabase has been created to take advantage of state-of-the-art spatial data inventory tools and procedures. By standardizing, centralizing,

and storing CNMS data in a geospatial format, FEMA will improve analysis and reporting by maintaining data that are current, readily available, and reliable.

A complete CNMS Study Record holds the validation evaluation results. There is the potential for an extensive investigative effort to determine appropriate attribute values for a record. Users of CNMS must develop a plan for capturing background information used in the validation and subsequent attribute determination processes. Appendix B outlines the need for capturing this background information and also suggests ways to provide a summary of this information to FEMA. Delivery of these summaries to FEMA for all flood hazard studies evaluated is required as part of CNMS data roll-up.

A New, Validated, or Updated Engineering (NVUE) reporting mechanism is also included in the component of CNMS referred to as the CNMS Inventory. The polyline features in the CNMS Inventory represent the centerlines of flooding sources. Floodplain engineering study validation statuses from CNMS Study Record polygons are imposed on the CNMS Inventory linework to allow reporting of NVUE descriptive summaries. Figure 1 in section 2.2 provides a visual representation of the above process. Understanding that there will be data contributions from many sources, participation and coordination at the regional level is imperative. NVUE summary reports include stream miles and stream mile percentages. FEMA will utilize the CNMS Inventory as the sole mechanism for reporting NVUE metrics.

2. CNMS

2.1. The Data Model Components of CNMS

CNMS Data Model consists of three major components:

- CNMS ESRI File Geodatabase – This template geodatabase contains all spatial entities defined in the E-R diagram with the proper geometry, relationship classes, fields, and domains. The CNMS File Geodatabase contains two feature datasets: 1) the CNMS Studies Feature Dataset, and 2) the CNMS Inventory Feature Dataset. Although CNMS information is stored in a ESRI geodatabase format, information can be extracted for use in other geographic information system (GIS) platforms.
- CNMS Entity-Relationship (E-R) Diagram (Appendix C) - This schematic diagram illustrates the entities in the database, their relationships, and domains.
- CNMS Data Dictionary (Appendix D) - This comprehensive dictionary defines the type, format, domains, and field definitions of every entity in the database.

2.2. Basis for CNMS Database Record Entry

The CNMS Studies Feature Dataset uses the engineering study Validation Checklist as the basis for data entry. Utilization of the Validation Checklist is primarily directed toward the evaluation of existing floodplain studies, the results of which are captured as a ‘CNMS Study Record’. Data and information gathered while evaluating a stream reach using the Validation Checklist, needs to be documented using the procedures identified in Appendix B. Lack of an existing detailed SFHA study should, with few exceptions, result in development of a CNMS ‘Request’ Record. The central purpose of the Validation Checklist and the Validation Process Documentation Checksheet (Appendix B), is to outline a format that must be utilized to document a condition assessment as being a “VALID” or “UNVERIFIED” flood study. Any “UNVERIFIED” flood study, or a CNMS Request Record, will warrant a review for inclusion in the map production planning process. For existing floodplain studies, this review will be triggered when one critical or four or more secondary deficiencies have been identified to mark the area as having an “UNVERIFIED” validation status. However, if a severe secondary deficiency exists, such as a high number of new or removed bridges/culverts, then secondary deficiencies can be elevated and considered critical. The decision to elevate a secondary deficiency to be considered critical is subjective, and responsibility rests solely with those making decisions on map update investments. Based on the Validation Checklist, if the validation evaluation identifies no critical elements and less than four secondary deficiencies for a stream segment flood study, the engineering analysis is considered validated.

In summary:

- A detailed floodplain study is assigned the “VALID” validation status if it has no critical deficiencies and less than 4 secondary deficiencies.
- A detailed floodplain study is assigned the “UNVERIFIED” validation status if it has at least one critical deficiency, or four or more secondary deficiencies

- When a CNMS study record is checked out for evaluation, or when a CNMS evaluation is planned or in queue, the validation status is set to “UNKNOWN”.
- If a detailed evaluation based on the Validation Checklist does not lead to a definitive determination of the validity, the “UNKNOWN” validation status is applied to the study.
- If there is a need for re-visiting the validation process as a result of statutory requirements or availability of new data, the validation status for all affected studies would be toggled to “UNKNOWN”. This review process is also triggered 5 years after the initial determination of the validation status when the evaluation is considered outdated, Such studies are queued up for a CNMS evaluation based on current conditions.
- If a flooding source centerline in an unmapped area is considered for a new study, then a validation status of “ASSESSED” is assigned to indicate that the stream has been assessed for a new study. The outcome of such consideration may be that resources are allocated in the current or future Fiscal Year, or that the request for new study has been deferred.

CNMS Study Records are not developed for approximate studies. However a validation status is assigned to the flooding source centerlines representing approximate studies in the CNMS Inventory.

An approximate floodplain study is assigned the “VALID” validation status if it is model-backed or has documentation that details the engineering methods used for analysis. Some approximate flood hazard studies may be considered “VALID” even if the studies are not model-backed, if a FEMA Regional office, at its sole discretion, decides to defer CNMS analysis and consider those studies as being “VALID” despite the CNMS guidelines on what is considered a “VALID” study,

The flow chart diagram included in Appendix E is a graphical overview of the study flow process including decision trees that result in one of the four Validation Status classifications. Within the CNMS Data Model, each of these four Validation Status classes are further categorized by different Status Types. Status Types are tracked using the ‘Status_Type’ field in the CNMS Data Model. Table 1 summarizes the different Status Types for each of the four possible Validation Status scenarios. Each possible Validation Status and Status Types are further described below.

“UNKNOWN” Validation Status

CNMS Study Records are initially given the validation status of “UNKNOWN” and status type of “To be Assessed” when Regional input to either defer, perform a CNMS evaluation, or use other info for Zone A's validation. A “Being Assessed” status type is assigned when Regional allocation to fund CNMS evaluation is established. The “UNKNOWN” validation status may also have a “Deferred” status type in where the validity remains unknown after Phase III evaluation or the Region has determined the study to be low priority and CNMS evaluation is deferred. The option to defer an assessment for 5 years must be held to a minimum and requires discussion with the FEMA Headquarters during each fiscal year production planning process.

Streams not part of FEMA’s inventory (e.g., Public Lands or National Parks) would be given a validation status of “UNKNOWN” and status type of “Not Being Assessed”. All newly studied or restudied streams classified as “VALID” will be reclassified as “UNKNOWN” after five years.

”UNVERIFIED” Validation Status

CNMS Study Records categorized as “UNVERIFIED” may have one of two status types depending upon whether resources can be allocated for a restudy in the current or future fiscal year. “UNVERIFIED” studies currently being studied or which have been allocated funding for the current fiscal year are given the status type “Being Restudied”. “UNVERIFIED” Studies that need to be addressed and are planned for a future fiscal year will have the status type as “To be Studied”.

”VALID” Validation Status

CNMS Study Records are categorized as “VALID” when a new study is performed or stream reach level validation was completed and reflects existing condition. These records will have the status type “NVUE Compliant” and monitored for re-evaluation every five years. Unmodernized studied streams determined as ‘VALID’ will be assigned the status type “NVUE Compliant”.

”ASSESSED” Validation Status

The “ASSESSED” validation status is for unmapped streams which have been added into the CNMS Inventory. The status type assigned to these streams depends upon if or when funding will be allocated by FEMA to conduct a study. Unmapped streams that are currently being studied or planned for the current fiscal year will be assigned “Being Studied” status type. Unmapped streams with studies planned for a future fiscal year will be assigned a status type of “To be Studied”. Finally, unmapped streams which the Region determines should not be studied will be assigned the status type “Deferred”.

Table 1. Validation Status Type Descriptions

Validation Status	Status Type	Description
“UNKNOWN”	To be Assessed	Requires Regional input to either defer, perform a CNMS evaluation, or use other info for Zone A's validation.
	Being Assessed	Studies currently being assessed per CNMS stream reach level validation described in this document
	Deferred	Low risk areas that will not be evaluated in Risk MAP
	Not Being Assessed	NHD Streams that are not part of FEMA's inventory (Public Lands, National Parks)
“UNVERIFIED”	To be Studied	Studies that need to be addressed and are planned for a future Fiscal Year
	Being Studied	Studies are currently being studied or have been allocated funding for the current Fiscal Year captured during the Discovery process.
“VALID”	NVUE Compliant	New study performed or stream reach level validation completed and reflects existing conditions
“ASSESSED”	To be Studied	Miles prioritized to be mapped with a SFHA within Risk MAP
	Being Studied	Unmapped streams that are currently being studied or have been allocated funding for the current Fiscal Year.
	Deferred	Miles investigated by Region for possible map project, but analysis resulted in low priority study

The Validation Checklist (Appendix A) lays out detailed definitions for the critical elements and secondary elements, and is intended to be used as a tool to assist in gathering information necessary to determine:

1. Whether a record qualifies for entry into the CNMS Study database according to Validation Guidance; and
2. Where a qualified record would fit into the CNMS Study database.

Appendix A outlines items in the validation checklist and provides additional guidance (in blue italic) on how to collect information for many of the elements. Answers to each item on the checklist feed directly into the CNMS data model, which will be discussed in detail in the next section.

Some examples of conditions that users might identify and enter into CNMS, after passing them through the validation checklist, include the following:

- Flood zones that have been affected by development since the date of the effective FIRM
- Inadequate flood hazard engineering data in areas with planned development/anticipated growth (i.e., areas that currently reflect approximate flood hazard analyses or those that have never been studied, yet have been slated for upgraded analyses given flood hazard data validation efforts)
- Stream reaches requiring restudy because they do not comply with quality standards
- Changes to corporate limits or county boundaries

Documentation of research and findings regarding validation are to be retained by the user. Appendix B outlines the need for capturing this background information and also suggests ways to provide a summary of this information to FEMA. Delivery of these summaries to FEMA for all flood hazard studies evaluated is required as part of CNMS data roll-up.

Figure 1 is a graphical depiction of the CNMS Record Entry Determination process with respect to the validation status classifications and request type determination. Paths to possible “bins” for CNMS Study or Request Records are displayed and decision points that are used to make the “bin” determination are depicted. These decision points are indicated by the “Yes”, “No” and “Unknown” flags in the process diagram.

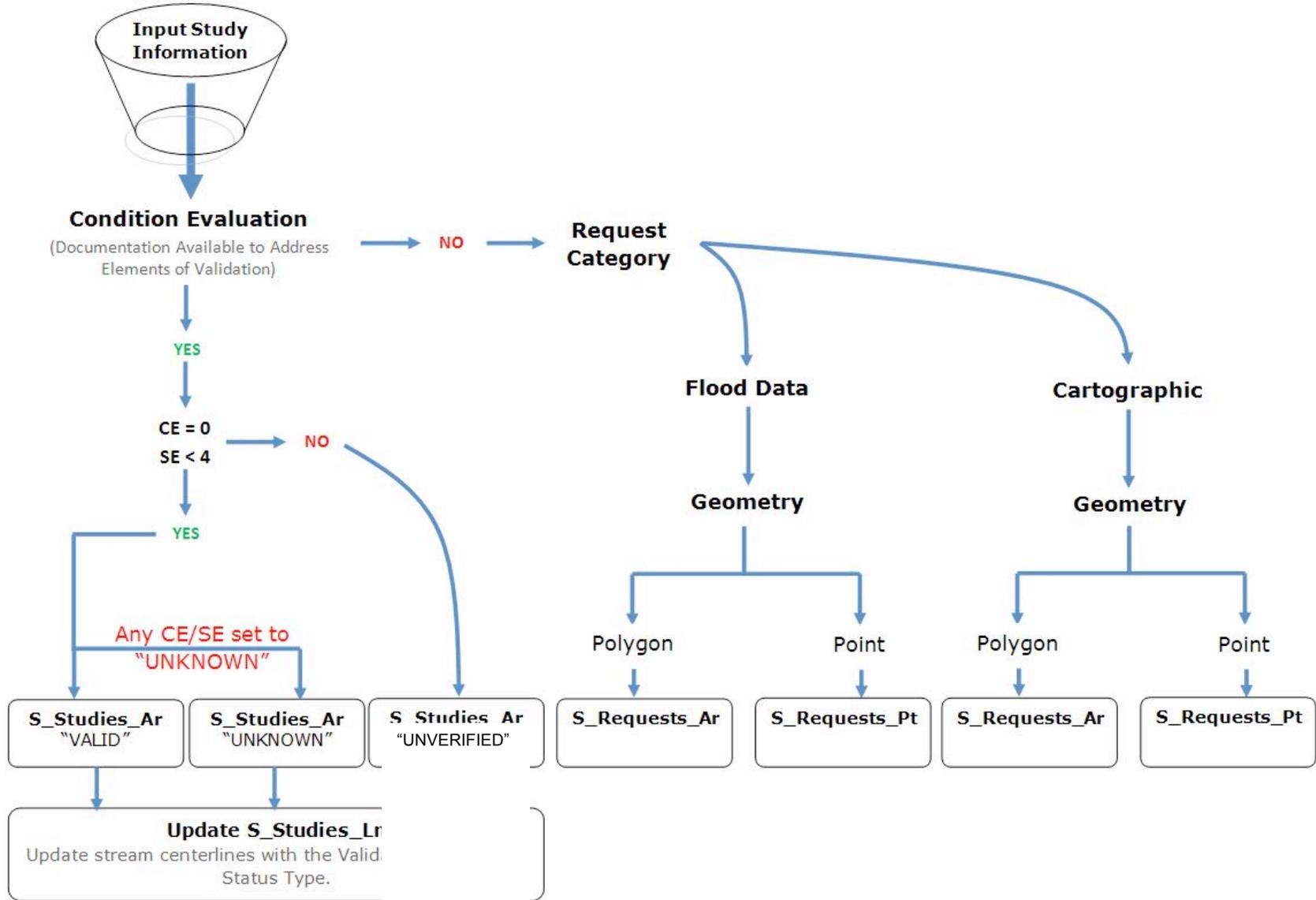


Figure 1. CNMS Record Entry Determination

2.3. Data Entry Process

How data are entered into the CNMS Studies Feature Dataset is determined by decision rules. Once these rules are understood, the process of entering data becomes more straightforward. In essence, the data model's primary distinction is between records for which there is an associated engineering model (Study Records) and those that do not have an associated engineering model (Request Records). Structurally, these data inputs have been separated into three types of feature classes within the CNMS Studies Feature Dataset: 'S_Studies_Ar,' and 'S_Requests_Ar' (or 'S_Requests_Pt'), and one feature class within the CNMS Inventory Feature Dataset: 'S_Studies_Ln'.

There are two processing approaches that have been identified by the CNMS Development Team. One approach is to address validation directly on the flooding source centerlines in the 'S_Studies_Ln' feature class. Another acceptable approach is to work on the SFHA/study polygons in the 'S_Studies_Ar' feature class. If the polylines are targeted first, then flooding source centerline segmentation and validation assessment are performed, and the lines then buffered to make polygons that would then be pushed into the 'S_Studies_Ar' database for validation/planning/tracking activities as described in section 2.3.3. If polygon records are created for representation of study footprints, validation/planning/tracking activities as detailed in section 2.3.3 would occur first, and validation status would be pushed to the flooding source centerline 'S_Studies_Ln' Feature class for summary and reporting. The results of the latter would be influenced by study dates of analysis and validation, in that a validation status assigned from an older study or validation assessment, would be trumped or over-written based on chronology.

Users should complete the Validation Process Documentation Checksheet (Appendix B). The validation checklist identified in Appendix A may be used as a working document while performing stream reach level validation, results of which need to be transferred to the Validation Process Documentation Checksheet identified in Appendix B, and to the appropriate table records in the geodatabase .

"Yes", "No", and "Unknown" are acceptable values for many fields within the CNMS database. A system "Null" will remain where the value has not been determined to be "Yes", "No" or "Unknown". The system "Null" is an indication by the user that a specific detail has not yet been addressed. The "Unknown" value should only be used when adequate data sources have been exhausted and the answer to the question is truly unknown. "Unknown" should not be used because a question was not answered or in place of "No".

The user who enters data into the CNMS database is presented with the opportunity to designate a point of contact (POC) as a reference for the entered record. **POC information is not required** and can change at an organizational level over time. A user should not feel obligated to retroactively update all records submitted by the associated organization. FEMA ensures that any data provided to the agency that is personal in nature (i.e. names and organization information, etc) will not be distributed and will be considered private. Should a POC be identified it is suggested that the individual be knowledgeable about the record and someone who would be accessible by FEMA for follow-up questions or requests for additional information.

2.3.1 Primary Key Considerations

The primary key in a relational database is what allows each record to be uniquely identified. Instruction for generating primary keys for the relational database records is very important. CNMS is anticipated to have many data entry points and because the primary key, by definition, is a unique record identifier, care must be taken to prevent data entry points from using the same record identification scheme. Duplication is not particularly likely at the local data entry level but may come in to play during a process of compilation or roll up at a regional or national level. If primary key duplication were to occur at the State, FEMA Region, or national level, the situation would require data conditioning prior to roll up to prevent data loss.

In the CNMS Data Model the primary key attribute name for the Studies and Requests tables is CNMS_ID. It is a text or character field with a defined width of twelve. Although this allows a tremendous amount of flexibility and number of unique combinations, the proactive adoption of a systematic structure for primary key generation is strongly encouraged. Suggestions for methods to generate primary keys may be found in the table attribute descriptions below.

At this time, the CNMS Data Model database is distributed as an ESRI ArcGIS file geodatabase. This means there will be many entities across the nation populating CNMS records in as many copies of the database. Data entry needs to consider other local stakeholders that may be developing records and also understand that FEMA is interested in rolling up the data at the national level. So, data development requires diligence to not create duplicate primary keys both locally and nationally speaking. For example, to generate the CNMS_ID in 'S_Studies_Ar' (Feature Class ID: 02) a programmatic approach that prefixes five record counting digits with the 5 digit County FIPS code and a 2 digit feature class ID would produce a number like 201190200001 (20119 is the county FIPS code, 02 is the table ID for 'S_Studies_Ar' and 00001 represent record counting digits) for the first record in 'S_Studies_Ar' for Meade County, Kansas. If there are multiple sources for record generation for a given county, coordination between or among the multiple sources would be required prior to consolidation of the two databases. However, if coordination were to take place prior to record generation the parties involved could agree to assigned number ranges and thereby avoid encroachment on the primary keys created by others.

2.3.2 S_Studies_Ln Feature Class (Polyline)

The 'S_Studies_Ln' feature class resides in the 'CNMS Inventory' Feature dataset under the CNMS Geodatabase. 'S_Studies_Ln' is a polyline feature class that is meant to fully encompass the physical extent, upstream and downstream, of a reach that is regulated by a SFHA under the NFIP. This feature class will inherit the validation statuses from the 'S_Studies_Ar' feature class to aid NVUE percentage reporting. Preliminary efforts have included the polyline shape for most regulated reaches into the 'S_Studies_Ln.' This means that the database will contain polyline shapes for most reaches representing SFHAs, but not all. Efforts were made to include all polyline work, but several issues have prohibited the accurate representation of all SFHAs in FEMA's mapped inventory in the CNMS Inventory. This could include, but not be limited to the following: the stream centerlines used to populate the inventory meander in and out of the SFHAs, or a study is currently underway and digital data does not exist. The issue

identified in the first instance exists because several stream centerline sources were leveraged to represent SFHA polygons studied in flood insurance studies. In this instance, one could optionally replace the existing stream centerlines in the CNMS inventory with better quality linework. In the second instance, one would want the digital data to overlay stream networks to extract the reaches that are regulated by SFHA extents when they become available. These examples point out that not all SFHA reaches are included in the current initial release of the inventory due to outstanding circumstances. It is a goal of each user to contribute to the inventory by identifying shortcomings in the initial inventory, providing updates as available, and maintaining the inventory accordingly.

The polyline is entered for areas within the inventory when a SFHA does not have a line representing the entire extent of its flooding. A polyline is removed from the inventory only when the SFHA has been removed from the NFIP. Sources of polylines to enter into the inventory are varied and will be the responsibility of the user to determine, but some examples are: 'S_Wtr_Ln' or 'S_Profil_Basln' from DFIRM studies, National Hydrography Dataset (NHD) High, Medium, Low resolution, or heads up digitization of a representative line for the SFHA. The above guidance is provided for SFHAs that are around riverine flooding sources.

Unlike riverine flooding sources, lakes and ponds that are part of FEMA's mapped SFHA inventory are often disconnected from stream centerlines and are two dimensional, making linear representation of these areas a challenge. Ignoring lakes and ponds altogether under-estimates the representative miles used for NVUE percentage calculations. Including the entire shoreline of these areas would over-estimate the representative miles used for NVUE percentage calculations. If the stream centerline sources identified above have linework passing through the lakes or ponds, then those may be used to represent these areas. If no stream centerline dataset has linework usable as described above, then one suggested methodology to address this is to store the polyline representing the lake or pond shoreline in the CNMS Inventory, but with only one half of the miles listed in the MILES field. Another alternative is to manually digitize a line along the center of these areas.

The current geometry of lines within the inventory is compiled from various sources. The eventual goal is to have every flood hazard study that is part of FEMA's mapped inventory represented accurately within the CNMS Inventory. Augmentations and improvements to linework geometry to achieve the above goal should be considered an ongoing process. By utilizing better quality line features the CNMS inventory should be able to provide more precise calculations of stream miles for NVUE reporting. Inventory polylines should be continuous through a SFHA of the same study type (i.e. Zone AE) for individual flooding sources, and split at zone breaks (i.e. Zone AE – Zone A). The reason for the split at zone breaks is that the inventory polyline inherits the SFHA zone attribute of the area directly below the linework. At confluences of differing flood sources (i.e. main stem – tributary) these should be split at their junction regardless of whether it's still the same SFHA zone. These confluences are typically different streams (i.e. main stem – tributary) with different names, and at times different types of studies (i.e. Zone AE – Zone A).

Described above are two important things to keep in mind when bringing polylines into the inventory or editing polylines in the current inventory. The polylines are to be split at zone breaks to inherit the SFHA zone information directly below it, and the polylines are split at confluences due to possible name changes

or zone transitions. Both of these (Zone, Stream Name) are attributes that will need to be pre-planned for as they are attributes in the ‘S_Studies_Ln’ Feature Class. Details of the ‘S_Studies_Ln’ table attributes are presented below:

Table 2. S_Studies_Ln (Feature Class ID: 01)

Field	Description
REACH_ID	Primary key for table. Assigned by table creator
Type of data expected	As the Primary key for this table this field must exist as a unique identifier for each individual record.
Potential source to obtain	"A programmatic approach that prefixes five record counting digits with the 5 digit County FIPS code and a 2 digit feature class ID would produce a number like 201190100001 (20119 is the county FIPS code, 01 is the feature class ID for ‘S_Studies_Ln’ and 00001 represent record counting digits) for the first record in ‘S_Studies_Ln’ for Meade County, Kansas. No repeat counting digits should be used within the same county.
Anticipated use for attribute	Unique identification of each individual CNMS record.
FIPS	Federal Information Processing Standard code
Type of data expected	Five-digit Federal Information Processing Standard code which uniquely identifies state and counties, or the equivalent. The first two digits are the FIPS state code and the last three are the county code within the state or possession.
Potential source to obtain	U.S Department of Commerce, Bureau of the Census, Geography Division is the maintenance agency. Many departments within the U.S. government maintain references back to this standard. Including the EPA: http://www.epa.gov/enviro/html/codes/state.html
Anticipated use for attribute	Establishes a unique identifier for determining what state and/or county the data resides in. The FIPS will also be combined with CID and counting digits to formulate the CNMS ID another attribute within ‘S_Studies_Ln.’
CID	Community Identification Number
Type of data expected	A unique six-digit number assigned to each community by FEMA and used for identity in computer databases; it is shown on the FIS, FIRM, and in the Q3 Flood Data files. The first two digits of the number are always the State FIPS code.
Potential source to obtain	FEMA is the source. The CID is obtainable from multiple sources; Community Information System, Flood Insurance Studies, FIRM panels, map indexes.
Anticipated use for attribute	Catalog and referencing
WATER_NAME	Name of flooding source
Type of data expected	Water feature name (ex. Mississippi River, Lake Superior, Pacific Ocean).
Potential source to obtain	The name of the flooding source should come from the FIS, FIRM, DFIRM DB, or source stream network, and should be given that order of importance. The FIS lists profiles in alphabetical order in the table of contents and usually discusses them in other FIS sections in that same order. Section 1.2 should list all of these streams and the dates they were studied. Section 2.1 should also list all the streams studied by detailed methods, and should also list all the streams studied by approximate methods. Note that the DFIRM should not be the sole source of information that is used to evaluate stream reaches. Often times there are graphic features or annotation on the PDF map panel that will help identify a stream reach.
Anticipated use for attribute	This attribute provides a geographic place name reference.
WATER_NAME_ALIAS_1	Alternate name of flooding source
Type of data expected	Water feature name (ex. Mississippi River, Lake Superior, Pacific Ocean).
Potential source to obtain	If an alternative name of a flooding source is identified from the sources identified for the ‘WATER_NAME’ field, then that would be stored here. Any other indications of an alternate name would also be captured in this field.
Anticipated use for attribute	This attribute provides a geographic place name reference.
FLD_ZONE	Zone type of the SFHA directly underneath the polyline (ex. Zone AE, Zone A)
Type of data expected	Entry from domain lookup table D_ZONE

Potential source to obtain	Flood zones depicted in the FIRM and/or DFIRM of the NFIP
Anticipated use for attribute	Query into the characteristics of the inventory: type of study, validation status, mileage.
VALIDATION_STATUS	This attribute establishes the latest evaluation condition of a flooding source centerline in relation to the criteria set forth in the CNMS User's Guide, any procedure memorandums, or previous work.
Type of data expected	Entry from domain lookup table D_VALID_CAT
Potential source to obtain	Current entry; or user assessed entry based on evaluation of criteria set forth in the CNMS User Guide, any procedure memorandums, or previous work.
Anticipated use for attribute	Used to categorize the Inventory for the purposes of planning, study selection, tracking and reporting.
STATUS_TYPE	This attribute establishes the sub-categories for each of the validation status classes of a flooding source centerline in relation to the criteria set forth in the CNMS User's Guide, any procedure memorandums, or previous work.
Type of data expected	Entry from domain lookup table D_STATUS_TYPE
Potential source to obtain	Current entry; or user assessed entry based on evaluation of criteria set forth in the CNMS User Guide, any procedure memorandums, or previous work.
Anticipated use for attribute	Used to further define the validation status type to categorize the Inventory for the purposes of planning, study selection, tracking and reporting.
MILES	An attribute of the calculated miles of the data record entry
Type of data expected	A number corresponding to the length of the inventory polyline segment
Potential source to obtain	In feature class format, and if projection is in feet or meters permanent length field of feature class can be used to populate this field by applying the appropriate conversion to miles. Otherwise, make a field calculation using field calculator and convert to miles. Be sure to understand the units the projection is in and how it will influence any resulting calculations. While the CNMS file geodatabase is provided in the NAD 1983 Geographic Coordinate System, the length of the polyline segments must be calculated in the US Equal Area Projection.
Anticipated use for attribute	Quantifies the results in D_VALID_CAT in stream miles for reporting (ex. NVUE, quarterly reports)
SOURCE	Source of polyline segment represented in the inventory
Type of data expected	Entry from domain lookup table D_SOURCE
Potential source to obtain	User sourced dataset used for the polyline entry (ex. NFHL, RFHL, DFIRM, NHD)
Anticipated use for attribute	Verify source of polyline used, and also determine whether it could be updated to a more accurate polyline feature if one becomes available.
VALIDATION_DATE	Date; Validated studies receive initial date of completion; 'Requires Assessment' and 'Unknown' will receive a date once the status is changed to either 'Validated' or 'Unverified'; 'Unverified' records will have the date the CNMS evaluation triggered the "Unverified" status. For all the above, the date of data acquisition to determine relevant status would prevail.
Type of data expected	Calendar date (ex. 01/01/10)
Potential source to obtain	Calendar
Anticipated use for attribute	Determine the most recent analysis and condition of the polyline. Will track and maintain the currency of the inventory, to insure all requirements are being adhered to according to mandates set forth within the NFIP.
PRELIM_QTR	For records with Validation Status of "In Progress" The Fiscal Quarter for which Preliminary issuance of study is anticipated.
Type of data expected	Entry from domain lookup table D_PRELIM_QTR
Potential source to obtain	Current entry or user assessed entry based on Regional forecast of Preliminary Study.
Anticipated use for attribute	Attribute will support the ability to forecast NVUE metric achievement into the future.
FY_FUNDED	Attribute of the most recent FEMA fiscal year funding applied to the stream reach at the time of study (ex. Watershed, county)
Type of data expected	Entry from domain lookup table D_FY_FUNDED

Potential source to obtain	MIP case numbers (as they are associated with fiscal year first funded), RSC Management
Anticipated use for attribute	Determine the latest FEMA funding year for the underlying SFHA
REASON	Attribute allows for user input of detailed description of considerations or special circumstances when determining attributes VALIDATION_STATUS, SOURCE, or any pertinent information in the data creation process.
Type of data expected	Preferably user defined template “canned” descriptors of their data entry process and considerations
Potential source to obtain	Criteria evaluated and considered in the S_Studies_Ar data creation, ancillary information presented by the regions or other parties, data used that is not readily available, etc.
Anticipated use for attribute	Attribute will document more details about the underlying considerations of other attributes contained in the CNMS database. This will serve as a first stop when questions arise about the attribution contained in the database without going back to the criteria, check sheets, or intermediate datasets. By choosing to use template “canned” entries, query of such entries will be streamlined. A useful example might be the need to query a specific consideration that based on current business rules is attributed a certain way, but based on new information might need to be queried and reattributed a different way.
HUC8_KEY	8-digit Hydrologic Unit Code (HUC) representing the smallest watersheds known as hydrologic cataloging units. This can be obtained by overlaying the HUC spatial files with the polyline information to determine which cataloging unit the polyline resides in.
Type of data expected	8-digit Hydrologic Unit Code
Potential source to obtain	Originator: United States Geological Survey (USGS): http://nhd.usgs.gov/data.html ; or EPA surf your watershed: http://cfpub.epa.gov/surf/locate/index.cfm
Anticipated use for attribute	Provides an attribute to determine what HUC 8 sub-basin the polyline resides in.
STUDY_TYPE	Study type of the SFHA represented by the polygon based on the current effective, preliminary, or draft FIS text.
Type of data expected	Entry from domain lookup table D_STUDY_TYPE
Potential source to obtain	FIS Text, Scoping Shapefiles, Study Manager Input etc.
Anticipated use for attribute	Query into the characteristics of the inventory: type of study, validation status, mileage.
LINE_TYPE	Attribute provides description of flooding source line type as being Riverine, Lake, Pond, Playa, Ponding, Coastal, or Other.
Type of data expected	Entry from domain lookup table D_LINE_TYPE
Potential source to obtain	Current entry or user assessed entry based on line geometry source.
Anticipated use for attribute	Attribute will allow for the identification of non-riverine flooding sources which do not fit well with the linear riverine model for calculating NVUE mileage. This attribute is to be used to equate the level of effort associated with each of line type relative to the level of effort associated with Riverine studies.
DUPLICATE	Is there a second line representing an SFHA across a county boundary, for a second study on the same extent of the reach? (Yes/No/Unknown)
Type of data expected	Value of ‘Yes’ for one of the two lines, when a stream defines a county boundary, and there are two SFHA studies on the same reach of the stream. The other line for the same reach extent would be set to ‘No’. All other streams on the interior of county boundaries, and for which only one study exists for that stream along a county boundary, would have the value set to ‘Unknown’ by default. Ideally, the line set to ‘Yes’ would be the one with a better validation status and a more detailed study out of the two that represent two studies performed on the same reach. This way, while considering stream miles for a watershed based scoping, the better study could be hidden by a query, and the mapping needs would become more apparent.
Potential source to obtain	While completing this field, one must check the same stream on the neighboring county to see if there is a second study for the same reach extent.
Anticipated use for attribute	Provides input that helps determine double lines representing the same stream when two studies have been conducted for that stream on either landward side. This situation occurs when community boundaries are defined by a stream and each community performs independent studies to map the SFHA on either side of the county boundary. If the line with a better validation status and a more detailed study to ‘Yes’, then while considering stream miles for a watershed based scoping, the better study could be hidden by a query, and the mapping needs would become more apparent.

2.3.3 S_Studies_Ar Feature Class (Polygon)

The ‘S_Studies_Ar’ feature class resides in the CNMS Studies Feature Dataset within the CNMS geodatabase. ‘S_Studies_Ar’ is a polygon feature class that is meant to fully encompass the physical extent, upstream and downstream, of a reach that is impacted by the critical or secondary elements documented through the Validation Checklist. When creating the polygon shape associated with this feature class, it is important to ensure it contains the affected stream reach entirely and only overlaps any other neighboring reach areas if they are impacted. Once created, the required reporting fields identified in the attribute table can then be populated.

Besides storing all of the referenced attributes, these polygons are to be used to update stream centerlines’ validation statuses in ‘S_Studies_Ln’ as illustrated in Figure 1 in section 2.2. The polygon features in ‘S_Studies_Ar’ can be linked to the stream centerlines in ‘S_Studies_Ln’ by populating the optional field REACH_ID which is the primary key of the stream centerlines in ‘S_Studies_Ln.’ However, in instances where many stream centerline segments lie within a single ‘S_Studies_Ar’ polygon, the relationship with ‘S_Studies_Ln’ becomes many-many and it would not be possible to assign a single REACH_ID to that polygon. Therefore, care should be taken to ensure that the spatial extent of these polygons are generalized enough to be able to contain and identify stream centerline segments associated with the polygons through spatial intersects.

Details of the ‘S_Studies_Ar’ table attributes are presented below:

Table 3. S_Studies_Ar (Feature Class ID: 02)

Field	Description
CNMS_ID	Primary key for table. Assigned by table creator
Type of data expected	As the Primary key for this table this field must exist as a unique identifier for each individual record.
Potential source to obtain	A programmatic approach that prefixes five record counting digits with the 5 digit County FIPS code and a 2 digit feature class ID would produce a number like 201190200001 (20119 is the county FIPS code, 02 is the feature class ID for ‘S_Studies_Ar’ and 00001 represent record counting digits) for the first record in ‘S_Studies_Ar’ for Meade County, Kansas No repeat counting digits should be used within the same county.
Anticipated use for attribute	Unique identification of each individual CNMS record.
REACH_ID	Foreign key to join to the primary key REACH_ID of ‘S_Studies_Ln’ in the CNMS data model
Type of data expected	A 12 digit key from the corresponding stream centerline in the ‘S_Studies_Ln’ feature class when there is a 1-1 or many-1 mapping between the polygon in this feature class and features in ‘S_Studies_Ln.’ May be left blank when many stream centerlines from ‘S_Studies_Ln’ lie within a single polygon in this feature class, i.e. when the mapping is 1- many or many-many.
Potential source to obtain	REACH_ID field in the ‘S_Studies_Ln’ feature class
Anticipated use for attribute	Catalog and referencing; foreign key to primary key of ‘S_Studies_Ln’
CID	Community Identification Number
Type of data expected	A unique six-digit number assigned to each community by FEMA and used for identity in computer databases; it is shown on the FIS, FIRM, and in the Q3 Flood Data files. The first two digits of the number are always the State FIPS code. This field is to be completed only when partial countywide data is used to input lines into the Inventory. It will serve as a reminder that the entire county is not digital under a county-wide DFIRM study.
Potential source to obtain	FEMA is the source. The CID is obtainable from multiple sources; Community Information System, Flood Insurance Studies, FIRM panels, map indexes.

Anticipated use for attribute	Catalog and referencing
MIP_CASE	MIP Case Number
Type of data expected	FEMA Mapping Information Platform (MIP) case number assigned to all new studies initiated by FEMA, if applicable
Potential source to obtain	The Mapping Information Platform (MIP).
Anticipated use for attribute	Association with MIP workflow and other FEMA process information.
WTR_NM	Name of flooding source
Type of data expected	Water feature name (ex. Mississippi River, Lake Superior, Pacific Ocean).
Potential source to obtain	The name of the flooding source should come from the FIS, FIRM and DFIRM DB, and should be given that order of importance. The FIS lists profiles in alphabetical order in the table of contents and usually discusses them in other FIS sections in that same order. Section 1.2 should list all of these streams and the dates they were studied. Section 2.1 should also list all the streams studied by detailed methods, and should also list all the streams studied by approximate methods. Note that the DFIRM should not be the sole source of information that is used to evaluate stream reaches. Often times there are graphic features or annotation on the PDF map panel that will help identify a stream reach.
Anticipated use for attribute	This attribute provides a geographic place name reference.
POC_ID	Foreign key to join to 'Point_of_Contact' table. ID for Point of Contact
Type of data expected	This field, if populated, should have a matching record in the 'Point_of_Contact' table.
Potential source to obtain	Establishing the relationship of 'S_Studies_Ar' records and 'Point_of_Contact' records is user controlled.
Anticipated use for attribute	This field is used to establish a database "join" with records in the 'Point_of_Contact' table. The supporting idea is to relate record ownership information to specific CNMS records.
DATE_RQST	Date need is made
Type of data expected	This field is of the type "Date." Data should be entered in MM/DD/YYYY format.
Potential source to obtain	The user should enter the date for which the CNMS record was entered in the database.
Anticipated use for attribute	Resource and tracking are the anticipated uses of dates.
DATE_RESOL	Date need is resolved
Type of data expected	This field is of the type "Date." Data should be entered in MM/DD/YYYY format.
Potential source to obtain	The Letter of Final Determination (LFD) should be used to determine when a need has been resolved as this is the date that determines when no future updates will be made to the model or maps.
Anticipated use for attribute	Resource and tracking are the anticipated uses of dates.
DATE_EFFCT	Date of effective analysis
Type of data expected	This date field will be used to document when the effective study was produced because there can be much time between when the study was created and when it went effective. Age of maps does not adequately reflect the age of the analysis as a study can be published on multiple effective maps without change. At times, the date that the analysis <i>first</i> went effective is sufficient as well, especially when supporting data is sparse. Data should be entered in the MM/DD/YYYY format.
Potential source to obtain	The date of effective analysis for a detailed study is usually included in Section 1.2 in the FEMA Insurance Study (FIS) text.
Anticipated use for attribute	This date will be evaluated for age of analysis of the effective study.
HYDRO_MDL	Hydrologic model used
Type of data expected	In this open text field the user should enter the name of the hydrologic model used and version, as appropriate.
Potential source to obtain	There are two references in which one would expect to find this information. One is in the reference section of the Flood Insurance Study (FIS) text and the second is the Technical Support Data Notebook (TSDN) for the study. A complete domain list of Hydrologic Models recognized by FEMA can be accessed on FEMA's Mapping Information Platform (MIP) or FEMA's website.

Anticipated use for attribute	Reference and evaluation
HYDRA_MDL	Hydraulic model used
Type of data expected	In this open text field the user should enter the name of the hydraulic model used and version, as appropriate.
Potential source to obtain	There are two references in which one would expect to find this information. One is in the reference section of the Flood Insurance Study (FIS) text and the second is the Technical Support Data Notebook (TSDN) for the study. A complete domain list of Hydraulic Models recognized by FEMA can be accessed on FEMA's Mapping Information Platform (MIP) and FEMA's website.
Anticipated use for attribute	Reference and evaluation
HODIGFMT	Is the hydrologic model in digital format? (Yes/No/Unknown)
Type of data expected	Yes or No is expected to indicate whether the data are digital or not.
Potential source to obtain	User evaluation of the data format
Anticipated use for attribute	Evaluation of the data relative to the expected effort associated with use of the data
HADIGFMT	Is the hydraulic model in digital format? (Yes/No/Unknown)
Type of data expected	Yes or No is expected to indicate whether the data are digital or not.
Potential source to obtain	User evaluation of the data format
Anticipated use for attribute	Evaluation of the data relative to the expected effort associated with use of the data
HO_RUNMOD	Can the Hydrologic digital model be run? (Yes/No/Unknown)
Type of data expected	Yes or No is expected to indicate whether the data can be run in a model.
Potential source to obtain	User evaluation of the data format
Anticipated use for attribute	Evaluation of the data relative to the expected effort associated with use of the data
HA_RUNMOD	Can the Hydraulic digital model be run? (Yes/No/Unknown)
Type of data expected	Yes or No is expected to indicate whether the data can be run in a model.
Potential source to obtain	User evaluation of the data format
Anticipated use for attribute	Evaluation of the data relative to the expected effort associated with use of the data
VALID_CAT	This attribute establishes the latest evaluation condition of a flooding source centerline in relation to the criteria set forth in the CNMS User's Guide, any procedure memorandums, or previous work.
Type of data expected	Entry from domain lookup table D_VALID_CAT
Potential source to obtain	Current entry; or user assessed entry based on evaluation of criteria set forth in the CNMS User Guide, any procedure memorandums, or previous work.
Anticipated use for attribute	Used to categorize the Inventory for the purposes of planning, study selection, tracking and reporting.
STATUS_TYPE	This attribute establishes the sub-categories for each of the validation status classes of a flooding source centerline in relation to the criteria set forth in the CNMS User's Guide, any procedure memorandums, or previous work.
Type of data expected	Entry from domain lookup table D_STATUS_TYPE
Potential source to obtain	Current entry; or user assessed entry based on evaluation of criteria set forth in the CNMS User Guide, any procedure memorandums, or previous work.
Anticipated use for attribute	Used to further define the validation status type to categorize the Inventory for the purposes of planning, study selection, tracking and reporting.
C1_GAGE	Critical Element 1, Change in gage record. Major change in gage record since effective analysis that includes major flood events? (Yes/No/Unknown) NOTE: Users may indicate change in rainfall record or other climatologic data in this field if gage data is not available but other precipitation indicators are available.
Type of data expected	This Yes/No field is to capture whether or not a major change in gage records have been observed since the effective analysis was completed.
Potential source to obtain	Investigate the existence of gages along the reach. Record all gages near or on the stream reach AND gages listed in the FIS.

Anticipated use for attribute	This Critical Element field is a trigger for indication of an identified deficiency, and subsequent assignment of “Unverified” validation status to the record.
C2_DISCH	Critical Element 2, Change in Discharge. Updated and effective peak discharges differ significantly based on confidence limits criteria in FEMA’s <i>Guidelines and Specifications for Flood Hazard Mapping Partners?</i> (Yes/No/Unknown)
Type of data expected	This Yes/No field is to capture whether or not updated and effective peak discharges differ significantly based on FEMA’s current confidence limits criteria since the effective analysis was completed.
Potential source to obtain	Look at the years of record for each gage. The FIS may tell you how many years of record were used in the model. Gage data are measured, compiled and served via web access by the USGS. The gage ESRI shapefile will tell you if there are continuous and updated years of record available. Use this info to determine if there is an increase of >25%. Record all gages with an increase of >25% and gages that you are unsure of but suspect there is an increase.
Anticipated use for attribute	This Critical Element field is a trigger for indication of an identified deficiency, and subsequent assignment of “Unverified” validation status to the record.
C3_MODEL	Critical Element 3, Model methodology. Model methodology no longer appropriate based on <i>Guidelines and Specifications for Flood Hazard Mapping Partners</i> (i.e. one-dimensional vs. two-dimensional modeling; Coastal Guidelines)? (Yes/No/Unknown)
Type of data expected	This Yes/No field is to capture whether or not the model methodology used to produce the effective analysis still meet current guidelines and specifications.
Potential source to obtain	Research and general knowledge to be provided by engineering staff.
Anticipated use for attribute	This Critical Element field is a trigger for indication of an identified deficiency, and subsequent assignment of “Unverified” validation status to the record.
C4_FCSTR	Critical Element 4, Hydraulic Change. Addition/removal of a major flood control structure (i.e., certified levee or seawall, reservoir with more than 50 acre-ft storage per square mile)? (Yes/No/Unknown)
Type of data expected	This Yes/No field is to capture whether or not there have been major flood control structures added or removed since the effective analysis was completed.
Potential source to obtain	The originator of the CNMS record should have professional knowledge of this situation.
Anticipated use for attribute	This Critical Element field is a trigger for indication of an identified deficiency, and subsequent assignment of “Unverified” validation status to the record.
C5_CHANN	Critical Element 5, Channel Reconfiguration. Current channel reconfiguration outside effective SFHA? (Yes/No/Unknown)
Type of data expected	This Yes/No field is to capture whether or not any channel reconfiguration outside the effective special flood hazard area (SFHA) have been observed since the effective analysis was completed.
Potential source to obtain	NAIP or DOQQ imagery can be used to determine if the mapped SFHAs do not match the channel configurations on the aerial. If they do not match, record a YES. If you record a YES be sure you can go back and state with confidence that the SFHAs do not match information on the aerial. NOTE: when stating YES, you are saying that the floodplains on the map are no longer valid.
Anticipated use for attribute	This Critical Element field is a trigger for indication of an identified deficiency, and subsequent assignment of “Unverified” validation status to the record.
C6_HSTR	Critical Element 6, Hydraulic Change 2. More than 5 new or removed hydraulic structures (bridge/culvert) that impact BFEs? (Yes/No/Unknown)
Type of data expected	This Yes/No field is to capture whether or not >5 new or removed hydraulic structures (bridge/culvert) that impact base flood elevations (BFEs) have been observed since the effective analysis was completed. Consider any combination of new and removed of >5 structures (i.e. 3 new and 3 removed). This should not be used to supersede the Letter of Map Revision process.
Potential source to obtain	The originator of the CNMS record should have professional knowledge of this situation.
Anticipated use for attribute	This Critical Element field is a trigger for indication of an identified deficiency, and subsequent assignment of “Unverified” validation status to the record.
C7_SCOUR	Critical Element 7, Channel Area Change. Significant channel fill or scour? (Yes/No/Unknown)
Type of data expected	This Yes/No field is to capture whether or not significant channel fill or scour has been observed since the effective analysis was completed.
Potential source to obtain	The originator of the CNMS record should have professional knowledge of this situation.
Anticipated use for attribute	This Critical Element field is a trigger for indication of an identified deficiency, and subsequent assignment of “Unverified” validation status to the record.

S1_REGEQ	Secondary Element 1, Regression Equation. Use of rural regression equations in urbanized areas? (Yes/No/Unknown)
Type of data expected	This Yes/No field is to capture whether or not a regression equation intended for rural use was used in an urbanized area.
Potential source to obtain	An existing study will indicate the use of a regression equation and provide information on the area for which the model was run. This field could indicate the incorrect use of a regression equation intended for rural areas in urban areas or could capture that urban sprawl has overtaken a once rural area for which a rural regression equation model has been run.
Anticipated use for attribute	Any combination of 4 or more Secondary Elements establishes a CNMS record as “Unverified”
S2_REPLO	Secondary Element 2, Repetitive Loss. Repetitive losses outside the SFHA? (Yes/No/Unknown)
Type of data expected	This Yes/No field is to capture whether or not repetitive loss claims have been filed for properties outside the SFHA.
Potential source to obtain	If there are repetitive loss points close to your reach and outside the SFHA, record a YES.
Anticipated use for attribute	Any combination of 4 or more Secondary Elements establishes a CNMS record as “Unverified”
S3_IMPAR	Secondary Element 3, Impervious Area. Increase in impervious area in the sub-basin of more than 50 percent (i.e., 10 percent to 15 percent, 20 percent to 30 percent, etc.)? (Yes/No/Unknown)
Type of data expected	This Yes/No field is to capture whether or not there is a significant increase in impervious surface in the sub-basin since the effective study.
Potential source to obtain	Taking advantage of remote sensing land use classification data, or change detection analyses are potential sources for this field.
Anticipated use for attribute	Any combination of 4 or more Secondary Elements establishes a CNMS record as “Unverified”
S4_HSTR	Secondary Element 4, Hydraulic Structure. More than 1 and less than 5 new or removed hydraulic structures (bridge/culvert) impacting BFEs? (Yes/No/Unknown)
Type of data expected	This Yes/No field is to capture whether or not there have been 1 to 5 new and/or removed hydraulic structures that impact BFEs since the effective study. This should not be used to supersede the Letter of Map Revision process.
Potential source to obtain	The originator of the CNMS record should have professional knowledge of this situation.
Anticipated use for attribute	Any combination of 4 or more Secondary Elements establishes a CNMS record as “Unverified”
S5_CHIMP	Secondary Element 5, Channel Improvements. Channel improvements / Shoreline changes? (Yes/No/Unknown)
Type of data expected	This Yes/No field is to capture whether or not there have been any channel improvement or shoreline changing projects since the effective study. This should not be used to supersede the Letter of Map Revision process.
Potential source to obtain	The originator of the CNMS record should have professional knowledge of this situation but one might check the local public works department for available supporting documentation.
Anticipated use for attribute	Any combination of 4 or more Secondary Elements establishes a CNMS record as “Unverified”
S6_TOPO	Secondary Element 6, Topography Data. Availability of better topography/bathymetry? (Yes/No/Unknown)
Type of data expected	This Yes/No field is to capture whether or not there are new topographic data meeting FEMA minimum standards available since the effective study.
Potential source to obtain	Look into all the resources available to determine if newer and/or more accurate topographic data are available for the reach and record a yes if you find updated topography (this will ultimately be based on whether or not new topographic data meet FEMA's minimum standards and are better than what was used for the effective study. The investigation of "Yes's" should be performed with an engineer or manager).
Anticipated use for attribute	Any combination of 4 or more Secondary Elements establishes a CNMS record as “Unverified”
S7_VEGLU	Secondary Element 7, Vegetation or Land Use. Changes to vegetation or land use? (Yes/No/Unknown)
Type of data expected	This Yes/No field is to capture whether or not there are significant changes in land use or vegetation since the effective study.

Potential source to obtain	Look at the NAIP (streaming) and other sources available to you to determine if the area has experienced changes to vegetation or land use.
Anticipated use for attribute	Any combination of 4 or more Secondary Elements establishes a CNMS record as “Unverified”
S8_DUNE	Secondary Element 8, Coastal Dune. Failure to identify primary frontal dune in coastal areas? (Yes/No/Unknown)
Type of data expected	This Yes/No field is to capture whether or not there was a failure to identify a primary frontal dune in coastal areas since the effective study.
Potential source to obtain	The originator of the CNMS record should have professional knowledge of this situation. One might reference an after action report following a recent disaster or the FIS text.
Anticipated use for attribute	Any combination of 4 or more Secondary Elements establishes a CNMS record as “Unverified”
S9_HWMS	Secondary Element 9, High Water Mark. Significant storms with High Water Marks. (Yes/No/Unknown)
Type of data expected	This Yes/No field is to capture whether or not there is recent storm surge high water mark data now available following the effective study.
Potential source to obtain	The originator of the CNMS record should have professional knowledge of this situation. One might reference an after action report following a recent high water event.
Anticipated use for attribute	Any combination of 4 or more Secondary Elements establishes a CNMS record as “Unverified”
S10_REGEQ	Secondary Element 10, Regression Equation. New regression equations available? (Yes/No/Unknown)
Type of data expected	The originator of the CNMS record should have professional knowledge of this situation. This information may come to light following the release of a new study that includes a new regression model.
Potential source to obtain	Research and general knowledge to be provided by engineering staff.
Anticipated use for attribute	Any combination of 4 or more Secondary Elements establishes a CNMS record as “Unverified”
CE_TOTAL	Total number of critical elements
Type of data expected	A number equivalent to the sum of the number of Critical Elements equaling "Yes" from above.
Potential source to obtain	User is to provide the sum of Critical Elements
Anticipated use for attribute	Determination of "Validated" vs. "Unverified"; "Unverified" is CE_Total > 0
SE_TOTAL	Total number of secondary elements
Type of data expected	A number equivalent to the sum of the number of Secondary Elements equaling "Yes" from above.
Potential source to obtain	User is to provide the sum of Secondary Elements
Anticipated use for attribute	Determination of "Validated" vs. "Unverified"; "Unverified" is SE_Total >= 4
STUDY_TYPE	Study type of the SFHA represented by the polygon based on the current effective, preliminary, or draft FIS text.
Type of data expected	Entry from domain lookup table D_STUDY_TYPE
Potential source to obtain	FIS Text, Scoping Shapefiles, Study Manager Input etc.
Anticipated use for attribute	Query into the characteristics of the inventory: type of study, validation status, mileage.
COMMENT	Additional comments

2.3.4 S_Requests Feature Classes (Point/Polygon)

The ‘S_Requests_Ar’ and ‘S_Request_Pt’ feature classes resides in the CNMS Studies Feature Dataset within the CNMS geodatabase. Two feature classes have been created in order to store these data as best applicable, either in the form of a point or polygon. Both feature classes contain the exact same table structure for data capture and storage. The ‘S_Requests’ feature classes are designed to store details

concerning update requests from a user and the corresponding data reporting fields for each. In order to populate the database with either of these record types, a user needs to determine if the Community request is better stored as a Point or Polygon feature. This will vary depending on the specific request type. Effort should also be made to ensure the database is fully populated, using the comment field to include any additional information that may prove valuable in the future when this request is further analyzed. Details of the ‘S_Requests’ feature class table attributes for points and polygons are presented below:

Table 4. S_Requests_Ar/Pt (Polygon/Point) (Feature Class ID: 03/04)

Field	Description
CNMS_ID	Primary key for table. Assigned by table creator
Type of data expected	As the Primary key for this table this field must exist as a unique identifier for each individual record.
Potential source to obtain	A programmatic approach that prefixes five record counting digits with the 5 digit County FIPS code and a 2 digit feature class ID would produce a number like 201190300001 (20119 is the county FIPS code, 03 is the feature class ID for ‘S_Requests_Ar’ and 00001 represent record counting digits) for the first record in ‘S_Requests_Ar’ for Meade County, Kansas . No repeat counting digits should be used within the same county.
Anticipated use for attribute	Unique identification of each individual CNMS record.
REACH_ID	Foreign key to join to the primary key REACH_ID of ‘S_Studies_Ln’ in the CNMS data model
Type of data expected	A 12 digit key from the corresponding stream centerline in the ‘S_Studies_Ln’ feature class that is nearest to the ‘S_Request’s’ feature when there is a 1-1 or many-1 mapping between the polygon in this feature class and features in ‘S_Studies_Ln.’ For polygons in ‘S_Requests_Ar,’ this field may be left blank when many stream centerlines from ‘S_Studies_Ln’ lie within a single polygon in this feature class, i.e. when the mapping is 1- many or many-many.
Potential source to obtain	REACH_ID field in the ‘S_Studies_Ln’ feature class
Anticipated use for attribute	Catalog and referencing; foreign key to primary key of ‘S_Studies_Ln’
WTR_NM	Name of flooding source
Type of data expected	Water feature name (ex. Mississippi River, Lake Superior, Pacific Ocean)
Potential source to obtain	The name of the flooding source should come from the FIS, FIRM and DFIRM DB, and should be given that order of importance. The FIS lists profiles in alphabetical order in the table of contents and usually discusses them in other FIS sections in that same order. Section 1.2 should list all of these streams and the dates they were studied. Section 2.1 should also list all the streams studied by detailed methods, and should also list all the streams studied by approximate methods. Note that the DFIRM should not be the sole source of information that is used to evaluate stream reaches. Often times there are graphic features or annotation on the PDF map panel that will help identify a stream reach.
Anticipated use for attribute	This attribute provides a geographic place name reference.
POC_ID	Foreign key to join to ‘Point_of_Contact’ table. ID for ‘Point of Contact’
Type of data expected	This field, if populated, should have a matching record in the ‘Point_of_Contact’ table.
Potential source to obtain	Establishing the relationship of ‘S_Requests_Ar’ records and ‘Point_of_Contact’ records is user controlled.
Anticipated use for attribute	This field is used to establish a database "join" with records in the ‘Point_of_Contact’ table. The supporting idea is to relate record ownership information to specific CNMS records.
RQST_CAT	Distinction between Cartographic and Flood Data requests
Type of data expected	The predefined acceptable values are to be selected from the ‘D_Rqst_CAT’ domain list.
Potential source to obtain	User selected based upon the circumstances of the request
Anticipated use for attribute	Catalog and reference
RQST_LVL	Level of analysis requested

Type of data expected	The predefined acceptable values are to be selected from the 'D_Rqst_Lvl' domain list.
Potential source to obtain	User selected based upon the circumstances of the request
Anticipated use for attribute	Catalog and reference
MTHOD_TYPE	Type of method used
Type of data expected	The predefined acceptable values are to be selected from the 'D_Mthod_Type' domain list.
Potential source to obtain	User selected based upon the circumstances of the request
Anticipated use for attribute	Study background information gathering
DATE_RQST	Date request is made
Type of data expected	This field is of the type "Date." Date should be entered in MM/DD/YYYY format.
Potential source to obtain	The user should enter the date for which the CNMS record was entered in the database.
Anticipated use for attribute	Resource and tracking are the anticipated uses of dates.
DATE_RESOL	Date request is resolved
Type of data expected	This field is of the type "Date." Date should be entered in MM/DD/YYYY format.
Potential source to obtain	This date field will be used to document when the effective study was produced because there can be much time between when the study was created and when it went effective. Age of maps does not adequately reflect the age of the analysis as a study can be published on multiple effective maps without change. At times, the date that the analysis <i>first</i> went effective is sufficient as well, especially when supporting data is sparse.
Anticipated use for attribute	Resource and tracking are the anticipated uses of dates.
CARTO_RQST	Type of cartographic change requested
Type of data expected	It is expected that a single CNMS Request record will be either cartographic or flood data related. If the 'RQST_CAT' is CARTOGRAPHIC in nature then this field would be populated with predefined acceptable values selected from the 'D_Carto_Rqst' domain list. Populating this field with cartographic information would imply that the 'FDATA_RQST' field remains unpopulated.
Potential source to obtain	This information is expected to come from the originator of the CNMS Request record.
Anticipated use for attribute	Catalog and reference
FDATA_RQST	Type of flood data change requested
Type of data expected	It is expected that a single CNMS Request record will be either flood data or cartographic related. If the 'RQST_CAT' is FLOOD DATA in nature then this field would be populated with predefined acceptable values selected from the 'D_FData_Rqst' domain list. Populating this field with flood data information would imply that the 'CARTO_RQST' field remains unpopulated.
Potential source to obtain	This information is expected to come from the originator of the CNMS Request record.
Anticipated use for attribute	Catalog and reference
RESOL_STATUS	Current resolution status for the requested action
Type of data expected	Entry from domain lookup table D_RESOL_STATUS
Potential source to obtain	This information is expected to come from the reviewer of the CNMS Request record.
Anticipated use for attribute	Catalog and reference
COMMENT	Additional comments

2.3.5 Specific_Needs_Info (Table)

The 'Specific_Needs_Info' table includes general information that will be associated, via the 'CNMS_ID' attribute, with every record that is entered into the CNMS database if applicable. The nature of the information stored in the 'Specific_Needs_Info' table is intended to capture CNMS record background information. Details of the 'Specific_Needs_Info' table attributes are presented below:

Table 5. Specific_Needs_Info

Field	Description
CNMS_ID	Primary key for table. Assigned by record creator or user. Imported from corresponding record in 'S_Studies_Ar,' 'S_Requests_Ar' and 'S_Requests_Pt'
Type of data expected	As the Primary key for this table this field must exist as a unique identifier for each individual record.
Potential source to obtain	Imported from corresponding record in 'S_Studies_Ar', 'S_Requests_Ar' and 'S_Requests_Pt'
Anticipated use for attribute	Unique identification of each individual CNMS record
COST_SHARE	Is there cost share? (Yes/No/Unknown)
Type of data expected	A Yes or No is expected to indicate whether or not a there is available cost share.
Potential source to obtain	FEMA and the Local sponsor should each have record of any cost share related to this CNMS record. Specific agreements are not required at this juncture.
Anticipated use for attribute	This information will document where FEMA can leverage its resources by incorporating local data into a study.
DISASTER	Associated disaster number, either federally or state declared.
Type of data expected	An example of an associated disaster number excerpt from a FEMA disaster announcement: <i>Major Disaster Declaration number 1823 declared on Feb 17, 2009.</i> If the disaster number is a State one only, it should be documented in the comments section. Federal disaster designations should be the primary information in this field.
Potential source to obtain	FEMA or State
Anticipated use for attribute	This is typically an historical reference to a disaster event.
MITIG_PLAN	Is there a mitigation plan identifying the need? (Yes/No/Unknown)
Type of data expected	A Yes or No is expected to indicate whether or not reference to this CNMS record is included in a formal mitigation plan. If Yes, please identify the specific mitigation plan document in the comment field. Additionally, document whether the plan is a State, local, or Tribal Mitigation plan and whether it is a standard or enhanced plan.
Potential source to obtain	Mitigation Plan documents
Anticipated use for attribute	It is anticipated that this attribute will be used as a reference in study background research.
RSK_ASSESS	Is there a risk assessment other than the 2010 Annualized Loss Estimate? (Yes/No/Unknown)
Type of data expected	A Yes or No is expected to indicate whether or not reference to this CNMS record is included in a formal risk assessment document. If Yes, then please complete entries for fields RSK_COMMENT, RSK_DATE, and RSK_MITIG.
Potential source to obtain	The local FEMA Region or local community might have information regarding risk assessments that may be associated with this record.
Anticipated use for attribute	It is anticipated that this attribute will be used as a reference in study background research.
RSK_CMMENT	Details on the type of Risk Assessment other than the 2010 Annualized Loss Estimate if answer to RSK_ASSESS was 'Yes'.
Type of data expected	Document name and description of the Risk Assessment performed
Potential source to obtain	The same source that helped determine the answer 'Yes' to RSK_ASSESS
Anticipated use for attribute	It is anticipated that this attribute will be used as a reference in study background research.
RSK_DATE	Date that the Risk Assessment identified in RSK_CMMENT if answer to RSK_ASSESS was 'Yes'.
Type of data expected	This field is of the type "Date." Date should be entered in MM/DD/YYYY format.
Potential source to obtain	The same source that helped determine the answer 'Yes' to RSK_ASSESS
Anticipated use for attribute	It is anticipated that this attribute will be used as a reference in study background research.

RSK_MITIG	Has the Risk Assessment identified in RSK_COMMENT been included as part of the current adopted hazard mitigation plan? (Yes/No/Unknown).
Type of data expected	This field is to be filled only Estimate if answer to RSK_ASSESS was 'Yes'.. Yes/No/Unknown based on reading the current adopted Hazard Mitigation Plan, and looking for the inclusion of the risk assessment identified through RSK_ASSESS and RSK_COMMENT in the Hazard Mitigation Plan.
Potential source to obtain	The same source that helped determine the answer 'Yes' to RSK_ASSESS
Anticipated use for attribute	It is anticipated that this attribute will be used as a reference in study background research.
HAZUS	Is there an enhanced HAZUS (Level 2 or 3) run on the stream (Yes/No/Unknown)
Type of data expected	A Yes or No is expected to indicate whether or not loss estimation has been generated for this study using the Flood Tool within HAZUS-MH. If Yes, please identify the location of any specific HAZUS related outputs in the comment field.
Potential source to obtain	The FEMA Region, State or community government, or HAZUS User's Group are three potential sources for obtaining this information.
Anticipated use for attribute	It is anticipated that this attribute will be used as a reference in study background research.
HAZUS_LVL	Level of HAZUS run (System default is 'Level 1' for Contiguous United States)
Type of data expected	There are three levels of HAZUS modeling runs: Level 1 is the basic level using HAZUS provided data (FEMA has already run the HAZUS Level 1 modeling for the nation); Level 2 is a run incorporating detailed and updated building stock data; and Level 3 is the most detailed and user controlled. The type of data expected are indications of whether Levels 2 and 3 have been run.
Potential source to obtain	The organization or individual responsible for initiating the HAZUS study are the most probable sources for obtaining information related to the level at which a HAZUS run was developed.
Anticipated use for attribute	It is anticipated that this attribute will be used as a reference in study background research.
COMMENT	Additional comments

2.3.6 Point_of_Contact (Table)

Table 6. Point_of_Contact (Table ID: 05)

Field	Description
POC_ID	Primary key for table. Assigned by record creator or user
Type of data expected	As the Primary key for this table this field must exist as a unique identifier for each individual record.
Potential source to obtain	A programmatic approach that prefixes 5 record counting digits with the 5 digit County FIPS code followed by the table ID 05 would produce a number like 201190500001 (20119 is the county FIPS code, 05 is a table ID to separate from 'CNMS_IDs' used on the 4 FCs, and 00001 represents record counting digits) for the first POC record in Meade County, Kansas.
Anticipated use for attribute	Unique identification of each individual CNMS POC record
POC_NAME	Given name of the point of contact knowledgeable of CNMS record
Type of data expected	Free text entry of point of contact's name
Potential source to obtain	Presumably a person connected to the identification of a CNMS record
Anticipated use for attribute	Information is used to identify the name of the POC for each CNMS data entry.
POC_TITLE	Any title associated with the point of contract
Type of data expected	Free text entry of the position held by the POC at his/her organization
Potential source to obtain	Normally, this information should be readily available to the person making the CNMS entry. Otherwise, it can be looked up on government websites (if POC works for public agency) or corporate websites (if POC works for private sector).
Anticipated use for attribute	This information can be used to identify the position of the POC within an organization. Should the POC move on to a new position, this information can be used to identify the appropriate new POC for a CNMS data entry.

POC_DESCRIPTION	Information regarding the role and responsibilities of the point of contact
Type of data expected	Free text entry of the job functions of a POC
Potential source to obtain	Normally, this information should be readily available to the person making the CNMS entry. Otherwise, it can be looked up on government websites (if POC works for public agency) or corporate websites (if POC works for private sector).
Anticipated use for attribute	This field provides additional information about the job functions of a POC as they relate to the CNMS project need/request.
ORG_NAME	The name of the owner, or managing government agency, of the subject item
Type of data expected	Free text entry of the name of the organization
Potential source to obtain	Normally, this information should be readily available to the person making the CNMS entry. Otherwise, it can be looked up on government websites (if POC works for public agency) or corporate websites (if POC works for private sector).
Anticipated use for attribute	Information can be used for correspondence with the POC.
ORG_TYPE	A code that represents a kind of organization
Type of data expected	The predefined acceptable values are to be selected from the 'D_Org_Type' domain list.
Potential source to obtain	Normally, this information should be readily available to the person making the CNMS entry. Otherwise, it can be looked up on government websites (if POC works for public agency) or corporate websites (if POC works for private sector).
Anticipated use for attribute	Information can be used to determine the source of the CNMS need/request (e.g. initiated by public agency vs. private sector, etc.).
BUSINESS_PHONE	The business telephone number of the contact person
Type of data expected	Free text entry of 10-digit phone number
Potential source to obtain	Information can be looked up on government websites (if POC works for public agency) or corporate websites (if POC works for private sector).
Anticipated use for attribute	Correspondence and communications with the POC regarding the CNMS entry
MOBILE_PHONE	The cellular phone number of the contact person
Type of data expected	Free text entry of 10-digit phone number
Potential source to obtain	Information can be looked up on government websites (if POC works for public agency) or corporate websites (if POC works for private sector).
Anticipated use for attribute	Correspondence and communications with the POC regarding the CNMS entry
FAX_PHONE	The fax number of the contact person
Type of data expected	Free text entry of 10-digit fax number
Potential source to obtain	Information can be looked up on government websites (if POC works for public agency) or corporate websites (if POC works for private sector).
Anticipated use for attribute	Correspondence and communications with the POC regarding the CNMS entry
ADDRESS_1	The first line of the point of contact's address
Type of data expected	Free text entry of POC's address
Potential source to obtain	Information can be looked up on government websites (if POC works for public agency) or corporate websites (if POC works for private sector).
Anticipated use for attribute	Correspondence and communications with the POC regarding the CNMS entry
ADDRESS_2	The second line of the point of contact's address
Type of data expected	Free text entry of POC's address, if applicable
Potential source to obtain	Information can be looked up on government websites (if POC works for public agency) or corporate websites (if POC works for private sector).
Anticipated use for attribute	Correspondence and communications with the POC regarding the CNMS entry
CITY_NAME	The city or town in which the contact person's address is located
Type of data expected	Free text entry of city name in which organization resides
Potential source to obtain	Information can be looked up on government websites (if POC works for public agency) or

	corporate websites (if POC works for private sector).
Anticipated use for attribute	Correspondence and communications with the POC regarding the CNMS entry
STATE	The name of the State in which the contact person's address is located
Type of data expected	Free text entry of state name in which organization resides
Potential source to obtain	Information can be looked up on government websites (if POC works for public agency) or corporate websites (if POC works for private sector).
Anticipated use for attribute	Correspondence and communications with the POC regarding the CNMS entry
ZIP_CODE	The Zip Code of the contact person's address
Type of data expected	Free text entry of 5- or 9-digit zip code for the organization
Potential source to obtain	Information can be looked up on government websites (if POC works for public agency) or corporate websites (if POC works for private sector).
Anticipated use for attribute	Correspondence and communications with the POC regarding the CNMS entry
COUNTY	The county name
Type of data expected	Free text entry of county name in which organization resides
Potential source to obtain	Information can be looked up on government websites (if POC works for public agency) or corporate websites (if POC works for private sector).
Anticipated use for attribute	Correspondence and communications with the POC regarding the CNMS entry
EMAIL_ADDRESS	Electronic mail address
Type of data expected	Free text entry of standard email address of POC
Potential source to obtain	Information can be looked up on government websites (if POC works for public agency) or corporate websites (if POC works for private sector).
Anticipated use for attribute	Correspondence and communications with the POC regarding the CNMS entry
COMMENT	Additional comments

Information gathered while using the Validation Checklist below to evaluate flooding sources and associated studies, would translate into a CNMS Study Record entry in the ‘S_Studies_Ar’ feature class. Other methods, not represented in the validation checklist, may be available and necessary to complete study validation and not all data and intelligence gathered for any validation exercise will find a place in the CNMS Studies Feature Dataset. To aid record keeping, a sample template of a ‘Validation Process Documentation Checksheet’ with an example CNMS Study Record will be provided electronically with this document. Appendix B lays out minimum requirements for Validation Process Documentation that must be consulted over and above the use of the Validation Checklist. The abovementioned template is only one way to document methodologies used to make validation decisions. Other methods may be used to track decisions made, but must contain the fields suggested in the template at the least.

Several pilot projects incorporated the guidance found in this document into useful workflows aided by tools. Besides the abovementioned sample template, these pilot studies should be consulted if no prior workflow outside of this guidance has been considered. It is strongly encouraged to take advantage of these processes or development of own processes to carry out the evaluations within this guidance.

VALIDATION CHECKLIST

Background Information
Name of Flooding Source:
Date of Effective Analysis: <ul style="list-style-type: none"> Determine from effective FIS the most recent date a flood hazard was updated.
Hydrologic Model Used: <ul style="list-style-type: none"> Determine from effective FIS or other source the date of the effective model.
Hydraulic Model Used and version (if applicable): <ul style="list-style-type: none"> Determine from effective FIS or other source the date of the effective model.
Are the models in digital format? If so, can you run the model? <ul style="list-style-type: none"> If the models are in digital format, and it is determined that they can be run, it is suggested that the location of the model be recorded with a description of the amount of effort it would take to prepare the model for a run.
Changes in Physical, Climate, and Engineering Methodologies since Date of Effective Analysis
CRITICAL ELEMENTS
(C1) Major change in gage record since effective analysis that includes major flood events <ul style="list-style-type: none"> Determine if USGS gage is on stream. If yes, record the gage Site No. and Site Name from the gages shapefile (add record in external table joined to CNMS database via CNMS_ID as necessary). Determine if there is a major flood event since the effective analysis. If yes, this Critical Element set to "YES" and you don't have to further evaluate gage records.
(C2) Updated and effective peak discharges differ significantly based on confidence limits criteria in FEMA's G&S <ul style="list-style-type: none"> If USGS gage on stream, compare years of record from effective FIS to years of record now available. If years of record is a >25% increase in years, record the gage Site No. and Site Name as above. Perform new Flood Frequency Analysis and compare resulting discharge to effective discharge to determine if statistically significant. If yes, this Critical Element set to "YES".
(C3) Model methodology no longer appropriate based on Guidelines and Specifications (i.e one-dimensional vs. two-dimensional modeling; Coastal Guidelines)
(C4) Addition/removal of a major flood control structure (i.e., certified levee or seawall, reservoir with more than 50 acre-ft storage per square mile).
(C5) Current channel reconfiguration outside effective SFHA <ul style="list-style-type: none"> Overlay DFIRM with latest USGS or NAIP aerial to determine.
(C6) New or removed hydraulic structures (bridge/culvert) that impact BFEs* <ul style="list-style-type: none"> More than 5 new or removed hydraulic structures
(C7) Significant channel fill or scour
SECONDARY ELEMENTS
(S1) Use of rural regression equations in urbanized areas
(S2) Repetitive losses outside the SFHA (if available/accessible because these data are typically not released to protect privacy rights) <ul style="list-style-type: none"> Overlay Repetitive Loss spatial dataset with SFHA. If there are any structures outside of the SFHA for that reach, then you have Repetitive Loss outside of SFHA.
(S3) Increase in impervious area in the sub-basin of more than 50 percent (i.e., 10 percent to 15 percent, 20 percent to 30 percent, etc.)
(S4) New or removed hydraulic structure (bridge/culvert) that impact BFEs* <ul style="list-style-type: none"> More than 1 and less than 5 new or removed hydraulic structures
(S5) Channel improvements / Shoreline changes
(S6) Availability of better topography/bathymetry
(S7) Changes to vegetation or land use
(S8) Failure to identify primary frontal dune in coastal areas
(S9) Significant storms with High Water Marks
(S10) New regression equations <ul style="list-style-type: none"> Check effective FIS to determine if regression equations were used. Check online (http://water.usgs.gov/osw/programs/nss/pubs.html) to verify if there is a report newer than the effective analysis and if changes were made to the regression equations.
<i>*FEMA intends to count only those structures that have an impact on BFEs when they are removed/added while still supporting the existing LOMR procedures. Therefore, we should only be counting those construction or replacement projects that have an impact on BFEs, which is not possible to determine from investigation of aerial photographs. As a result, we will rely on community input for the elements related to bridge/culvert additions/replacements/removals.</i>

Appendix B. Documentation

Validation Process

Validation Process Documentation is necessary to insure that the flooding source being evaluated has a record of the criteria evaluated, and the data used in the evaluation of that criteria. Summaries of the background information used to evaluate the criteria should be submitted as part of the CNMS Data roll-up sent to the FEMA regional offices. These summaries will be referred to if FEMA ever has questions about the validity of methods used to evaluate criteria. Either in the format of the Validation Checklist, or in the format suggested in the sample template provided electronically with this user guide, the user should maintain current and accurate records that explicitly describe how the criteria were evaluated along with a list of the source and location of the data used in that evaluation. Source data should be documented outlining originator, location (URL, local drives), digital availability, and whether it can be shared or distributed. Data that has been processed such that it cannot be recreated in a reasonable amount of time from source data, or was manipulated once obtained from source, should be stored by its creator.

The need of the user to maintain records is important as the deliverable is subject to scrutiny. The first query under any scrutiny would be on the Validation Checklist entries used for the flooding source. This would be a summary level document that could be retrieved from regional offices and answer most, if not all, questions in regards to the decisions that went into the evaluation of the flooding source and its criteria. In extreme circumstances a second query would be to provide either the unmodified source data evaluated, or the modified data in cases where the source data was manipulated.

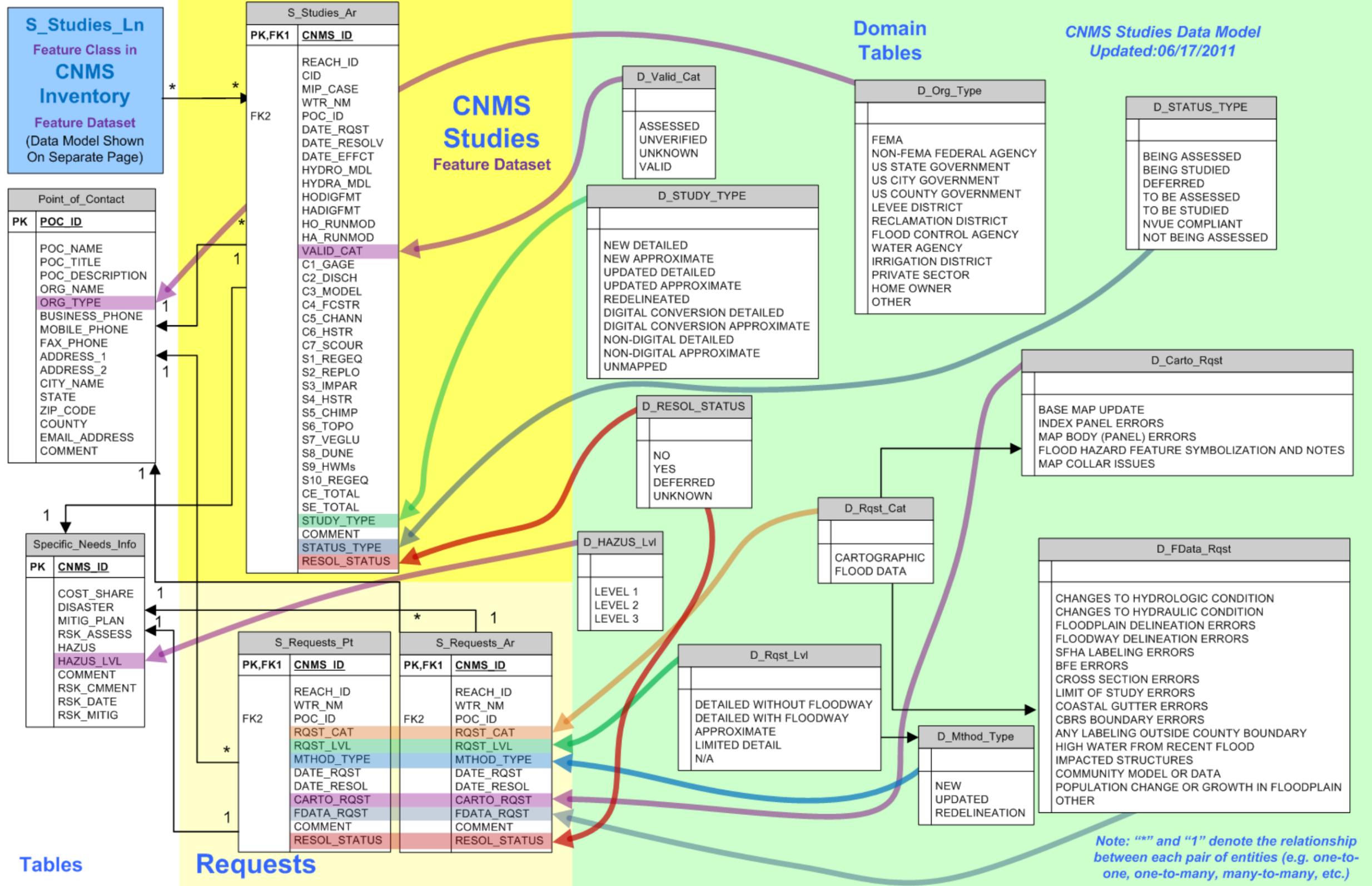
To aid in record keeping in a searchable format and linked to the CNMS Database, a sample template of a 'Validation Process Documentation Checksheet' with an example CNMS Study Record is provided electronically with this document. The template is only one way to document methodologies used to make validation decisions. Other methods, including making customized Validation Checklists for each study reach evaluated, may be used to track decisions made. However, these alternate methods must track the information suggested in the template at the least.

Electronic attachment to Appendix B:

CNMS_Sample_Validation_Process_Documentation_Checksheet_V1.0.xls

Appendix C.

CNMS Data Model



S_Studies_Ar
Feature Class in
CNMS Studies
Feature Dataset
(Data Model Shown
On Separate Page)

S_Studies_Ln	
PK	REACH_ID
	FIPS
	CID
	WATER_NAME
	WATER_NAME_ALIAS_1
	FLD_ZONE
	VALIDATION_STATUS
	MILES
	SOURCE
	VALIDATION_DATE
	FY_FUNDED
	REASON
	STUDY_TYPE
	SHAPE_Length
	PRELIM_QTR
	LINE_TYPE
	HUC8_KEY
	DUPLICATE
	STATUS_TYPE

**CNMS
Inventory
Feature Dataset**

**Domain
Tables**

D_Valid_Cat
UNKNOWN
ASSESSED
UNVERIFIED
VALID

D_SOURCE
NATIONAL FLOOD HAZARD LAYER
REGIONAL FLOOD HAZARD LAYER
COUNTY DFIRM DATABASE
NATIONAL HYDROGRAPHY DATASET LOW RESOLUTION
NATIONAL HYDROGRAPHY DATASET MEDIUM RESOLUTION
NATIONAL HYDROGRAPHY DATASET HIGH RESOLUTION
COUNTY DFIRM DATABASE ACQUIRED DURING STUDY PERIOD
DIGITIZED

D_FY_FUNDED
PRE-MAPMOD FUNDED
FISCAL YEAR 2003 FUNDED
FISCAL YEAR 2004 FUNDED
FISCAL YEAR 2005 FUNDED
FISCAL YEAR 2006 FUNDED
FISCAL YEAR 2007 FUNDED
FISCAL YEAR 2008 FUNDED
FISCAL YEAR 2009 FUNDED
FISCAL YEAR 2010 FUNDED
FISCAL YEAR 2011 FUNDED
FISCAL YEAR 2012 FUNDED
.
.
FISCAL YEAR 2030 FUNDED

D_STUDY_TYPE
NEW DETAILED
NEW APPROXIMATE
UPDATED DETAILED
UPDATED APPROXIMATE
REDELINEATED
DIGITAL CONVERSION DETAILED
DIGITAL CONVERSION APPROXIMATE
NON-DIGITAL DETAILED
NON-DIGITAL APPROXIMATE
UNMAPPED

D_LINE_TYPE
RIVERINE
LAKE OR POND
PLAYA
PONDING
COASTAL
OTHER

D_ZONE
A
AE
AH
AO
AR
1 PCT ANNUAL CHANCE FLOOD HAZARD CONTAINED IN CHANNEL
1 PCT CONDITIONS
A99
V
VE
0.2 PCT ANNUAL CHANCE FLOOD HAZARD
0.2 PCT ANNUAL CHANCE FLOOD HAZARD CONTAINED IN CHANNEL
AREA NOT INCLUDED
D
X PROTECTED BY LEVEE
X
OPEN WATER

D_PRELIM_QTR
V
Q1FY10
Q2FY10
Q3FY10
Q4FY10
Q1FY11
Q2FY11
Q3FY11
Q4FY11
Q1FY12
Q2FY12
Q3FY12
Q4FY12
.
.
Q1FY29
Q2FY29
Q3FY29
Q4FY29
Q1FY30
Q2FY30
Q3FY30
Q4FY30

D_STATUS_TYPE
BEING ASSESSED
BEING STUDIED
DEFERRED
TO BE ASSESSED
TO BE STUDIED
NVUE COMPLIANT
NOT BEING ASSESSED

Note: "*" and "1" denote the relationship between each pair of entities (e.g. one-to-one, one-to-many, many-to-many, etc.)

Appendix D. CNMS Data Dictionary

S_Studies_Ln Feature Class (polyline)

Field	Type	Length	Required	Domain Table	Description
REACH_ID	Text	12	Yes		Primary key for table, assigned by table creator
FIPS	Text	12	Yes		Federal Information Processing Standard code (FIPS code)
CID	Text	12			FEMA Community ID
WATER_NAME	Text	50			Name of flooding source
WATER_NAME_ALIAS_1	Text	50			Alternate name of flooding source
FLD_ZONE	Text	50	Yes	D_ZONE	SFHA type directly underneath the polyline (ex. Zone AE, Zone A)
VALIDATION_STATUS	Text	50	Yes	D_Valid_Cat	This attribute establishes the latest evaluation condition of a flooding source centerline in relation to the criteria set forth in the CNMS User's Guide, any procedure memorandums, or previous work.
MILES	number (double)	8	Yes		An attribute of the calculated miles of the data record entry
SOURCE	Text	100	Yes	D_SOURCE	Source of polyline segment represented in the inventory
VALIDATION_DATE	Date	8	Yes if VALIDATION_STATUS = "VALID" or "UNVERIFIED"		Date; Valid studies receive initial date of completion; Requires assessment and unknown will receive a date once the status is changed to either valid or Unverified; Unverified will have the date the CNMS evaluation triggered the Unverified status.
FY_FUNDED	Text	25	Yes if retrievable from MIP Case Number or RSC Management	D_FY_FUNDED	Attribute of the most recent FEMA fiscal year funding applied to the stream reach (ex. watershed, county)
REASON	Text	255			Attribute allows for user input of detailed description of considerations or special circumstances when determining attributes VALIDATION_STATUS, SOURCE, or any pertinent information in the data creation process.
STUDY_TYPE	Text	40		D_STUDY_TYPE	Study type of the SFHA represented by the polygon based on the current effective, preliminary, or draft FIS text.

PRELIM_QTR	Text	25	Yes if VALIDATION_STATU S = "IN PROGRESS"	D_PRELIM_QTR	For records with Validation Status of "In Progress" The Fiscal Quarter for which Preliminary issuance of study is anticipated.
LINE_TYPE	Text	40	Yes	D_LINE_TYPE	Attribute provides description of flooding source line type as being Riverine, Lake, Pond, Playa, Ponding, Coastal, or Other.
HUC8_KEY	number (double)	8	Yes		8-digit Hydrologic Unit Code (HUC) representing the smallest watershed known as hydrologic cataloging units. This can be obtained by overlaying the HUC spatial files with the polyline information to determine which cataloging unit the polyline resides in.
DUPLICATE	Short		Yes if stream reach has 2 lines representing 2 different studies for the same reach extent.	D_Element	If there is a second line representing an SFHA across a county boundary, for a second study on the same extent of the reach? (Yes/No/Unknown) Only one of the 2 lines for that reach is set to 'Yes'.
STATUS_TYPE	Text	100	Yes	D_STATUS_TYPE	This attribute establishes the sub-categories for each of the validation status classes of a flooding source centerline in relation to the criteria set forth in the CNMS User's Guide, any procedure memorandums, or previous work.

S_Studies_Ar Feature Class (polygon)

Field	Type	Length	Required	Domain Table	Description
CNMS_ID	Text	12	Yes		Primary key for table, assigned by table creator
REACH_ID	Text	12			Foreign key for table. Primary Key for S_Studies_Ln.
CID	Text	12	Yes		FEMA Community ID
MIP_CASE	Text	15	Yes if there is a MIP Case Number		MIP Case Number
WTR_NM	Text	100	Yes		Name of flooding source
POC_ID	Text	20	Yes		Foreign key to join to Point_of_Contact table. ID for Point of Contact.
DATE_RQST	Date		Yes		Date request is made
DATE_RESOL	Date		Yes		Date request is resolved
DATE_EFFCT	Date		Yes		Date of effective analysis
HYDRO_MDL	Text	100	Yes (if applicable)		Hydrologic model used
HYDRA_MDL	Text	100	Yes (if applicable)		Hydraulic model used

HODIGFMT	Short		Yes if HODIGFMT = "Yes"	D_Element	Is the Hydrologic model in digital format? (Yes/No/Unknown)
HADIGFMT	Short		Yes if HADIGFMT = "Yes"	D_Element	Is the Hydraulic model in digital format? (Yes/No/Unknown)
HO_RUNMOD	Short		Yes if HO_RUNMOD = "Yes"	D_Element	Can the Hydrologic digital model be run? (Yes/No/Unknown)
HA_RUNMOD	Short		Yes if HA_RUNMOD = "Yes"	D_Element	Can the Hydraulic digital model be run? (Yes/No/Unknown)
VALID_CAT	Text	20	Yes	D_Valid_Cat	This attribute establishes the latest evaluation condition of a flooding source centerline in relation to the criteria set forth in the CNMS User's Guide, any procedure memorandums, or previous work.
C1_GAGE	Short		Yes	D_Element	Critical Element 1, Change in gage record. Major change in gage record since effective analysis that includes major flood events? (Yes/No/Unknown)
C2_DISCH	Short		Yes	D_Element	Critical Element 2, Change in Discharge. Updated and effective peak discharges differ significantly based on confidence limits criteria in FEMA's G&S? (Yes/No/Unknown)

C3_MODEL	Short		Yes	D_Element	Critical Element 3, Model methodology. Model methodology no longer appropriate based on Guidelines and Specifications (i.e. one-dimensional vs. two-dimensional modeling; Coastal Guidelines)? (Yes/No/Unknown)
C4_FCSTR	Short		Yes	D_Element	Critical Element 4, Hydraulic Change. Addition/removal of a major flood control structure (i.e., certified levee or seawall, reservoir with more than 50 acre-ft storage per square mile)? (Yes/No/Unknown)
C5_CHANN	Short		Yes	D_Element	Critical Element 5, Channel Reconfiguration. Current channel reconfiguration outside effective SFHA? (Yes/No/Unknown)
C6_HSTR	Short		Yes	D_Element	Critical Element 6, Hydraulic Change 2. More than 5 new or removed hydraulic structures (bridge/culvert) that impact BFEs? (Yes/No/Unknown)
C7_SCOUR	Short		Yes	D_Element	Critical Element 7, Channel Area Change. Significant channel fill or scour? (Yes/No/Unknown)
S1_REGEQ	Short		Yes	D_Element	Secondary Element 1, Regression Equation. Use of rural regression equations in urbanized areas? (Yes/No/Unknown)
S2_REPLO	Short		Yes	D_Element	Secondary Element 2, Repetitive Loss. Repetitive losses outside the SFHA? (Yes/No/Unknown)
S3_IMPAR	Short		Yes	D_Element	Secondary Element 3, Impervious Area. Increase in impervious area in the sub-basin of more than 50 percent (i.e., 10 percent to 15 percent, 20 percent to 30 percent, etc.)? (Yes/No/Unknown)
S4_HSTR	Short		Yes	D_Element	Secondary Element 4, Hydraulic Structure. More than 1 and less than 5 new or removed hydraulic structures (bridge/culvert) impacting BFEs? (Yes/No/Unknown)
S5_CHIMP	Short		Yes	D_Element	Secondary Element 5, Channel Improvements. Channel improvements / Shoreline changes? (Yes/No/Unknown)
S6_TOPO	Short		Yes	D_Element	Secondary Element 6, Topography Data. Availability of better topography/bathymetry? (Yes/No/Unknown)

S7_VEGLU	Short		Yes	D_Element	Secondary Element 7, Vegetation or Land Use. Changes to vegetation or land use? (Yes/No/Unknown)
S8_DUNE	Short		Yes	D_Element	Secondary Element 8, Coastal Dune. Failure to identify primary frontal dune in coastal areas? (Yes/No/Unknown)
S9_HWMS	Short		Yes	D_Element	Secondary Element 9, High Water Mark. Significant storms with High Water Marks. (Yes/No/Unknown)
S10_REGEQ	Short		Yes	D_Element	Secondary Element 10, Regression Equation. New Regression Equations Available? (Yes/No/Unknown)
CE_TOTAL	Short		Yes		Total number of critical elements
SE_TOTAL	Short		Yes		Total number of secondary elements
COMMENT	Text	255	No		Additional comments
STUDY_TYPE	Text	40		D_STUDY_TYPE	Study type of the SFHA represented by the polygon based on the current effective, preliminary, or draft FIS text.
STATUS_TYPE	Text	100	Yes	D_STATUS_TYPE	This attribute establishes the sub-categories for each of the validation status classes of a flooding source centerline in relation to the criteria set forth in the CNMS User's Guide, any procedure memorandums, or previous work.
RESOL_STATUS	Text	50	No	D_RESOL_STATUS	Current resolution status for the requested action

S_Requests Feature Classes (point or polygon)

Field	Type	Length	Required	Domain Table	Description
CNMS_ID	Text	12	Yes		Primary key for table, assigned by table creator
REACH_ID	Text	12			Foreign key for table. Primary Key for S_Studies_Ln.
WTR_NM	Text	100	Yes		Name of flooding source
POC_ID	Text	20	Yes		Foreign key to join to Point_of_Contact table. ID for Point of Contact.
RQST_CAT		30	Yes	D_Rqst_Cat	Distinction between Cartographic and Flood Data requests
RQST_LVL	Text	30	Yes	D_Rqst_Lvl	Level of analysis requested
MTHOD_TYPE	Text	20	Yes	D_Mthod_Type	Type of method requested to make FIRM improvement
DATE_RQST	Date		Yes		Date request is made
DATE_RESOL	Date		Yes		Date request is resolved

CARTO_RQST	Text	50	Yes if RQST_CAT is CARTOGRAPHIC	D_Carto_Rqst	Type of cartographic change requested
FDATA_RQST	Text	50	Yes if RQST_CAT is FLOOD DATA	D_FData_Rqst	Type of flood data change requested
COMMENT	Text	255	No		Description of request
RESOL_STATUS	Text	50	No	D_RESOL_STATUS	Current resolution status for the requested action

Specific_Needs_Info Business Table

Field	Type	Length	Required	Domain Table	Description
CNMS_ID	Text	12	Yes		Primary key for table, assigned by table creator
COST_SHARE	Short		No	D_Element	Is there cost share? (Yes/No/Unknown)
DISASTER	Text	50	No		Associated disaster number
MITIG_PLAN	Short		No	D_Element	Is there a mitigation plan identifying need? (Yes/No/Unknown)
RSK_ASSESS	Short		No	D_Element	Is there a risk assessment other than the 2010 Annualized Loss Estimate? (Yes/No/Unknown)
RSK_COMMENT	Text	255	Yes if RSK_ASSESS is 'Yes'		Details on the type of Risk Assessment other than the 2010 Annualized Loss Estimate if answer to RSK_ASSESS was 'Yes'.
RSK_DATE	Date		Yes if RSK_ASSESS is 'Yes'		Date that the Risk Assessment identified in RSK_COMMENT if answer to RSK_ASSESS was 'Yes'.
RSK_MITIG	Short		Yes if RSK_ASSESS is 'Yes'	D_Element	Has the Risk Assessment identified in RSK_COMMENT been included as part of the current adopted hazard mitigation plan? (Yes/No/Unknown). This field is to be filled only Estimate if answer to RSK_ASSESS was 'Yes'.
HAZUS	Short		No	D_Element	Is there a HAZUS run on the stream (Yes/No/Unknown)
HAZUS_LVL	Text	20	No	D_HAZUS_Lvl	Level of HAZUS run
COMMENT	Text	255	No		Additional comment

Point_of_Contact Business Table

Field	Type	Length	Required	Domain Table	Description
POC_ID	Text	20	Yes		Primary key for table. A unique, user defined identifier for each record or instance of an entity.

POC_NAME	Text	50	Yes		The name of the point of contact
POC_TITLE	Text	20	Yes		Any title associated with the point of contract
POC_DESCRIPTION	Text	60	Yes		Information regarding the role and responsibilities of the point of contact
ORG_NAME	Text	50	Yes		The name of the owner, or managing government agency, of the subject item
ORG_TYPE	Text	50	Yes	D_Org_Type	A code that represents a kind of organization
BUSINESS_PHONE	Text	20	Yes		The business telephone number of the contact person
MOBILE_PHONE	Text	20	No		The cellular phone number of the contact person
FAX_PHONE	Text	20	No		The fax number of the contact person
ADDRESS_1	Text	75	Yes		The first line of the point of contact's address
ADDRESS_2	Text	75	No		The second line of the point of contact's address
CITY_NAME	Text	75	Yes		The city or town in which the contact person's address is located
STATE	Text	50	Yes	D_State	The name of the State in which the contact person's address is located
ZIP_CODE	Text	10	Yes		The Zip Code of the contact person's address
COUNTY	Text	100	Yes		The county name
EMAIL_ADDRESS	Text	50	Yes		Electronic mail address
COMMENT	Text	255	No		A description or other unique information concerning the subject item

Domain Tables

The following tables list the acceptable domain values for the CNMS database. Tables containing coded values will display two columns, with the coded value on the left and the corresponding description on the right. Tables where coded values are equal to their corresponding description will display only a single column with the appropriate code/description text.

D_CARTO_RQST C
AOS MAP UPDATE B
FLOOD HAZARD FEATURE SYMBOLIZATION AND NOTES B
INDEX PANEL ERRORS B
MAP BODY (PANEL) ERRORS B
MAP COLLAR ISSUES B

oded Value C	D_ELEMENT C
0 B	NO B
1 B	YES B
2 B	UNKNOWN B

D_FDATA_RQST C
ANY LABELING OUTSIDE COUNTY BOUNDARY B
FE ERRORS B
CBRS BOUNDARY ERRORS B
CHANGES TO HYDRAULIC CONDITION B
CHANGES TO HYDROLOGIC CONDITION B
COASTAL GUTTER ERRORS B
COMMUNITY MODEL OR DATA B
CROSS SECTION ERRORS B
FLOODPLAIN DELINEATION ERRORS B
FLOODWAY DELINEATION ERRORS B
HIGH WATER FROM RECENT FLOOD B
IMPACTED STRUCTURES B
LIMIT OF STUDY ERRORS B
OTHER B
POPULATION CHANGE OR GROWTH IN FLOODPLAIN B
SFHA LABELING ERRORS B

oded Value C	D_FY_FUNDED C
PRE B	PRE-MAPMOD FUNDED B
FY03 B	FISCAL YEAR 2003 FUNDED B
FY04 B	FISCAL YEAR 2004 FUNDED B
FY05 B	FISCAL YEAR 2005 FUNDED B
FY06 B	FISCAL YEAR 2006 FUNDED B
FY07 B	FISCAL YEAR 2007 FUNDED B
FY08 B	FISCAL YEAR 2008 FUNDED B
FY09 B	FISCAL YEAR 2009 FUNDED B
FY10 B	FISCAL YEAR 2010 FUNDED B
FY11 B	FISCAL YEAR 2011 FUNDED B
FY12 B	FISCAL YEAR 2012 FUNDED B
FY13 B	FISCAL YEAR 2013 FUNDED B
FY14 B	FISCAL YEAR 2014 FUNDED B
FY15 B	FISCAL YEAR 2015 FUNDED B
FY16 B	FISCAL YEAR 2016 FUNDED B
FY17 B	FISCAL YEAR 2017 FUNDED B
FY18 B	FISCAL YEAR 2018 FUNDED B

oded Value C	D_FY_FUNDED C
FY19 B	FISCAL YEAR 2019 FUNDED B
FY20 B	FISCAL YEAR 2020 FUNDED B
FY21 B	FISCAL YEAR 2021 FUNDED B
FY22 B	FISCAL YEAR 2022 FUNDED B
FY23 B	FISCAL YEAR 2023 FUNDED B
FY24 B	FISCAL YEAR 2024 FUNDED B
FY25 B	FISCAL YEAR 2025 FUNDED B
FY26 B	FISCAL YEAR 2026 FUNDED B
FY27 B	FISCAL YEAR 2027 FUNDED B
FY28 B	FISCAL YEAR 2028 FUNDED B
FY29 B	FISCAL YEAR 2029 FUNDED B
FY30 B	FISCAL YEAR 2030 FUNDED B

D_HAZUS_LVL C
LEVEL 1 B
LEVEL 2 B
LEVEL 3 B

D_HYDRA C
ADVANCED ICPR 2.20 (OCTOBER 2000) B
DHM 21 (AUGUST 1987) B
FEQ 8.92 (1997) B
FEQUTL 4.68 (1997) B
FESWMS 2DH 1.1 (JUNE 1995) B
FLDWAV (NOVEMBER 1998) B
FLDWY (MAY 1989) B
FLO-2D V.2000.11 (DECEMBER 2000) B
GAGE ANALYSIS B
HCSWMM 4.31B (AUGUST 2000) B
HEC-2 B
HEC-2 (1983) B
HEC-2 4.6.2 (MAY 1991) B
HEC-RAS B
HEC-RAS 2.2 (SEPTEMBER 1998) B
HEC-RAS 3.0.1 B
HEC-RAS 3.1.3 B
HEC-RAS 4.0 B
HY8 4.1 B
HY8 6.0 B
LRD-1 B

_HYDRA D
MIKE 11 HD (JUNE 1999) B
OTHER B
PSUPRO B
QUICK-2 1.0 B
QUICK-2 2.0 B
SFD B
SHEET 2D 9 (JULY 2000) B
SWMM 4.30 (MAY 1994) B
SWMM 4.31 (JANUARY 1997) B
TABS-RMA2 V.4.3 (OCTO ER 1996) B
TABS-RMA4 V.4.5 (JULY 2000) B
UNET 4.0 (APRIL 2001) B
Unknown B
WSP-2 B
WSPGW 12.96 (OCTO ER 2000) B
WSPRO (JUNE 1988) B

_HYDRO D
AHYMO 97 (AUGUST 1997) B
CUHPF/PC (MAY 1996) B
DBRM 3.0 (1993) B
DR3M (OCTO ER 1993) B
FAN B
HEC-FFA 3.1 B
HEC-1 4.0.1 B
HEC-1 4.1 B
HEC-HMS 1.1 B
HEC-HMS 2.0 B
HEC-HMS 2.0.3 B
HEC-HMS 2.1.1 B
HEC-HMS 2.1.2 B
HEC-HMS 2.1.3 B
HEC-IFH 1.03 B
HEC-IFH 1.04 B
HEC-IFH 2.0 B
HEC-IFH 2.01 B
HSPF 10.10 B
HSPF 10.11 B
HSPF 11.0 B

D_HYDRO E
HYMO B
MIKE 11 RR (JUNE 1999) B
MIKE 11 UHM (JUNE 1999) B
OTHER B
PEAKFQ 2.4 (APRIL 1998) B
PEAKFQ 2.5 B
PEAKFQ 3.0 B
PEAKFQ 4.0 B
RATIONAL METHOD B
REGRESSION EQUATIONS B
SNYDER METHOD B
SWMM (RUNOFF) 4.30 (MAY 1994) B
SWMM (RUNOFF) 4.31 (JANUARY 1997) B
TR-20 (FEBRUARY 1992) B
TR-55 (JUNE 1986) B
PEAKFQ-REGRESSION EQUATIONS B
PEAKFQ B
HEC-1 B
HEC-FFA-REGRESSION EQUATIONS B
TWO STATION STATISTICAL METHOD B
UNKNOWN B
HEC-HMS B

D_LINE_TYPE E
COASTAL B
LAKE OR POND B
OTHER B
PLAYA B
PONDING B
RIVERINE B

D_MTHOD_TYPE E
NEW B
REDELINEATION B
UPDATED B

D_ORG_TYPE E
FEMA B
FLOOD CONTROL AGENCY B
HOME OWNER B

D_ORG_TYPE
IRRIGATION DISTRICT C
LEVEE DISTRICT C
NON-FEMA FEDERAL AGENCY C
OTHER C
PRIVATE SECTOR C
RECLAMATION DISTRICT C
US CITY GOVERNMENT C
US COUNTY GOVERNMENT C
US STATE GOVERNMENT C
WATER AGENCY

D_PRELIM_QTR
Q1FY10 C
Q2FY10 C
Q3FY10 C
Q4FY10 C
Q1FY11 C
Q2FY11 C
Q3FY11 C
Q4FY11 C
(all FY Quarters in between are implied) C
Q1FY29 C
Q2FY29 C
Q3FY29 C
Q4FY29 C
Q1FY30 C
Q2FY30 C
Q3FY30 C
Q4FY30

D_RESOL_STAT
NO C
YES C
DEFERRED C
UNKNOWN C

D_RQST_CAT
ARTOGRAPHIC C
FLOOD DATA C

D_RQST_LVL
APPROXIMATE
DETAILED WITH FLOODWAY
DETAILED WITHOUT FLOODWAY
LIMITED DETAIL
N/A

oded Value	D_SOURCE
DFIRM	COUNTY DFIRM DATABASE
DFIRM_PRELIM	COUNTY DFIRM DATABASE ACQUIRED DURING STUDY PERIOD
DIGITIZED	DIGITIZED
NFHL	NATIONAL FLOOD HAZARD LAYER
NHD-HIGH	NATIONAL HYDROGRAPHY DATASET HIGH RESOLUTION
NHD-LOW	NATIONAL HYDROGRAPHY DATASET LOW RESOLUTION
NHD-MED	NATIONAL HYDROGRAPHY DATASET MEDIUM RESOLUTION
RFHL	REGIONAL FLOOD HAZARD LAYER

D_STATE
ALABAMA
ALASKA
ARIZONA
ARKANSAS
CALIFORNIA
COLORADO
CONNECTICUT
DELAWARE
DISTRICT OF COLUMBIA
FLORIDA
GEORGIA
HAWAII
IDAHO
ILLINOIS
INDIANA
IOWA
KANSAS
KENTUCKY
LOUISIANA
MAINE
MARYLAND
MASSACHUSETTS
MICHIGAN

_STATE D
MINNESOTA B
MISSISSIPPI B
MISSOURI B
MONTANA B
NEBRASKA B
NEVADA B
NEW HAMPSHIRE B
NEW JERSEY B
NEW MEXICO B
NEW YORK B
NORTH CAROLINA B
NORTH DAKOTA B
OHIO B
OKLAHOMA B
OREGON B
PENNSYLVANIA B
RHODE ISLAND B
SOUTH CAROLINA B
SOUTH DAKOTA B
TENNESSEE B
TEXAS B
UTAH B
VERMONT B
VIRGINIA B
WASHINGTON B
WEST VIRGINIA B
WISCONSIN B
WYOMING B

_STATUS_TYPE D
EING ASSESSED B
EING STUDIED B
DEFERRED B
TO BE ASSESSED B
TO BE STUDIED B
NVUE COMPLIANT B
NOT BEING ASSESSED B

D_STUDY_TYPE C
DIGITAL CONVERSION APPROXIMATE B
DIGITAL CONVERSION DETAILED B
NEW APPROXIMATE B
NEW DETAILED B
NON-DIGITAL APPROXIMATE B
NON-DIGITAL DETAILED B
REDELINEATED B
UNMAPPED B
UPDATED APPROXIMATE B
UPDATED DETAILED B

D_VALID_CAT C
ASSESSED B
UNVERIFIED B
UNKNOWN B
VALID B

D_ZONE C
0.2 PCT ANNUAL CHANCE FLOOD HAZARD B
0.2 PCT ANNUAL CHANCE FLOOD HAZARD CONTAINED IN CHANNEL B
1 PCT ANNUAL CHANCE FLOOD HAZARD CONTAINED IN CHANNEL B
1 PCT FUTURE CONDITIONS B
A B
A99 B
AE B
AH B
AO B
AR B
AREA NOT INCLUDED B
D B
OPEN WATER B
V B
VE B
X B
X PROTECTED BY LEVEE B

Appendix E. CNMS Lifecycle Flow Diagram

CNMS Lifecycle Flow Diagram

Last Edited: 06/14/2011

